DIGEST

OF

TRANSACTIONS

OF

FIRST WORLD POWER CONFERENCE

HELD AT

LONDON, ENGLAND

JUNE 30 TO JULY 12, 1924

BY

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INTRODUCTION

The data of the Conference, published,* in four volumes aggregating 6,423 pages, because of huge mass, are not easily accessible. The following verbatim quotations are merely the salient features. The source of each quotation is given by the Roman numeral for the volume and the page number after each quotation. The quotations given, of course, represent the ideas of the Conference and not my own views.

The power possibilities of winds, tides, sun, alcohol and oil, because of obvious engineering limitations, were given little consideration; the Conference activities were directed primarily to the two principal sources of energy—water power and coal.

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July 8, 1925
Hartman Building,
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PART I

PUBLIC'S VITAL INTEREST
IN
WORLD POWER PROBLEMS

§1.—Origin of First World Power Conference

"A number of distinguished scientists, engineers and leaders of industry in Great Britain had sponsored the World Power Conference. The Departments of State soon made it possible, in the name of the British Empire, to invite the nations of the world to meet in London to survey the power resources of each participating country and the extent to which they had been utilized; to consider the technical problems involved and what steps, if any, could be taken to provide adequate opportunities for the cooperation of all nations in the development of power resources and the economic, political and educational issues involved."—I—ix

§2.—Participants in First World Power Conference

"On June 30, 1924, the first World Power Conference was opened by His Royal Highness, The Prince of Wales, under the Chairmanship of The Earl of Derby in the presence of about 2,000 delegates representing the following forty-two countries:

Australia, Austria, Belgium, British Guiana, Canada, Ceylon, Chile, China, Colombia, Czechoslovakia, Denmark, Dutch East Indies, Finland, France, Germany, Gold Coast, Greece, Great Britain, Holland, Hungary, India, Irish Free State, Italy, Japan, Kenya Colony, Latvia, Luxemburg, Mexico, New Zealand, Norway, Nyasaland, Peru, Poland, Roumania, Russia, Southern Rhodesia, Spain, Sweden, Switzerland, South Africa, United States of America and Yugo-Slavia."—I—ix and 1433

§3.—Object of First World Power Conference

"The object of the conference was for the common purpose of pooling technical information—facts, theories and visions. Above all, in terms of conservation, the power program meant saving of man power. Electricity was the wonder worker of the day and generation and by its magic, much of the load has been lifted from the back of man."— I—1417

§4.—What the Conference Accomplished

"We have brought together here the leading technical experts from all over the world, and we have brought together in the papers presented to this Conference the greatest contribution, in my judgment, on the subject of Power that has ever been brought together. Above all, however, I count the greatest value of the Conference the fact that individuals from so many nations have met together and, irrespective of the position that was taken by any group in the years just behind us, we have been able to meet round a common council table in friendly cooperation."—IV—1807

"The delegates and members from the participating countries had thought of nothing but the benefit and welfare of mankind at large. They had each declared without any reserve and without the least selfish motive, the extent of the natural resources of their own countries, and the measure in which they were being utilized, and the manner in which it might be possible to develop them to better advantage in the future."— IV—1816

§5.—Social Significance of Power

"At the beginning of the last century the world consumption of power was almost negligible. Today it exceeds 120,000,000 horsepower and is daily increasing.

Apart from the growth in the demand for power there is another aspect of the power problem that ought to receive attention, and that is the beneficial effects on wages of an increased employment of power in industry. **** Where power is used to the maximum extent, wages are high, and what is equally important, the return on capital is high also."—I—349 AND 350

"The social structure itself is in a sense bound up with the effective use of power for industrial purposes, and there are many reasons to support the view that the weakness of the social structure in an industrial state is due to inefficient or inadequate utilization of power."—I—1428

§6.—Power's Effect on Civilization

"The factor that has been primarily responsible for the tremendous changes of the last century, and without which modern civilization could not exist, is mechanical power. The form in which in increasing degree such power is being applied to electric energy— the greatest tool that has ever come into the hands of man. The degree to which we utilize this tool as a substitute for manual labor will largely determine the rate of our industrial and social progress. To reduce human labor, to increase its productivity, is the most profound basis of social advancement. To bring about this substitution, and in the process to economize in the use of sources of power, to organize production, and to provide the necessary safeguards for the producer and the consumer, is one of the major problems of the present day."—IV—1580

§7.—Power's Effect on Environment

"The capacity of a people to do things, the progressive supremacy of the race over its environment depends upon the amount of power at its command and its orderly, intelligent, efficient and effective use of that power.

All the laborers in the world, working like slaves from sunrise to sunset, could not perform the work that is done by power operated machinery in the United States alone.

In 1869, there was available to each wage earner in the mills and factories of the United States 0.6 of a horsepower. By 1919, this had grown to 3.25 horsepower. In 50 years the power available per workman had increased over five-fold."— IV—1406 AND 7

§8.—**Power's Effect on Productivity**

"This progress of the nineteenth century is coincident with the development of power, beginning with the invention of the steam engine and advancing in step with improvements and the introduction of new means for increasing the amount of power under the control of man, thereby permitting him to increase his production without a corresponding increase of his own labor.

After centuries of groping for the touchstone of easy living it is now demonstrated that true progress is only found in the increase of productivity by a given amount of human effort, thereby gaining more material things and more leisure to devote to intellectual and moral advancement. There is no other way. All other proposals are either visionary or vicious, and are at best supplementary to the fundamental principle that we can enjoy more only by producing more."— IV—1446 AND 7

§9.—**How Power Has Accelerated Human Progress***

"There are certain statistical indicators in the field of economics, which can reasonably be deemed to show by their trend the whole course of the advance of civilization.

The rising curve of iron and steel consumption, for instance, runs parallel to the clearly rising curve of living standards and aggregate possessions, but if the living standards of a people and the individual opportunity, by which is indicated the widening circle of human possession and use, rest in their ultimate analysis, as I believe they do, on the creation of national wealth through the conversion of Nature into manifold forms of human use, then there can be no rival to the claim that power consumption is the most direct reflection of human progress. When one recalls that after forty centuries of accumulated effort, the total wealth of the world was estimated in 1781, when steam generation was first developed, at one hundred billion dollars, and increased in the one hundred and forty years succeeding to a total aggregate of one thousand billions, then we begin to visualize the quickened process of wealth creation which rested clearly on the enlargement of man's productive effort by the service of generated power. The forty centuries which preceded steam generation were centuries of slow accumulation of reserves beyond current living consumption."— IV—1398

§10.—**How Power Makes Wealth**

"If it is agreed that national wealth is after all the aggregate of individual possessions, that therefore wealth rests on the conversion of the raw treasures of nature into usable forms, that field and

*The substitution of power from energy resources for muscular effort—both human and animal—has resulted in changing our environment more in the last 50 years than all of the changes in all preceding historic time.

forest and mine and oil bestowed by Nature are nevertheless useless and valueless until converted to such shapes of daily use, then we may claim for every agency which quickens this conversion, the title of a social benefit."— IV—1400

"It is indicative of the extent to which power production has been applied to wealth creation from Nature, that six per cent of the world's population in America produces and consumes these per cents. of basic materials:

	Produces	Consumes
Coal	43%	37%
Iron	54	53
Steel	64	57
Copper	49	44
Petroleum	64	72
Cotton	60	27
Timber	52	51

How rapidly this ascending scale of wealth creation rises in this industrial country remarkably receptive to the industrial methods that base on power, is shown by the rising curve of annual national earnings thus:

1890	$12	billion
1900	18	"
1910	32	"
1920	60	" "—IV—1401 AND 2

§11.—Power's Effect on the World

"In power, there is an immense wealth of energy which, economically used, would change the whole economic aspect of the world. A most potent factor in the future of industrial civilization is that of power utilization. It is customary to think of a nation's wealth in terms of gold, but another criterion might well be used—the capacity of its resources to yield economically an efficient and abundant supply of power."— IV—1321

§12.—Power's Effect on History

"History as it is written and taught is a story of rising and falling empires and dynasties, of wars and conquests, of warriors and of kings; but when the industrial history of the race shall be written, when the story of the growing control of the forces, and the adaptation of the materials of Nature through the invention of prime movers and the use of machinery and power consuming processes comes to be told, the role of power in man's onward and upward progress will loom large and controlling."—IV—1407

§13.—Electric Service for Farms*

"The ultimate wealth of any nation—whatever may be its resources— is entirely dependent upon the success of its agriculture. In view of this, it is no wonder that the agricultural vote is forcing

*For further discussion see "Analysis of Electric Service for Rural Homes" by Samuel S. Wyer.

the hands of many politicians, who are wildly promising a supply of electricity to every farm, without really knowing whether or not the proposition is financially sound.

Most countries are today suffering from a shortage of labor on the land, which is another reason for facilitating the supply of electric power to farms.

It will therefore be appreciated that upon national and ethical grounds a rural supply of electricity is of very great importance.—IV—539

"After all, electro-farming is but the application of the principles of other industries to agriculture. There is plenty of actual practical experience now available, so that unprofitable pioneer work is to a great extent now eliminated.

There is no question in the mind of the author but that in any country the application of electricity on farms will add greatly to the wealth of that nation, that the success of its supply undertakings will be increased and the comfort and profits of its farmers assured."—IV—569

§14.—Electricity's Dominant Position

"Electricity and power are talked about as the same thing today. Electric power is the world's greatest labor saver. The only way in which people can live at a higher material level is by making their work more useful and more productive. Electricity does this in the first place and thus improves the lot of each individual. Later on, electricity enables that individual to carry on life's work more easily and more agreeably."—I—1438

"The degree to which any country utilized electrical energy as a substitute for manual labor would largely determine the rate of its industrial and social progress."— IV—1609

"The increase of electric power since 1907 has been as follows:

United States	890%
Great Britain	328%
Italy	314%"

—IV—1313

§15.—Dangers of Power

"This age of power has brought new problems. The powerful economic forces now at man's command present a complex structure which must be guided intelligently indeed if there is not to be disaster."— IV—1404

"The opinion has been expressed that Science is progressing too rapidly for the average man to control wisely—that Science is making a Frankinstein monster that will destroy our civilization. I do not see the logic of such fear. It is true that every increase in man's control over Nature increases his power for evil as well as good, but man's nature is not changed, and I believe that the balance of power has been slowly passing to the good side. Education may not, but certainly ignorance cannot save us.

Everything depends upon the use we make of our new knowledge, and that depends upon our point of view. **** If the world can be innoculated with this scientific spirit, we need not fear the future."— IV—1444

§16.—Political* Aspects of Electric Power

"The possibilities of electricity are so great, and to many minds so fascinating, that it has proved the easiest thing—a thing unfortunately only too easy for enthusiasts, political and other—to issue streams of words full of beautiful promises of a universal Utopia if only the supply of electricity were sufficiently 'cheap and abundant' with but too little consideration of what would be involved in the 'sufficiently' before the world was totally idealized."— IV—338

§17.—Water Power Does Not Deplete Resources

"The primary consideration of the national importance of water power is that the generation of power by water does not constitute a drain on the resources of the State. Nature replenishes year by year the energy used up, so that there is an everlasting supply available. Home supplies can be economized; this is of particular importance in time of war or industrial troubles. Owing to the small staff required to operate a hydro-electric development, and owing to independence of outside resources, the supply of power is practically free from labor troubles."—I—30 AND 31

§18.—Water Power Not Always Cheaper than Fuel Power

"The theory has been advanced that the utilization of water power, wherever possible, rules out the utilization of fuel-generated power, but water power can only be used when economic justification can be found for it. In many cases, fuel generated power is obtainable at a lower capital cost than water power and the question of capital cost may be decisive."— IV—1320

"Most of the early large American water power developments suffered great hardships or bankruptcy, while waiting for customers for the last half of their available power. An undeveloped and unmarketed water power is at a great disadvantage compared with steam, because substantially all of the expenditure for a large water power development has to be made in dam, flowage rights and power house, before any power can be delivered; whereas steam can be added a unit at a time, and only the coal burned has to be paid for; and all this has been reflected in current practice in the delay in developing certain great powers."—II—391

§19.—Navigation and Water Power Rights Contrasted

"In every case in which the development of water power on a navigable stream is under consideration, the relative value and importance of the use of the stream for navigation and of the power that may be developed should be judged in the light of existing and reasonably probable future conditions. Navigation should be given the preference only if it is of substantial character with strong prob-

*The politician follows current public opinion and is interested primarily in the results of the next election. The statesman, creates public opinion based on facts and is interested primarily in the welfare of society as a whole.

ability of permanence and of future growth. If, however, there is no commercial navigation, and experience shows that it is unlikely to develop in the future, then power should be given the preference and every opportunity afforded to develop the greatest possible amount in the most economical way."—II—398 AND 99

§20.—Coal and Civilization

"Mechanical power is the main spring of modern civilization, and is the active expression of the latent energy stored in Nature's stupendous fuel resources. The exhaustion of the one implies the exhaustion of the other—and the collapse of our marvellous civilization. Today mankind is cashing checks on the fuel reserve of future generations."—I—322

§21.—Duration of Coal Supplies

"In respect of the duration of supplies on the present basis of production the North American resources, and more especially those of the United States, will outlast all other countries, for her supplies will probably suffice for 2,000 years. Of the other great coal producing countries Great Britain does not stand anything like so well in point of the duration of her supplies, for at the present rate of production her coal will not exceed, at most, 600 years, and if we take into consideration coal existing to a depth of 4,000 feet only, it is doubtful whether the supply will suffice for much more than 450 years. Germany, before its Silesian fields were ceded to Poland, had reserves to coal sufficient to meet her present day rate of demand for a little over 1,000 years. France is not well situated. She will, before very long, have to live entirely on imported coal. Switzerland can mine all her resources in a few years. Belgium has probably somewhat under 500 years' supply."—I—423

"At its present rate of consumption, it is most likely that the world's supply of coal will not last for more than 1,500 to 2,000 years and it is interesting to reflect that, when this stage has been reached the period of the intensive use of coal will have constituted only about one per cent of the period that man has been on the earth. Modern material civilization is so largely based upon the utilization of the energy in coal that the time must come, far distant though it may be, when, driven by fear and necessity, the fuel problem of the world must receive much more consideration than it does at the present time."—I—421

§22.—Definition of Superpower*

" 'Superpower' means interconnection of systems and larger central stations, fuel or water, scattered over the whole nation. It is in daily progress before our very eyes. Interconnection does not imply extensive capital consolidation or the building up of great trusts. It implies the sale and resale of power from one utility distribution system to another; it implies cooperative action between utilities in the erection of central stations; and it must embrace

*Sometimes called "Giant Power".

municipal plants as well as corporation plants. It implies no gigantic exploitation, for that is impossible under State regulation of rates and profits."—IV—1587

§23.—Governmental Interests in Power

"All business needs a lifting purpose greater than the struggle of materialism. But this does not lie in some visionary and emotional crusade. It lies in the higher pitch of economic life and a finer regard for the rights of others; through the organization of the great tools in our economic life so that they may produce happier individual lives, more secure in employment, wider in possibilities of comfort and enjoyment, larger in possibilities of intellectual life.

The Government can best contribute through stimulation of and cooperation with voluntary forces in our national life; for we thus preserve the foundations upon which we have progressed so far—the initiative of our people. With vision and devotion these voluntary forces can accomplish more for America than any spread of the hand of Government."—IV—1590

§24.—Individual Initiative Necessary

"The progress of our nation can come only by preserving on the one hand the vital initiative and enterprise of our people and on the other hand an equality of opportunity for all. Both would be strangled by the hand of bureaucracy and politics. No bureaucracy with a board of directors of 580 congressmen and senators would have made the electrical discoveries of the last fifty years or pioneered their application."—IV—1587

§25.—Function of Government

"It is the business of Government to provide an open road for the exercise of the individual initiative of its citizens, not to substitute its own activities for that initiative; to see that free opportunity is given for the economic production of wealth, not to produce wealth itself. That Government is the wisest which does not attempt to perform those functions which more localized agencies, governmental or otherwise, can perform for themselves. It is the business of the Government to regulate and control, not to manage or operate."—IV—1539

"There is a clear line of demarcation between regulation and management. The Supreme Court of the United States recently called attention to this fact in sharp and decisive language.*

'It must never be forgotten that while the state may regulate with a view to enforcing reasonable rates and charges, it is not the owner of the property of public utility companies and is not clothed with the general power of management incident to ownership ***. The commission is not the financial manager of the corporation and it is not empowered to substitute its judgment for that of the directors of the corporation.' This basic principle underlies all regulation in the United States."—IV—1603

*262 U. S. 276.

PART II

WATER POWER RESOURCES
OF
VARIOUS COUNTRIES

§26.—Water Power Problem in the United States

"In the United States, as in the world at large, we are now in the midst of the greatest activity ever known in water power development.

Today, the foremost problems connected with water power which await improvement are those of the inter-connection of plants manufacturing power from water and steam *** for the purposes of better service and greater conservation of capital, as well as for the conservation of natural resources, and perhaps the most important of the problems now before us are those of public relations and of future public welfare."—II—359

"Many look on water power as an ever flowing stream of gold, ignorant or forgetful of the vast amount of capital required and ignorant of the risks involved in its development, such as those of bad conditions for foundations, and unappreciative of the great fact that cost of power can be lessened to the ultimate consumer, and that dependability of power against interruption, can be safeguarded most effectively by vast interconnected systems, each reaching over many communities and to many plants, with generation both by water and by steam; by which inter-connection advantage can be taken of the 'diversity factor' of loads for different uses, coming at different hours, and by which the surplus capacity of a new plant can be most fully put into immediate service and earning, and the safeguards against interruption most effectively provided."—II—393

§27.—Water Power Resources of the United States

State and Division	Kilowatts* Potential, available 90% of the time	Kilowatts* Installed capacity
United States	25,975,000	6,778,871
New England—		
Maine	400,000	352,998
New Hampshire	139,000	175,914
Vermont	60,000	125,191
Massachusetts	79,000	256,578
Rhode Island	19,000	22,520
Connecticut	48,000	101,772
Middle Atlantic—		
New York	2,991,000	1,151,065
New Jersey	37,000	14,101
Pennsylvania	192,000	126,817

*One kilowatt equals 1.34 horsepower.

State and Division	Potential, available 90% of the time	Installed capacity in kilowatts
East North Central—		
Ohio	41,000	22,196
Indiana	30,000	21,782
Illinois	141,000	63,411
Michigan	125,000	210,087
Wisconsin	213,000	301,594
West North Central—		
Minnesota	152,000	158,040
Iowa	126,000	132,251
Missouri	50,000	13,406
North Dakota	61,000	183
South Dakota	47,000	13,556
Nebraska	136,000	14,708
Kansas	78,000	10,820
South Atlantic—		
Delaware	4,000	2,337
Maryland and D. C.	79,000	5,891
Virginia	342,000	81,909
West Virginia	265,000	10,974
North Carolina	403,000	321,899
South Carolina	320,000	266,702
Georgia	427,000	271,838
Florida	7,000	5,249
East South Central—		
Kentucky	58,000	937
Tennessee	322,000	95,835
Alabama	352,000	161,034
Mississippi	22,000	0
West South Central—		
Arkansas	93,000	887
Louisiana	1,000	0
Oklahoma	52,000	1,282
Texas	178,000	10,310
Mountain—		
Montana	1,902,000	257,400
Idaho	1,583,000	202,105
Wyoming	525,000	5,883
Colorado	571,000	65,632
New Mexico	87,000	986
Arizona	2,058,000	28,915
Utah	1,059,000	86,035
Nevada	224,000	10,108
Pacific—		
Washington	3,708,000	358,346
Oregon	2,734,000	154,321
California	3,434,000	1,083,065
Outlying Possessions—		
Alaska	746,000	29,840
Porto Rico	14,000	11,190"
Hawaii	75,000	18,650

—I—640, 642 AND 643

§28.—Canada's Water Power Situation

"Of all the natural resources, remarkable as much for their variety as their extent, with which nature has endowed the Dominion of Canada, none is of more permanent value than its water powers. Coal beds, however vast, must some day become exhausted. So must oil wells and iron and other mineral deposits. Forests are gradually cut down, and even the products of the soil diminish with its fertility. Water power alone is inexhaustible. As long as rivers run it will remain possible to harness them and use them for the benefit of mankind.

The water powers of Canada form one of its greatest assets, and not the least important are those that lie along the international boundary, within economic reach of nearly all the principal centers of population of the country. These inter-national water powers, owned jointly by Canada and the United States represent approximately 8,000,000 horsepower, more than the total water power of any country in Europe."—IV—1471

§29.—Available Water Power in Canada

Province	Available 24 hour power at 80% efficiency at ordinary minimum flow horsepower
British Columbia	1,931,142
Alberta	475,281
Saskatchewan	513,481
Manitoba	3,270,491
Ontario	4,950,300
Quebec	6,815,244
New Brunswick	50,406
Nova Scotia	20,751
Prince Edward Island	3,000
Yukon and North West Territories	125,220

"The estimates of available power are based upon sites where the head is definitely known or well authenticated. They omit many falls, rapids or possible concentrations, regarding which information is not reasonably definite and reliable. They may be looked upon, therefore, as representing the minimum water power possibilities of the Dominion."—I—167

"The water power available, minimum 24 hour continuous power, is over 18,000,000 horsepower, equivalent to an ultimate installation of some 40,000,000 turbine horsepower, and will therefore meet all possible requirements for many years to come."—I—168

§30.—Great Britain's Water Power Resources

"The ascertained undeveloped water power resources in Great Britain ***, are estimated at 250,000 kw. on a continuous basis, distributed as follows:

Scotland	195,000 kw.
Wales	36,000 kw.
England	20,000 kw.

"The water powers in England are mainly on rivers, comprising a large number of small capacity, which necessarily could only be developed for local purposes, provided the output could be absorbed within a reasonable distance.

The real field for development in Great Britain is therefore restricted to the Scottish Water Powers."—IV—1263 AND 64

"England itself is not favorably circumstanced for the development of water power on any large scale. Owing to the general flatness of its gradients, no large individual powers are available."—I—377

§31.—Norway's Water Power Resources

"Norway is undoubtedly more favorably situated with reference to water power than any other country in the world. Although Norway's power resources are not absolutely the greatest to be found in any single country, they are the greatest in proportion to the population of the country and to its possibilities of development."—I—1044

"Norway, with approximately 16 millions horsepower has the greatest abundance of water power of any country in the world. The greatest part of her 1.8 millions developed horsepower has been developed at a cost varying from 100 to 200 kroner* per horsepower. Large quantities have also been developed at a cost of 400 kroner per horsepower."—I—1062

§32.—Sweden's Water Power Resources

"Sweden's total water power resources cannot be estimated with any high degree of accuracy, until the waterfall survey has been completed. However, the total water power before regulation has been approximately estimated to be at least 10 millions of horsepower available during six months or 6¾ millions of horsepower during nine months. According to available data, Sweden is second only to Norway among European countries in respect of total nine months water power as well as in respect of available horsepower per inhabitant."—I—1344

"About 330,000 horsepower of the total water power installation is in the hydro-electric power stations of the State. The State thus controls about 28 per cent of the hydro-electric power now developed.

As seen from the above, only about 14 per cent of the potential six months water power is utilized now, corresponding to about 41 per cent of the 3.5 millions horsepower which may be expected to be utilized within the next fifty years. Of the total power assumed to be worth development, which amounts to 8.8 millions horsepower, about 15 per cent is now utilized. The resources are, therefore, sufficient for a very long time."—I—1346

"It is calculated that the amount of Swedish water power worth developing and available for nine months in the year amounts to about 6 million horsepower. Of this quantity, about 1.4 million horsepower or somewhat more than 20% has hitherto been developed. The resources are very unevenly distributed over various parts of the country."—II—308

*One kroner equals 26.8 cents.

§33.—Holland's Water Power Resources

"The water power resources in the flat country of Holland are of no importance."—I—905

§34.—Denmark's Water Power Resources

"Denmark consists of one large peninsula, Jutland, and of several islands, of which the biggest is Sealand. There are no mountains; the greatest height of any hill being 600 feet. The altitude of the land, and its relatively small extension in any direction, has the effect that all rivers carry little water, and the fall everywhere is small. Consequently, the potential energy of the water resulting from rainfall at any point is generally small, and it is difficult to make use of it."—I—765

§35.—Spain's Water Power Resources

"We may safely reckon that the whole amount of this water power reaches a total of 6,000,000 horsepower, which is by no means an exaggerated figure when compared with those shown in prior records and statements."—I—1315

§36.—Poland's Water Power Resources

"The total power available all over the country as calculated on the mean annual discharge amounts to about 3,652,000 horsepower."—I—1121

"According to pre-war statistics, there were about 9,000 water power plants installed on the present Polish territory, with a total power of 125,000 horsepower. This represents about 3.4 per cent of the total resources available."—I—1122

§37.—Germany's Water Power Resources

"With regard to the size and nature of her water power, Germany is behind the specially favored neighboring countries, for instance, Switzerland and Scandinavia. It is only in the southernmost part of Germany, in the Black Forest, in the small portion of the Alps belonging to Germany, and in the areas crossed by rivers carrying water from those mountains, that relatively favorable conditions exist for the development of valuable water power."—II—197

§38.—Austria's Water Power Resources

"The main source of energy of Austria is centered in its water power. There are still about 3,000,000 horsepower (average annual output) worth developing for water power works, whereas the water power used up to the end of 1923 is estimated at about 400,000 horsepower (annual average output)."—IV—3

§39.—Hungary's Water Power Resources

"Within its thousand years old natural boundaries, formed by the magnificent wreath of the Carpathian range, Hungary had at her disposal before the war approximately 1,700,000 horsepower at low water of the rivers, which theoretically could have been raised by means of proper regulation and storage to about 2,865,000 horsepower."—I—919

§40.—Esthonia's Water Power Resources

"The State of Esthonia lies south of the Gulf of Finland and forms an elevated tableland of an average height of 52 metres above sea level."—I—817

"Altogether a total of 16,953 horsepower is utilized."—I—821

§41.—Czechoslovakia's Water Power Resources

"The following statistics refer to the supply of horsepower in the Republic:

	Developed Used	Undeveloped	Total
Bohemia	100,000	500,000	600,000
Moravia	15,000	65,000	80,000
Silesia	8,000	32,000	40,000
Slovakia	30,000	745,000	775,000
Carpathian Ruthenia	2,000	225,000	227,000
	155,000	1,567,000	1,722,000"

—I—758

§42.—Yugo-Slavia's Water Power Resources

"There can be no doubt that the potential water power is the most important source of energy in Yugo-Slavia."—I—1396

"The total water power at low water for Yugo-Slavia is 3,527,000 horsepower. The developed horsepower is 165,000."—I—1403

§43.—Switzerland's Water Power Resources

"The utilizable water power in Switzerland was estimated at a minimum of three million horsepower, and a maximum of eight million horsepower capable of producing twenty milliard* kwh. annually. Barely 15 per cent of this power was being utilized so that there were enormous reserves.

Switzerland was exporting about 460 million kwh. annually, part of which supplied only a summer load. This exported power was chiefly used for electro-chemical purposes."—II—458

§44.—Italy's Water Power Resources

"Italy was the first country to carry out long distance transmission of electricity. Some of the first hydraulic machines used for the water falls at Niagara were made in Italian work shops."—I—945

"The total power for which exploitation has been proposed would amount to over 6 million horsepower."—I—948

*1 milliard=1000 millions.

"The science of hydraulics is traditional in Italy, owing perhaps to the patient work of centuries on the difficult task of regularizing her numerous waterways and the necessity of irrigating her land; a tradition which in olden times culminated in the genius of the great Leonardo."—I—985

§45.—Russia's Water Power Resources

"The total hydraulic power available in Russia is summarized in the following figures:

European Russia	21,505	thousand	hp.
Asiatic Russia	40,875	"	"
	62,380	"	"

—I—1225

§46.—Australia's Water Power Resources

"The Australian Continent, in relation to its great size, possesses comparatively small possibilities of water power development, due to the low rainfall and the topographical unsuitability of other than the eastern portion."—I—8

"The water power available from the east coast rivers and from irrigation schemes on the western slopes and plains may be conservatively estimated as three-quarters of a million continuous horsepower."—I—9

"There is well in excess of 300,000 continuous horsepower available in water power in New South Wales. It will be noted that the greater portion of these powers is centered in two developments, that of the Snowy River in the southeast, where some 145,000 horsepower is available, and that of the Clarence River in the northeast, representing a further 90,000 horsepower. These two developments are responsible for over two-thirds of the total power available."—I—10

"The conditions are favorable to water power development, namely high elevations and good rainfall, are found principally in the eastern half of Victoria. Investigations, to date, show 126,600 horsepower total quantity of power economically available."
—I—18 AND 21

"The hydro-electric possibilities of Queensland have up to the present received little attention."—I—22

§47.—Tasmania's Water Power Resources

"An extremely conservative estimate of the water power resources of the island would give the total at 700,000 hp. continuous, and the amount already developed is approximately 10 per cent of the total.

The average annual rainfall varies from over 140 inches on the West Coast to under 20 inches on the East Coast, and for the whole area of the island (approximately 24,500 square miles), averages 48.5 inches.

Many storage facilities exist on the high plateau, and as the fall of the streams is very steep, extremely favorable conditions exist for the development of cheap water power on a very large scale."—I—28

§48.—New Zealand's Water Power Resources

"New Zealand is particularly favorably situated with respect to the available water powers, and has appropriately been termed 'The Switzerland of the Southern Hemisphere'."—I—460

"The total water power available in the Dominion in sources of 1,000 horsepower or more, is about 770,000 horsepower in the North Island and 4,100,000 horsepower in the South Island."—I—461

§49.—New Guinea's Water Power Resources

"The rainfall in the mainland averages 248 inches per annum."—I—34

"There are many small streams above 5,000 feet which could be easily harnessed, but, of course, may be too far inland to be commercially accessible. In one instance I roughly measured an upper tributary of the Musa, which fell 1,400 feet in half a mile. It was about 66 feet wide and developed 250,000 horsepower."—I—37

" 'A study of the facts at present available shows that the rivers of Papua have a highland catchment area of 50,000 square miles, having an elevation of between 2,000 feet and 13,000 feet. The average rainfall of this area is certainly in excess of 130 inches per annum. Were it possible to utilize only 50 per cent of this, through a height of only 500 feet, a total power of 8,500,000 horsepower would be developed'."—I—38

§50.—Dutch East Indies' Water Power Resources

Principal Islands	Horsepower Minimum
Java	750,000
Sumatra	2,000,000
Dutch Borneo	2,000,000
Celebes	1,000,000
	5,750,000"—

I—776

§51.—Japan's Undeveloped Water Powers

"There is still a very large amount of water power that can be developed in Japan. In this we have the solution of the rapidly increasing demand of power and decreasing reserves of coal." IV—389

§52.—Southern Rhodesia's Water Power Resources

"The Zambesi River is pre-eminently the major source of potential water power in Southern Rhodesia. There are three points in its course along our northern boundary which are good power sites, viz., Victoria Falls, Kariba Gorge, and Mapata Gorge. The effective fall available at the Falls is 300 feet with an estimated minimum flow of 7,500 cu. ft. second which would permit of the development of 225,000 horsepower.

The effective fall available at Kariba Gorge is 100 feet in a distance of about four miles with the same minimum flow available and permitting of the development of 75,000 horsepower. No details are known of the fall at Mapata Gorge."—I—494

§53.—British Guiana's Water Power Resources

"British Guiana has its latent water power entirely undeveloped."—I—146

"According to elevation, locality or other influences, the Colony enjoys a rainfall varying from 40 to 100 inches per annum, probably the average—without allowances for evaporation etc.—is about 80 inches."—I—147

"On the Potaro River, at the Kaieteur Falls (E), just twenty miles S.S. E. of Amaila, there occurs a magnificent single drop and perfectly vertical fall of 742 feet, with a rapid get away from a pool at its foot. This fall has been estimated to yield during the dry season about 50,000 horsepower, and at ordinary times 500,000 horsepower and upwards."—I—149

PART III

COAL RESOURCES
OF
VARIOUS COUNTRIES

§54.—Coal in the United States Available for Power

"The following estimate of coal for power purposes does not include anthracite or semi-anthracite, as they are more valuable for domestic purposes than they would be for the generation of power. It includes only coal beds of workable thickness under present or near future mining conditions and which lie within a workable depth. The lower limit of workability is considered as 2 feet for high rank coals and 3 feet for lignites, and the maximum depth as 2,000 feet."—I—646

	Tons of Coal
"Available lignite equivalent to	276,420,000,000
" sub-bituminous coal equivalent to	446,560,000,000
" bituminous coal " "	799,238,000,000
" semi-bituminous coal " "	37,380,000,000
	1,559,598,000,000"

—I—645

§55.—Canada's Coal Resources

"Canada has an abundance of coal of all qualities ranging from low-grade lignites to high-grade bituminous and semi-anthracite. This is concentrated in the western and eastern extremities, leaving a wide stretch of territory comprising the more thickly populated and industrialized provinces of Ontario and Quebec dependent on foreign sources of supply."

"The annual consumption of coal for all purposes is about 32 millions of short tons and the known reserves 1,234,269 millions of metric tons*."—I—261

§56.—Great Britain's Dependence on Coal

"92 per cent of the power used in Great Britain is derived from coal. Less than 2 per cent of the power used in Great Britain is generated from water."—I—350

§57.—Sweden's Coal Resources

"Coal is found as already mentioned, within a limited area of some 800 sq. km. in Skane. The probable resources are estimated at 300 millions metric tons."—I—1346

§58.—Hungary's Fuel Plight

"The Treaty of Trianon has deprived Hungary not only of two-thirds of its thousand years' old territory, but practically of all such

*1 metric ton equals 2204 lbs.

stocks of raw material and natural sources of energy which were essential for the organization of a sound and self supporting economic system."—IV—983

"Hungary has lost all its natural gas wells, 94 per cent of its water power, 85 per cent of its great forests and out of its very modest stock of mineral fuels, over 60 per cent, the largest and best deposits. The production of useful power in present Hungary must rely almost exclusively upon stocks of mineral fuels which are in their quantity so limited that, if the present waste is not soon severely checked, will not last any longer than about 60 years."—IV—984

§59.—Yugo-Slavia's Coal Resources

"Stone coal occurs only in small quantities in Yugo-Slavia, and that only in the eastern part of Serbia and in one or two places in Bosnia. Practically, Yugo-Slavia possesses only brown coal."—I—1393

"Brown coal occurs in large quantities throughout the country. It is of fairly good quality."

"Lignite coal occurs, likewise in large quantities, all over Yugo-Slavia."

"Yugo-Slavia practically does not possess any coal suitable for coking, consequently, no coke for supplying the blast-furnaces can be produced in the country."—I—1394

§60.—Poland's Coal Resources

"The Polish coal fields consist of four separate basins. The Dombrowa Basin, the Cracow Basin, the Silesian Basin, and the Ciezyn (Teschen) Basin."—I—1101

"The probable coal resources of Poland are 18,781 million tons."—I—1102

"The annual coal production is about 36 million tons."—I—1102

"Poland possesses also extensive lignite deposits. While the coal seams are concentrated in a few neighboring districts, the relatively small lignite fields are distributed all over the country."—I—1106 AND 7

§61.—Austria's Coal Resources

'The brown coal beds of Austria are estimated at 350,000,000 tons and the pit coal is estimated at 7,000,000 tons."

"The Austrian coal production in the year 1923 amounted to 2,817,090 tons, of which 158,183 tons were pit coal and 2,658,907 tons brown or wood coal."—IV—1

§62.—Czechoslovakia's Coal Resources

"An estimate of the coal supplies which can be obtained on a profit basis is 8,787 million tons."—I—748

"An estimate of the lignite supplies which can be obtained on a profit basis is 12,434 million tons."—I—749

§63.—Russia's Coal Resources

"Assuming the actual weight of the world's coal resources to be 7,280 milliard tons, which corresponds approximately to 5,500 milliard tons of normal coal, it will be found that the mineral coal reserves of Russia amount to 5.8 per cent by actual weight of the world's resources, or to about 7 per cent in terms of normal fuel."—I—1217

"The mean permanent rate of increase in Russia can be taken as equal to 8 per cent per annum. A calculation based on the present Russian production of 15.11 million tons shows that the available resources will be exhausted in the whole of Russia within 100 years, and in European Russia within eighty years. If we assume that the future rate of increase will be equal to the mean pre-war increase of 4 per cent the Russian resources will last for 180 years."—
I—1219 AND 20

"Both European and Asiatic Russia possess enormous areas of peat deposits. They cover in European Russia about 150 million acres. The peat areas in Asiatic Russia cannot be estimated even approximately, but they are, in any case, immense."—I—1222

"The U. S. S. R.* and more particularly European Russia is fairly poor in mineral coal deposits. With regard to oil deposits, she occupies the first place among the countries of the world. She possesses large resources of peat and vast quantities of renewable energy. With her total power resources, she is entitled to a prominent place among the other countries."

"During the second five years of the next decade, Russia will begin to feel the insufficiency of her fuel resources. This will be due to the increase of demand and decrease of production. Exports will naturally have to cease. There will still be, however, a surplus of oil and oil products, and these will have to be exported."—
I—1285 AND 86

§64.—Australia's Coal Resources

"The principal coal deposits of Australia are situated along the eastern and south-eastern portions of the Continent, in Tasmania, and in the south-western corner of Western Australia. Although large areas of the country may be definitely stated to hold no probability of the discovery of coal, the fact that within the last few years several more or less promising discoveries have been made would suggest that further investigation will disclose a more extensive distribution of this source of power throughout the Continent.

Australia's greatest wealth as regards sources of power lies in her rich coal deposits, in many cases in close proximity to the great centres of population."—I—40

"Productive coal measures are known to occupy an area of 15,000 square miles approximately, mainly within a great basin of New South Wales of which the city of Sydney is approximately the centre."—I—50

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*Union of Socialist Soviet Republics.

"Coke is produced from coal won on the three main coal fields of New South Wales."—I—54

"So far black coal has only been found in Victoria, and these beds are situated to the south of the Dividing Range and extend southward beneath Bass Strait."—I—59

Brown coal occurs in numerous areas throughout the State; the largest is in Gippsland in the valley of the Latrobe River with Morwell as a center. Boring has proved seams upwards of 700 feet in thickness."—I—64

"Queensland has vast regions of magnificent coal-bearing country distributed over its area of 670,500 square miles, the deposits occurring in many portions of the central and southern districts, and in a few localities in the northern and western districts."— I—67

"There is no active coal mining in South Australia at the present time, and coal is imported into the State for all purposes—mostly from New South Wales.

The domestic resources of fossil fuel are, however, considerable and several deposits will be exploited ultimately."— I—87

"Coal, however, has only been extensively mined in one district, the Collie Field of Western Australia.

Lignites and brown coal, mostly of poor quality, are known to occur in various portions of the State, but so far little active work has been done upon any of them.

The Collie Coalfield is the only one in the State upon which any active mining operations are being carried on, though there are other areas in Western Australia in which lignites and brown coals occur. The area occupied by the Coal Measure is, so far as is known, approximately 50 square miles."— I—81

§65.—Tasmania's Coal Resources

"Coal measures are extensively developed in the eastern midland and south-eastern portion of Tasmania. These seams constitute the most important coal resources of Tasmania and vary in thickness from 3 to 16 feet, the most important having an average thickness of 12 feet."— I—90

§66.—British West Africa's Coal Resources

"No desposits of coal have yet been found in the country."— I—327

PART IV

WORLD'S POWER SITUATION

§67.—Water Power Resources of the World

	Total in Horsepower I—1304	Percent of Total Now in Use—I—1306
Siberia	51,138,000	.17
United States	26,700,000	16.8
Canada	25,700,000	6.6
France	10,000,000	12.
Sweden	10,000,000	7.2
Norway	7,500,000	12.3
Austria Hungary	6,500,000	13.9
Italy	5,500,000	17.3
Japan	5,500,000	14.2
Spain	5,000,000	8.
Switzerland	3,000,000	27.5
Germany	1,800,000	24.6
Great Britain	253,000	8.3

§68.—World's Coal Reserves

"Looked at from the point of view of continents, the world's reserves of coal in terms of millions of metric tons:*

Continent	Total
Europe	784,190
Asia	1,279,586
Africa	57,839
North America	5,073,431
South America	32,097
Oceania	170,410
	7,397,553

For the purpose of this estimate the minimum thickness of seams, workable to a depth of 4,000 feet from the surface, is taken as 1 foot, and between depths of 4,000 feet and 6,000 feet as 2 feet; 6,000 feet being regarded as the limit in respect of workable depth."
—I—422

§69.—Coal Reserves of the World in Million Metric Tons

"Country	Million Metric Tons	
North America—		
Canada	1,234,269	
United States	3,838,657	
Mexico—no estimate		
Honduras	5	
		5,073,431

*1 metric ton equals 2204 lbs.

Europe—		
Great Britain and Ireland	189,533	
Portugal	20	
Spain	8,768	
France	17,583	
Italy	243	
Greece	40	
Bulgaria	388	
Denmark	50	
Netherlands	4,402	
Belgium	11,000	
Germany	423,356	
Hungary	1,717	
Austria	53,876	
Bosnia and Herzegovina	3,676	
Servia	529	
Roumania	39	
Sweden	114	
Russia	60,106	
Spitzbergen	8,750	
		784,190
Asia—		
Corea	81	
China	995,587	
Japan	7,970	
Manchuria	1,208	
Siberia	173,879	
Indo-China	20,002	
India	79,001	
Persia	1,858	
		1,279,586
Oceania—		
Australia	165,572	
New Zealand	3,386	
British N. Borneo	75	
Netherlands India	1,311	
Philippines	66	
		170,410
Africa—		
Belgian Congo	990	
Southern Nigeria	80	
Rhodesia	569	
South Africa	56,200	
		57,839
South America		32,097
		7,397,553"

—I—438, 39, 40, 41, 42, 43, 44

§70.—Production of Coal—Including Brown Coal

"Country	Thousands of Long Tons 1922	
British Empire—		
United Kingdom	249,607	
Nigeria	111	
South Rhodesia	460	
Union of South Africa	9,126	
Canada	13,533	
Brunei	19	
Federated Malay States	282	
India	19,011	
Australia	12,299	
New Zealand	1,858	
		306,000
Foreign Countries—		
Austria	3,229	
Belgium	20,868	
Bulgaria	1,005	
Czechoslovakia	28,385	
France	32,365	
Germany	262,878	
Greece	120	
Hungary	7,004	
Italy	926	
Jugoslavia	3,660	
Netherlands	4,525	
Poland	20,044	
Portugal		
Rumania	2,082	
Russia	8,400	
Spain	4,689	
Spitzbergen	310	
Sweden	373	
Switzerland	4	
Algeria	9	
Belgian Congo	1,830	
Tunis		
Mexico	918	
United States	425,849	
Brazil	400	
Chili	1,030	
Peru	298	
Venezuela		
China	21,300	
Dutch East Indies	1,020	
Formosa		
French Indo China	973	
Japan	27,420	
Korea	111	
Kwantung Peninsula		
Philippine Island		
Turkey in Asia	670	
		890,000
The World		1,200,000"

—I—445 AND 46

§71.—Distribution of Peat

"Bogs varying in depth from one to fifty feet are found in most countries.

Country	Area in Sq. kilometres
Great Britain	24,000
Ireland	12,000
United States	29,000
Canada	96,000
Sweden	19,000
Norway	12,000
Germany	25,000
Russia	170,000
Finland	100,000"

—II—1020

"The world's peat deposits must exceed 600,000 square kilometres in area, capable of producing an amount of standard peat fuel which may equal 200,000 million tons, equivalent to, say, 100,000 million tons of coal."— II—1021

POWER RESOURCES OF THE WORLD

(POTENTIAL AND DEVELOPED)

Preface by

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SECTION II

HARD COAL, BROWN COAL, GAS, AND OIL

SECTION II

HARD COAL, BROWN COAL, GAS, AND OIL

TORONTO GEOLOGICAL CONGRESS—TERRITORIAL CHANGES CAUSED BY THE WAR—CORRECTING THE TORONTO ESTIMATES—COAL RESOURCES OF FRANCE, CANADA, GERMANY, HOLLAND, AUSTRIA, CZECHO-SLOVAKIA, POLAND, HUNGARY, ROUMANIA, RUSSIA, CHINA, SPITZBERGEN, INDIA, AUSTRALIA, SOUTH AFRICA, NEW ZEALAND, COLOMBIA, CHILE, UNITED STATES. WORLD PRODUCTION OF COAL, BROWN COAL, AND COKE (1913-1927)—NATURAL GAS AND WASTE HEAT, AMERICAN STATISTICS—OIL RESOURCES AND PRODUCTION OF THE WORLD—AN ESTIMATE OF RESOURCES—TECHNICAL DIFFICULTIES—DANGER OF ATTEMPTING SURVEY.

If we deal with coal first, we find that the Toronto Congress of 1913 made the first estimate of the world's coal resources, the three main divisions being anthracite coals, bituminous coals, and sub-bituminous coals, brown coals, and lignites. A number of countries made a further distinction between reserves actually surveyed, possible reserves and potential reserves, the first two categories being based on a depth of 1,000 metres, and the last on the depth of 1,000-2,000 metres. The results of the Toronto Congress were published by Sir Richard Redmayne in a paper he submitted to the 1924 World Power Conference on the coal resources of the world, and they are given in the following table :

Since 1913 no attempt has been made to carry out a second world survey of coal resources, but a number of countries have gone into the subject much more carefully, and their findings were either published in a number of papers submitted to the World Power Conference, or in a number of documents of an official nature surveying certain territories. Again, the incidence of the war destroyed many of the old territorial divisions. Thus Austria and Hungary, as defined in the Geological Congress Reports, have ceased to exist. The whole of Central Europe has changed its political boundaries, while Russia has been narrowed in area by the loss of the Baltic States and Finland. For this reason alone, it would be necessary to carry out a new survey.

TABLE V

COAL RESERVES OF THE WORLD

I. COAL RESERVES OF NORTH AMERICA

(In Million Metric Tons)

Country	Class of Coal			Totals	
	Anthracite coals	Bituminous coals	Sub-bituminous coals, brown coals and lignites		
Newfoundland ...		500			500
Canada—					
Nova Scotia ...		9,649			
		70		9,719	
New Brunswick ...		151		151	
Ontario			25	25	
Manitoba			160	160	
Saskatchewan ...			57,400	57,400	
Alberta	768	198,092	876,179	1,075,039	
British Columbia...	1,350	67,689	5,196	76,035	
		1,800			
Yukon	40	210	4,690	4,940	
N.W. Territories ...			4,800	4,800	
Arctic Islands ...		6,000		6,000	
	2,158	283,661	948,450		1,234,269
United States—					
Eastern Fields ...	16,906	494,454		511,360	
Interior Fields ...	363	478,232		478,595	
Gulf Fields ...			20,952	20,952	
Northern Plains ...		41,106	1,134,000	1,175,106	
Mountains & Coast	484	335,460	692,207	1,028,151	
Coal deeply covered		604,900		604,900	
Alaska	1,931	1,369	16,293	19,593	
	19,684	1,955,521	1,863,452		3,838,657
Mexico; no estimate					
Honduras		1	4		5
Total Estimate for North America	21,842	2,239,683	2,811,906		5,073,431

II. COAL RESERVES OF EUROPE

(In Million Metric Tons)

Country	Class of Coal			Totals	
	Anthracite coals	Bituminous coals	Sub-bituminous coals, brown coals and lignites		
Great Britain and Ireland—					
England		125,899		125,899	
Wales	8,685	31,597		40,282	
Scotland	2,500	20,561		23,061	
Ireland	172	119		291	
	11,357	178,176			189,533
Portugal	20				20
Spain—					
Asturias	1,156	2,312 2,312		5,780	
Other Fields ...	479	925 817	767	2,988	
	1,635	6,366	767		8,768
France—					
North of Ardennes Massif.	2,210	8,860 1,090		12,160	
Eastern		16 630		646	
Armorican Massif.	7	26		33	
Central Massif. ...	949	1,312 746		3,007	
Alps	105			105	
Lignite Areas ...			1,632	1,632	
	3,271	12,680	1,632		17,583
Italy	144		99		243
Greece			40		40
Bulgaria		30	358		388
Denmark			50		50
Netherlands					
S. Limburg ...	195	1,857 320		2,372	
S. Peel	125	1,640 265		2,030	
	320	4,082			4,402

II. COAL RESERVES OF EUROPE (*Continued*)

(In Million Metric Tons)

Country	Class of Coal			Totals	
	Anthracite coals	Bituminous coals	Sub-bituminous coals, brown coals and lignites		
Belgium—					
Campine—					
Limbourg ...		7,000			
D'Anvers ...		1,000			
Namur		3,000			
		11,000			11,000
Germany—					
Saar		16,548		16,548	
Westphalia ...		213,566		213,566	
L. Silesia		2,944		2,944	
U. Silesia ...		165,987		165,987	
Saxony		225	3,000	3,225	
Left of Rhine ...		10,458		10,458	
Other districts ...		247		247	
N. German States			9,745	9,745	
Bavaria			368	368	
Hesse			268	268	
		409,975	13,381		423,356
Hungary—					
Carboniferous ...		3		3	
Liassic		110	25	135	
Cretaceous ...			3	3	
Tertiary			1,444	1,444	
Neo-Tertiary ...			132	132	
		113	1,604		1,717
Austria—					
Alpine Regions ...		10	460	470	
Tertiary Lowlands			250	250	
Bohemia, Silesia and Galicia ...		28,377	12,170	40,547	
Dalmatia			14	14	
Deep Measures ...		12,595		12,595	
		40,982	12,894		53,876
Bosnia & Herzegovina—					
Triassic			1		
Oligocene-Miocene			1,325		
Pliocene			2,350		
			3,676		3,676

II. COAL RESERVES OF EUROPE (*Continued*)
(In Million Metric Tons)

Country	Class of Coal: Anthracite coals	Class of Coal: Bituminous coals	Class of Coal: Sub-bituminous coals, brown coals and lignites	Totals	
Servia		45	484		529
Roumania			39		39
Sweden		114			114
Russia—					
Dombrova ...		2,525		2,525	
Moscow			1,578	1,578	
Donetz	37,599	18,014		55,613	
S.W. Russia ...			43	43	
W. Urals ...		57		57	
Caucasus		253	37	290	
	37,599	20,849	1,658		60,106
Spitzbergen ...		8,750			8,750
Total Estimate for Europe	54,346	693,162	36,682		784,190

III. COAL RESERVES OF ASIA
(In Million Metric Tons)

Country	Class of Coal: Anthracite coals	Class of Coal: Bituminous coals	Class of Coal: Sub-bituminous coals, brown coals and lignites	Totals	
Corea	40	5	27		
		9			
	40	14	27		81
China—					
Chili	10,027	11,691		22,668	
		950			
Shantung	2,000	5,083		7,083	
Shansi	300,000	414,340		714,340	
Shensi		1,050		1,050	
Kansu		5,129		5,129	
Honan	6,575	2,700		9,275	
Kiangsu	10			10	
Anhui		187		187	
Hupei		117		117	
Chekiang	18	126		144	

III. COAL RESERVES OF ASIA (*Continued*)

(In Million Metric Tons)

Country	Class of Coal			Totals	
	Anthracite coals	Bituminous coals	Sub-bituminous coals, brown coals and lignites		
Kiangsi		3,395		3,345	
Fukien	80			80	
Kuantung ...	754	255		1,009	
Kuangsi		500		500	
Hunan	48,000	42,000		90,000	
Szechuan	20,000	60,000	500	80,500	
Kueichou		30,000		30,000	
Yunnan		30,000	100	30,100	
	387,464	607,523	600		995,587
Japan—					
Mesozoic coal ...	41	5		51	
		5			
Tertiary coal—					
Karafuto		1,362		362	
Hokkaido		2,442	233	2,675	
Honsu	21	15	545	581	
Kyushu		2,916		2,916	
Taiwan		385		385	
	62	7,130	778		7,970
Manchuria ...	68	254			
		886			
	68	1,140			1,208
Siberia	1	66,034	107,844		173,879
Indo-China ...	20,002				20,002
India—					
Bengal, Behar Orissa		53,085		53,295	
		210			
Central India ...		22,657		22,657	
Central Provinces		270	2,549	2,849	
		30			
Northern Province		147	53	200	
		76,399	2,602		79,001
Persia		1,858			1,858
Total Estimate for Asia ...	407,637	760,098	111,851		1,279,586

IV. COAL RESERVES OF OCEANIA
(In Million Metric Tons)

Country	Class of Coal: Anthracite coals	Class of Coal: Bituminous coals	Class of Coal: Sub-bituminous coals, brown coals and lignites	Totals	
Australia—					
New South Wales		118,439		118,439	
Victoria		52	31,144	31,196	
Queensland ...	659	12,777	866		
		916		15,218	
Tasmania		65			
		1		66	
W. Australia ...			653	653	
	659	132,250	32,663		165,572
New Zealand ...		125	2,475		
		786			3,386
British N. Borneo ...		75			75
Netherlands India		240	1,071		1,311
Philippines ...		5	61		66
Total Estimate for Oceania ...	659	133,481	36,270		170,410

V. COAL RESERVES OF AFRICA
(In Million Metric Tons)

Country	Class of Coal: Anthracite coals	Class of Coal: Bituminous coals	Class of Coal: Sub-bituminous coals, brown coals and lignites	Totals	
Belgian Congo ...		90	900		990
Southern Nigeria ...			80		80
Rhodesia	22	B 425	74		
		C 68			569
South Africa—					
Transvaal		B 28,800			
		C 7,200		36,000	
Natal	4,700	4,700		9,400	
Zululand	6,000			6,000	
Orange Free State,					
Cape, Basutoland		B 2,880			
Swaziland ...	960	C 960		4,800	
	11,660	44,540			56,200
Total Estimate for Africa ...	11,662	45,123	1,054		57,839

VI. COAL RESERVES OF SOUTH AMERICA

(In Million Metric Tons)

Country	Class of Coal			Totals	
	Anthracite coals	Bituminous coals	Sub-bituminous coals, brown coals and lignites		
Colombia		27,000		27,000	
Venezuela		5		5	
Peru	700	1,339		2,039	
Argentina		5		5	
Chili...		3,048		3,048	
Total Estimate for South America	700	31,397			32,097

COAL RESERVES OF THE WORLD

RECAPITULATION

(In Million Metric Tons)

	Class of Coal			Totals	
	Anthracite coals	Bituminous coals	Sub-bituminous coals, brown coals and lignites		
North America ...	21,842	2,239,683	2,811,906		5,073,431
Europe	54,346	693,162	36,682		784,190
Asia	407,637	760,098	111,851		1,279,586
Oceanic	659	133,481	36,270		170,410
Africa	11,662	45,123	1,054		57,839
South America ...	700	31,397			32,097
Total	496,846	3,902,944	2,997,763		7,397,553

Unestimated reserves are known in Mexico, Switzerland, Denmark, Iceland, Norway, Montenegro, Turkey, Siberia, Malay States, Siam, Asia Minor, Ecuador, Bolivia, Brazil, and on the Antarctic Continent.

Brown coal not included in the estimate is found in Oceania, South America and in the Arctic Regions.

It is impossible at this stage to gather together statistics of the world's coal resources which would have even the authoritative character of those submitted to the Toronto Congress. All that we can do is to take a number of countries, regarding which more recent information is available, and carry the survey through those countries without attempting to reach a world total. The main weakness of the Toronto Congress figures is this: there is little real distinction made between the coal reserves actually surveyed and those which are possible or potential, and there is little unanimity regarding the depth to which investigation should be carried. It is obvious, however, that the only reliable statistics that should be considered in this connection are those of reserves actually surveyed, and they, of course, represent a comparatively small fraction of the total resources given at the Congress.

Thus, if we take two countries widely separated, France and Canada, we obtain the following figures:—

TABLE VI

COAL RESOURCES OF FRANCE

A. By Class of Coal

(In Millions of Tons)

Class of Coal	Reserves at depth of less than 1,200 metres				Possible Reserves at depth of 1,200-1,800 m.	General Total
	Ascertained	Probable	Possible	Total		
Anthracite with less than 7% volatiles	2·5	4·5	115·0	122·0	—	122·0
Anthracite with 7-12% volatiles...	578·6	922·4	1,108·7	2,609·7	540·0	3,149·7
Semi-bituminous with 12-17% volatiles	679·3	658·1	1,342·3	2,679·7	860·0	3,539·7
Coking Coal with 17-26% volatiles	1,094·2	1,123·7	864·7	3,082·6	950·0	4,032·6
Bituminous proper with 26-32% volatiles ...	1,064·1	662·6	625·0	2,351·7	290·0	2,641·7
Gas Coal with more than 32% volatiles	784·6	522·3	830·0	2,136·9	330·0	2,466·9
Total Coal ...	4,203·3	3,893·6	4,885·7	12,982·6	2,970·0	15,952·6
Lignites ...	301·0	410·2	920·8	1,632·0	...	1,632·0
General Totals ...	4,504·3	4,303·8	5,806·5	14,614·6	2,970·0	17,584·6

B. By Region

(In Millions of Tons)

Region	Reserves at depth of less than 1,200 metres				Possible Reserves at depth of 1,200-1,800 m.	General Total
	Ascertained	Probable	Possible	Total		
Nord et Pas-de-Calais (Valenciennes) ...	3,790·0	3,010·0	2,720·0	9,520·0	2,580·0	12,100·00
Loire	316·35	275·4	285·0	696·75	90·0	786·75
Gard	73·5	370·6	515·7	959·8	...	959·8
Bourgogne et Nivernais ...	65·0	111·3	584·0	760·3	...	760·3
Tarn et Aveyron	92·1	51·0	171·0	314·1	...	314·1
Other Regions ...	347·35	485·5	1,530·8	2,363·65	300·0	2,663·65
Total	4,504·3	4,303·8	5,806·5	14,614·6	2,970·0	17,584·60

In the case of France, the reserves actually surveyed were less than a third of the totals given, while, in Canada, the actual reserve formed only half of the total, including probable and potential resources.

TABLE VII

COAL RESOURCES OF CANADA, BY PROVINCES AND CLASSES OF COAL*

(In metric tons of 2,204 lb.)

Provinces or Districts	Including seams of 1 ft. or over to a depth of 4,000 ft.					Including seams of 2 ft. and over at depths between 4,000 and 6,000 ft.	
	Actual Reserve			Probable Reserve		Probable Reserve	
	Calculation based on actual thickness and extent			Approximate Estimate		Approximate Estimate	
	Area sq. miles	Class of Coal†	Thousands of Tons	Area sq. miles	Thousands of tons	Area sq. miles	Thousands of tons
Nova Scotia	174	B	2,188,151	204	4,911,817	73	2,639,000
New Brunswick	—	B	—	121	151,000	—	—
Ontario ..	—	L	—	10	25,000	—	—
Manitoba ..	—	L	—	48	160,000	—	—
Saskatchewan	306	L	2,412,000	13,100	57,400,000	—	—
Alberta ..	25,300	L	382,500,000	56,375	491,271,000	203	12,700,000
		B	3,223,800		182,183,600		
		A & B	669,000		100,000		
British Columbia ..	439	A & B	23,771,242	6,196	44,907,700	11	2,160,000
		L	60,000		5,136,000		
Yukon ..		A & B	—	2,840	250,000	—	—
		L	—		4,690,000	—	—
North-West Territories ..	—	L	—	300	4,800,000	—	—
Arctic Islands	—	B	—	6,000	6,000,000	—	—
Total ..	26,219	..	414,804,193††	85,194	801,986,117	287	17,499,000

*See "Coal, Coke and By-Products," published by the Imperial Mineral Resources Bureau.
†A=Anthracite; B=Bituminous; L=Lignite.
††The coal of all classes mined in Alberta to 1911, amounting to 20,000,000 tons, has been deducted.

Again, we find the Prussian Geological Intitute defining the certain coal resources of Germany as follows :—

TABLE VIII

COAL RESOURCES OF GERMANY

	Million Tons
Hard Coal	
West Upper Silesia	10,900
Lower Silesia	1,240
Free State of Saxony ... ... Province of Saxony	230
Hanover	250
Ruhr	55,100
North Crefeld Area	7,100
Brüggen-Erkelenz Area	1,750
Aachen Area	1,570
Saar...	12,200
Brown Coal	
Lower Rhine Area	3,700
Westerwald	110
Upper Hesse	70
Lower Hesse	160
Braunschweig-Magdeburg Area	1,610
Thuringia-Saxony	8,660
Niederlausitz Area	5,220
Oberlausitz Area	1,530
Oder Area	470
Other Areas	370
Grand Total (Hard Coal and Brown Coal)	112,240
Grand Total (excluding Saar)	100,040

These estimates are only one-fourth of the total given at the Toronto Congress, which was 423,356,000,000 tons, but, while the hard coal resources given above—namely, 90,340,000,000 tons—are only 22 per cent. of those given at Toronto, the brown coal resources, 21,900,000,000 tons, are 64 per cent. higher.

The coal resources of Holland, according to a more recent survey than that of the Toronto Geological Congress, have been given as equivalent to 5,000,000,000 tons of bituminous coal, 3,000,000,000 tons being located in South Limburg, 1,800,000,000 tons in North Limburg and North Brabant and 200,000,000 tons in East Gelderland and East Oberijssel.

The coal resources of Austria in its present geographical position have been given as 16,000,000 tons of bituminous and 384,000,000 tons of sub-bituminous and lignites, yielding a grand total of 400,000,000 tons. In Czecho-Slovakia, the corresponding figures have been given as 8,787,200,000 tons of bituminous and sub-bituminous coals, and 12,434,000,000 tons of lignites, giving a grand total of 21,221,100,000 tons. The Polish statistics give a total for all types of coal as 43,010,000,000 tons, actual and probable resources, with an additional 18,871,000,000 tons possible resources, equivalent to a grand total of 61,881,000,000 tons. In Hungary, with its new territorial limits, the total potential resources have been estimated at 118,600,000 tons of bituminous coal, 518,490,000 tons of brown coal, and 3,650,000 tons of lignite, giving a grand total of 640,740,000 tons. In Roumania, the most recent estimates give for bituminous coal 2,900,000 tons actually surveyed, with an additional 1,230,000 tons representing a probable reserve, or a total of 4,130,000 tons. In addition to this, lignites and sub-bituminous coals account for a total of about 26,000,000 tons.

Estimates of the coal resources of Russia and Siberia differ very widely, one set of statistics giving the remarkable total of 429,000,000,000 tons. This total is made up of 38,000,000,000 tons of anthracites, 379,000,000,000 tons of bituminous and sub-bituminous coals, and 12,000,000,000 tons of lignites. According to statistics published by the French *Comité des Forges,* the coal resources of Russia are spread over a number of basins, as follow :—

(1). The Moscow basin, with actual and probable reserves estimated at 78,000,000 tons. Practically this entire reserve belongs to the sub-bituminous category.

(2). The Ural basin, with reserves of 110,000,000 tons, also of the sub-bituminous type.

(3). The Caucasus, with 365,000,000 tons.

(4). The Turkistan, with 170,000,000 tons.

(5). The Irkutsk basin in Siberia, with 150,000,000,000 tons, mostly in the sub-bituminous category. It is estimated that not less than 1,500,000,000,000 tons represent the total possible and potential resources of Siberia.

(6). The Donetz basin, with total resources of 65,613,000,000 tons, of which 37,599,000,000 tons are anthracite and the remainder bituminous coal.

All these estimates must be regarded as purely tentative, since no completely detailed survey has been made of the territory.

A third estimate has been given by W. A. Obrutschew (Internationale Bergwirtschaft, February, 1926), where he gives the entire reserves of European Russia as 57,930,000,000 tons and of Siberia as 358,658,000,000 tons, or a total of 416,588,000,000 tons for both areas. The Siberian reserves are concentrated largely in seven basins :—Kusnez with 250,000,000,000 tons, Tocheremchowo, with 57,300,000,000 tons, Tungus with 35,000,000,000 tons, the Kirghiz Steppes with 4,160,000,000 tons, the Abakans basin with 6,223,000,000 tons, the Chacharei with 2,700,000,000 tons, and Ekebaston with 500,000,000 tons. The Siberian anthracite reserves are given as only 37,100,000 tons, and brown coal, lignites, etc., as 3,544,000,000 tons. Some light on the distribution of the last-named is thrown by E. E. von Ahnert (Internationale Bergwirtschaft, July, 1928), who gives the brown coal reserves of areas actually surveyed in the Far East of Russia as 835,341,000 tons.

TABLE IX

BROWN COAL RESERVES OF FAR EASTERN RUSSIA

(Thousands of Tons)

Area or Province	Proved	Probable	Possible	Total
Trans-Caikal Regions ...	—	81,488	161,380	242,866
Amurland	—	187,500	214,400	401,900
North Ussuriland	25	7,500	26,250	33,775
South Ussuriland	9,395	11,913	128,664	154,800
North Saghalin	—	—	2,000	2,000
Total	9,420	288,401	532,694	835,341

The estimates carried out for the 1924 Conference regarding the coal resources of Spitzbergen and Bear Island give the resources of the latter as 200,000,000 tons of bituminous coals, and, of the former as 6,800,000,000 tons, 280,000,000 tons of which were culms, 1,500,000,000 tons cretaceous, 5,000,000,000 tons tertiary, with an additional 20,000,000 tons of undecided formation. These coals can scarcely be regarded as bituminous in the narrow sense of the definition; they tend more towards a lower grade type of coal.

In China, according to the Geological Survey concluded in 1926, the coal resources ascertained were as follows:—

TABLE X

COAL RESOURCES OF CHINA

(Millions of Tons)

Province	Anthracite	Bituminous	Lignite	Total
Chili	797	2,031	—	2,828
Fengsten	30	1,250	5	1,285
Jehol	20	473	167	660
Chakar & Suiyuan ...	150	310	—	460
Shansi	35,356	91,586	173	127,115
Hunan	5,842	1,607	—	7,449
Shantung	30	2,500	—	2,530
Anhui	70	288	—	358

TABLE X (*Continued*)

COAL RESOURCES OF CHINA

(Millions of Tons)

Province	Anthracite	Bituminous	Lignite	Total
Kuangsi	—	19,000	—	19,000
Kiangsu	110	785	—	895
Kukei	—	195	—	195
Chekiang	138	310	—	448
Heilungkiang ...	50	70	—	120
Kirin	—	344	23	367
Szechuan	—	6,000	—	6,000
Shensi	1,000	18,000	—	19,000
Yunnan	—	6,968	—	6,968
Kueichou	—	18,900	100	19,000
Kuantung	—	500	—	500
Fukien	—	150	—	150
Kansu	—	500	—	500
Total	43,593	173,465	568	217,626

In the British Dominions more recent figures have been available, above all for India, New Zealand and Australia. In India, the total coal resources are stated to be 79,992,500,000 tons; Bengal Behar and Orissa accounting for 54,295,000,000 tons, Central India for 22,672,000,000 tons, the Central Provinces for 270,000,000 tons of bituminous coals and 2,549,000,000 tons of sub-bituminous coals and lignites, Assam for 147,000,000 tons, Beluchistan for 45,000,000 tons, and other provinces for 14,500,000 tons, all of bituminous coals.

The coal resources of New Zealand, according to the Director of the Geological Survey, may be grouped in two classes, those actually proved and those surveyed.

TABLE XI

COAL RESOURCES OF NEW ZEALAND

(Millions of Tons)

Classification	Proved	Probable	Possible
Anthracite	Very little	Very little	Small
Bituminous	187	477	Moderate
Semi-bituminous ...	68	196	,,
Brown Coal	194	728	,,
Lignite	161	420	Large
Total	610	1,821	

The coal resources of Australia, as recorded in statistics published in the "Journal and Proceedings of the Royal Society of New South Wales in 1924," were estimated as follows :—

TABLE XII

COAL RESOURCES OF AUSTRALIA

(Millions of Tons)

State	Reserve	Probable Additional Reserve	Possible Additional Reserve
New South Wales ...	20,000		Very large, probably as much as 100,000
Queensland	410	1,684 (approx.)	13,000
Victoria	10,500		Not large
South Australia ...	50	No estimates	Moderately large
West Australia	3,500		Apparently not large
Tasmania	125	123	Do.
New Guinea		No estimates	
North Territory ...		Do.	
Total	34,585		

These statistics correspond fairly closely with the information given at the 1924 World Power Conference. Then it was stated that the total coal resources of New South Wales could be given as 26,000,000,000 tons, 7,500,000,000 tons of which belong to a first stage of development or survey, 11,500,000,000 tons to a second less definite, with a third potential class yielding 7,000,000,000 tons. South Australia was given as possessing 54,000,000 tons, largely of sub-bituminous coal. Otherwise there is no difference in the figures.

In South Africa, a detailed examination of a number of coalfields established reserves of bituminous coals as follow :— Witbank, 7,200,000,000 tons; South Rand, 7,314,000,000 tons; Vindeul-Delmas, 1,480,000,000 tons; Vaal, 760,000,000 tons; Springs, 542,000,000 tons; yielding a grand total of 17,296,000,000 tons. These resources are much smaller than the aggregates given by the Geological Toronto Congress for the various states of South Africa, but they only bear on individual coalfields and not on the entire area. In Southern Rhodesia, the coal resources were given in a more recent estimate as 6,800,000,000 tons, 15 per cent. of which was bituminous and 85 per cent. semi-bituminous.

In South America, geological surveys have been carried out in a number of the Republics, and in a recent report published in "Gluckauf" (August 25, 1928), on the tertiary coal deposits of Colombia, Dr. Scheibe describes the state of knowledge regarding the coal resources of that republic, but he makes no effort to assess the resources of the territory in definite terms. He gives the annual output of coal for Colombia as 220,000 tons, but he states quite specifically that the coal resources of Colombia, as given at the Toronto Geological Congress—namely, 27,000,000,000 tons—are excessively over-estimated. The Toronto Geological Congress based its estimates on the Provinces of Valle and Cauca, 20,000,000,000 tons; Cundinamarca and Boyaca, 6,000,000,000 tons; and Antioquia, 1,000,000,000 tons. A more recent investigation carried out by Dr. Grosse, and published in 1927, gives the resources of Antioquia as 2,500,000,000 tons down to a depth of 1,000 metres. In Chili, according to M. Lux ("Glückauf," May 28, 1927), the total coal resources lie in the vicinity of 200,000,000 tons, with a present annual production of about 2,000,000 tons. These resources represent known deposits, but they do not cover all the possible reserves available in the territory, regarding which no satisfactory information is available.

The coal resources of the United States, as given at the 1924 World Power Conference, are shown in Table XIII. Anthracite has not been included. There is room for a new statistical compilation giving all recent modifications and bringing the Toronto estimates up-to-date, but it would be inadvisable to do so until further information is available. We have indicated the principal countries regarding which more recent statistics have been prepared. They include the United States, Germany, Holland, Austria, Czecho-Slovakia, Hungary, Roumania, Russia, China, Spitzbergen and Bear Island, India, New Zealand, Australia, South Africa, Colombia and Chili.

Production

The hard coal, brown coal, and coke production of the world, over the periods 1913, 1921-27, has been compiled by the German State Coal Association for the consideration of the German State Coal Council, and we have decided to adopt their statistics in preference to all others. Examination of these statistics shows

TABLE XIII

ESTIMATED COAL RESERVES OF THE UNITED STATES, EXCLUSIVE OF ANTHRACITE, AND THEIR AVERAGE HEATING VALUES, EXPRESSED IN BRITISH THERMAL UNITS

State	Lignite		Sub-bituminous		Bituminous		Semi-bituminous	
	Short Tons	B.T.U.	Short Tons	B.T.U.	Short Tons	B.T.U.	Short Tons	B.T.U.
Alabama	—	—	—	—	35,582,000,000	13,500	—	—
Arkansas	60,000,000	6,000	—	—	90,700,000	13,500	854,800,000	13,500
Arizona	—	—	761,000,000	10,500	6,700,000	11,000	—	—
California	—	—	7,000,000	9,000	18,000,000	11,600	—	—
Colorado	—	—	69,430,000,000	9,800	141,980,000,000	12,100	—	—
Georgia	—	—	—	—	—	—	300,000,000	14,000
Idaho	—	—	60,000,000	8,500	300,000,000	12,200	—	—
Illinois	—	—	—	—	122,021,000,000	11,600	—	—
Indiana	—	—	—	—	34,724,000,000	11,400	—	—
Iowa	—	—	—	—	14,477,700,000	10,700	—	—
Kansas	—	—	—	—	19,755,000,000	12,500	—	—
Kentucky	—	—	—	—	81,561,000,000	13,200	—	—
Maryland	—	—	—	—	1,005,000,000	13,000	4,094,700,000	14,00
Michigan	—	—	—	—	1,000,000,000	11,700	—	—
Missouri	—	—	—	—	42,000,000,000	11,000	—	—
Montana	200,000,000,000	6,200	32,000,000,000	9,000	1,895,000,000	10,700	—	—
New Mexico	—	—	115,250,000,000	11,000	11,840,000,000	12,000	—	—
North Carolina	—	—	—	—	56,000,000	13,700	—	—
North Dakota	400,000,000,000	6,300	—	—	61,272,000,000	12,500	—	—
Ohio	—	—	—	—	31,171,000,000	13,200	4,000,000,000	13,400
Oklahoma	—	—	—	—	—	—	—	—
Oregon	—	—	3,000,000,000	8,200	1,500,000,000	8,400	—	—
Pennsylvania	—	—	—	—	35,230,800,000	13,500	8,624,980,000	14,000
South Dakota	400,000,000	6,000	—	—	—	—	—	—
Tennessee	—	—	—	—	16,886,000,000	13,400	—	—
Texas	15,300,000,000	7,000	—	—	5,941,000,000	12,000	—	—
Utah	—	—	2,500,000,000	10,600	64,080,000,000	12,800	—	—
Virginia	—	—	—	—	19,050,000,000	13,800	264,500,000	14,500
Washington	—	—	26,000,000,000	8,500	7,484,000,000	11,400	—	—
West Virginia	—	—	—	—	94,214,000,000	13,500	18,764,000,000	14,500
Wyoming	—	—	393,160,000,000	9,500	53,563,000,000	12,000	—	—
Totals	615,760,000,000		642,168,000,000		898,703,900,000		36,902,980,000	

Available lignite equivalent to	276,420,000,000	tons of coal of 14,000 B.Th.U.
Available sub-bituminous coal equivalent to	446,560,000,000	tons of coal of 14,000 B.Th.U.
Available bituminous coal equivalent to	799,238,000,000	tons of coal of 14,000 B.Th.U.
Available semi-bituminous coal equivalent to	37,380,600,000	tons of coal of 14,000 B.Th.U.
Total	1,559,598,600,000	

The short ton (2,000 pounds = 907 kilograms) is used throughout this statement.

[*To face p.* 30.

TABLE XIV—COAL PRODUCTION OF THE WORLD

	In Million Metric Tons								Development (1913=100)						
	1913	1921	1922	1923	1924	1925	1926	1927	1921 %	1922 %	1923 %	1924 %	1925 %	1926 %	1927 %
EUROPE:															
England	292·0	165·9	253·6	280·4	271·4	247·1	128·3	263·5	56·8	86·8	96·0	92·9	84·6	43·9	90·2
Germany (excluding the Saar, Palatinate, Upper Silesia and Alsace-Lorraine)	140·8	113·9	119·2	62·3	118·8	132·6	145·3	153·6	80·9	84·7	44·2	84·4	94·2	103·2	109·1
Saar	12·4 }	9·6	11·2	9·2	14·0	13·0	13·7	13·6	72·7	84·9	69·7	106·1	98·5	103·8	103·0
Palatinate	0·8 }														
Upper Silesia	32·3	22·4	25·6	26·4	23·7	21·4	25·8	27·6	69·3	79·3	81·7	73·4	66·3	79·9	85·4
Alsace-Lorraine ..	3·8	3·4	4·2	4·2	5·3	5·3	5·3	5·4	89·5	110·5	110·5	139·5	139·5	139·5	142·1
France (excluding Alsace-Lorraine) ..	40·1	24·8	26·9	33·5	38·7	41·8	46·1	46·4	61·8	67·1	83·5	96·5	104·2	115·0	115·7
Belgium	22·8	21·8	21·2	22·9	23·4	23·1	25·3	27·6	95·6	93·0	100·0	102·6	101·3	111·0	121·1
Holland..	1·9	3·9	4·6	5·3	5·9	6·8	8·6	9·2	205·3	242·1	279·0	310·5	357·9	452·6	484·2
Czecho-Slovakia ..	14·3	12·0	9·9	12·4	14·4	12·8	14·4	14·7	83·9	69·2	86·7	100·7	89·5	100·7	102·8
Austria and Hungary ..	1·4	1·3	1·1	1·0	0·8	1·0	1·0	1·0	92·9	78·6	71·4	57·1	71·4	71·4	71·4
Poland & Upper Silesia	8·9	7·6	9·2	9·7	8·5	7·6	9·9	10·3	85·4	103·4	107·9	95·5	85·4	111·2	115·7
Russia	27·3	7·2	7·9	9·0	11·1	13·9	26·5†	31·1‡	26·4	28·9	33·0	40·7	50·9	97·1	113·9
Spain	4·0	5·0	4·4	5·9	6·1	6·1	6·5	6·0	125·0	110·0	147·5	152·5	152·5	162·5	150·0
Jugoslavia§	3·5	3·1	3·8	4·1	3·6	4·2	4·1	4·0*	88·6	108·6	117·1	102·9	120·0	117·1	114·3
Other Countries ..	0·5	1·8	2·6	3·1	3·2	2·0	2·0	1·5*	360·0	520·0	620·0	640·0	400·0	400·0	300·0
Total—Europe ..	606·8	403·7	505·4	489·3	548·9	538·7	462·8	615·5*	66·5	83·3	80·6	90·5	88·8	76·3	101·4
AMERICA:															
United States	516·6	457·9	430·7	594·7	516·6	526·0	594·7	542·9	88·6	83·4	115·1	100·0	101·8	115·1	105·1
Canada	13·4	10·5	10·7	12·6	9·1	8·6	11·7	12·3	78·4	79·9	94·0	67·9	64·2	87·3	91·8
South America.. ..	1·6	1·9	1·9	2·0	2·3	2·0	2·0	1·8*	118·8	188·8	125·0	143·8	125·0	125·0	112·5
Other Countries ..	—	—	0·4	0·3	0·3	0·2	0·2	0·2*	—	—	—	—	—	—	—
Total—America ..	531·6	470·3	443·7	609·6	528·3	536·8	608·6	557·2*	88·5	83·5	114·7	99·4	101·0	114·5	104·8
ASIA:															
Japan	21·4	26·2	27·7	28·9	30·1	29·2	29·3	30·5*	122·4	129·4	135·0	140·7	136·5	136·9	142·5
China	13·2	19·5	20·0	24·2	18·6	20·0	22·0*	18·0*	147·7	151·5	183·3	140·9	151·5	166·7	136·4
British India	16·5	19·6	19·3	19·1	20·6	20·2	20·4	22·3	118·8	117·0	115·8	124·8	122·4	123·6	135·2
Siberia	2·6	0·8	1·3	1·3	2·0	2·3	3·2†	3·6‡	30·8	50·0	50·0	76·9	88·5	123·1	138·5
Other Countries ..	1·0	0·1	1·0	0·3	0·3	—	—	—	10·0	100·0	30·0	30·0	—	—	—
Total—Asia	54·7	66·2	69·3	73·8	71·6	71·7	74·9	74·4*	121·0	126·7	134·9	130·9	131·1	136·9	136·0
AFRICA:															
Union of S. Africa ..	7·9	10·3	8·8	10·8	11·3	16·4	12·5	11·6*	130·4	111·4	136·7	143·0	207·6	158·2	146·8
Other Countries ..	0·8	0·5	0·5	0·6	0·6	0·7	0·9	0·5*	62·5	62·5	75·0	75·0	87·5	112·5	62·5
Total—Africa.. ..	8·7	10·8	9·3	11·4	11·9	17·1	13·4	12·1*	124·1	106·9	131·0	136·8	196·6	154·0	139·1
OCEANIA:															
Australia	12·5	13·0	12·4	12·8	14·1	14·7	14·5	14·2*	104·0	99·2	102·4	112·8	117·6	116·0	113·6
Other Countries ..	2·0	4·0	1·7	4·0	4·0	4·0	5·0	3·0*	200·0	85·0	200·0	200·0	200·0	250·0	150·0
Total—Oceania ..	14·5	17·0	14·1	16·8	18·1	18·7	19·5	17·2*	117·2	97·3	115·9	124·8	129·0	134·5	118·7
WORLD TOTAL ..	1216·3	968·0	1041·8	1200·9	1178·8	1183·0	1179·2	1276·4*	79·6	85·7	98·7	96·9	97·3	96·9	104·9

*Provisional. †1926-27. ‡1927-28. §Including Brown Coal.

TABLE XV—BROWN COAL PRODUCTION OF THE WORLD

Country	Production in 1,000 tons								Development (1913=100)						
	1913	1921	1922	1923	1924	1925	1926	1927	1921	1922	1923	1924	1925	1926	1927
Germany	87,233	123,064	137,179	118,785	124,637	139,725	139,151	150,806	141·1	157·3	136·2	142·9	160·2	159·5	172·9
Czecho-Slovakia ..	23,017	21,335	18,942	16,266	20 507	18,789	18,614	20,028	97·7	82·3	70·7	89·1	81·6	81·9	87·0
Austria	2,621	2,797	3,136	2,685	2,786	3,033	2,958	3,077	106·7	119·6	102·4	106·3	115·7	112·9	117·4
Hungary	5,954	4,963	6,177	6,842	5,751	5,329	5,822	6,243	83·4	103·7	114·9	96·6	89·5	97·8	104·9
France	800	736	758	864	939	1,007	1,056	1,067	92·0	94·8	108·0	117·4	125·9	132·0	133·4
Holland	—	122	29	54	191	208	211	263	—	—	—	—	—	—	—
Italy	697	1,026	745	953	917	1,105	1,181	*1,078	147·2	106·9	136·7	131·6	158·5	169·4	154·7
Spain	277	409	330	394	412	403	400	412	147·7	119·1	142·2	148·7	145·5	144·4	148·7
Poland	192	256	219	171	88	66	76	*77	133·3	114·1	89·1	45·8	34·4	39·6	40·1
Bulgaria	348	886	957	1,013	1,152	1,157	1,206	*1,145	238·2	275·0	291·1	331·0	332·5	346·6	329·0
Greece	—	170	132	118	131	136	145	135	—	—	—	—	—	—	—
Russia	2,936	704	484	804	1,539	901	1,240	935	24·0	16·5	27·4	52·4	30·7	42·2	31·8
United States ..	470†	1,483	1,974	2,184	1,993	*2,125	2,091	*1,795	315·5	420·0	464·7	524·0	452·1	444·9	381·9
Canada	193	2,986	3,088	2,800	3,219	3,285	3,262	3,466	1,547·1	1,600·0	1,450·8	1,667·9	1,702·1	1,690·2	1,795·9
Other Countries ..	250	600	600	600	600	600	600	600	240·0	240·0	240·0	240·0	240·0	240·0	240·0
WORLD TOTAL	124,988	161,537	174,750	154,533	164,862	177,869	178,013	* 191,127	129·2	139·8	123·6	131·9	142·3	142·4	152·9

*Provisional Figure. †1914.

TABLE XVI—COKE PRODUCTION OF THE WORLD

Country	Production in 1,000 tons								Development (1913=100)						
	1913	1921	1922	1923	1924	1925	1926	1927	1921	1922	1923	1924	1925	1926	1927
Germany	34,630[1]	28,901[2]	30,225[3]	14,071	24,885	28,397	29,297	32,261	83·5	87·3	40·6	71·9	82·0	78·8	93·2
England	13,004	4,647	9,181	13,635	12,957	11,186	4,790	12,000[7]	35·7	70·6	104·9	99·6	86·0	36·8	—
Saar	1,697	177	253	133	216	272	255	262	10·4	14·9	7·8	12·7	16·0	15·0	15·4
France	4,027	1,861	2,362	4,287	4,600	3,070[4]	3,767	4,068	46·2	58·7	106·5	114·2	76·2	93·5	101·9
Poland (Upper Silesia)	981	1,184	1,331	1,376	950	964	1,115	1,402	120·7	135·7	140·3	96·8	98·3	113·7	142·9
Belgium	3,523	1,402	2,850	4,157	4,160	4,108	4,956	5,387	39·8	80·9	118·0	118·1	116·6	140·7	152·9
Holland	—	—	452	672	976	1,144	1,199	1,285	—	—	—	—	—	—	—
Czecho-Slovakia ..	2,562	1,136	878	1,474	2,219	1,558	1,524	2,477	44·3	34·3	57·5	86·6	60·8	59·5	96·7
Russia	4,443	104[5]	112[5]	262[5]	462[5]	1,115[7]	2,800[7]	3,900[7]	2·3	2·5	5·9	10·4	25·1	63·0	87·8
Spain	596	446	383	244	848	878	832	863[7]	74·8	64·3	40·9	142·1	147·3	139·6	144·8
Italy	498	34	168	275	310	512	592	496[7]	6·8	33·7	55·2	62·3	102·8	118·9	99·6
United States ..	42,002	22,941	33,679	51,625	40,161	46,509	51,589	46,199	54·6	80·2	122·9	95·6	110·7	122·8	110·0
Canada	1,380	861	616	1,038	1,243	1,335	1,839	1,797	62·4	44·6	75·2	90·1	96·3	133·3	130·2
Other Countries ..	620	1,354	768	1,200	750	750	750	750	218·4	123·9	193·6	121·0	121·0	121·0	121·0
WORLD TOTAL[6]	107,285	63,864	83,258	94,449	94,737	101,798	103,305	113,147	59·5	77·6	88·0	88·3	94·9	96·3	105·5

[1]Old Boundary. [2]Not including Saar. [3]Not including Upper Silesia. [4]Production of colliery cokeries only. [5]Donez district only. [6]In so far as the figures for the Saar and Upper Silesia are also included in the total for Germany, they are not duplicated in the World Total. [7]Provisional.

[*To follow Table XIII*

that the 1913 output has only been exceeded once—namely, in 1927—and that by a very small margin, so that we can assume that the coal output of the world is practically stationary. We can also assume that the fuel and power requirements of the world are being met to a much lesser extent by coal than before. This has been due partly to the study of fuel economy, partly to the higher efficiency of power-generating and power-consuming plant, and partly to the wider use of substitutes for coal fuel, such as oil and water power.

Examination of statistics for separate continents shows that the greatest relative increase has taken place in Asia, due to developments in Japan and British India. In Europe, with the exception of 1927, there has been a heavy decline from the pre-war total, in spite of the fact that Germany has more than recovered her pre-war position. The decline has been due to a fall in British production, followed by a fall in Russia and Upper Silesia. France, Belgium, and Holland have shown a decided upward movement, the Dutch figure being specially noteworthy in this connection. Russia has now exceeded her pre-war level. In America, the statistics for the United States have shown a tendency to move forward, very slightly, however, while Canada, owing to the enormous increase in water power development, has registered a slight decline. Among other countries, the Union of South Africa has shown the greatest relative improvement.

Examination of world production makes clear, above all, the fact that no excessive strain will be laid on existing sources by any rapid increase, either in production or consumption. The tendency is towards decline, and this tendency, if it does become accentuated, must render less urgent the effective utilisation of coal resources.

In brown coal, which only accounts for a very small percentage of the world's fuel consumption, progress have been fairly rapid since 1913, the output in 1927 being 53 per cent. above that of 1913. The countries responsible for this development were, above all, Germany with an increase of 73 per cent., Canada with an increase of 1,696 per cent., Bulgaria with an increase of 229 per cent., and France with an increase of 33 per cent.; the only three countries showing a serious decline being Czecho-Slovakia, Poland, and Russia. Germany is now responsible for almost 80 per cent. of the world's production, so that, if we except that country, we can consider developments in this sphere as of practically no significance.

In coke production, although there has been a steady upward movement since 1921, when the output was only 69.5 per cent. of the pre-war total, it was only in 1927 that the pre-war average was exceeded, the net increase being 5.5 per cent. The three countries showing the greatest relative improvement are Belgium, Poland, and Spain. Germany has not yet reached the pre-war average, France has barely exceeded it, while Great Britain is probably now producing on a 1913 level. The greatest decrease of all has been registered by the Saar, followed by Russia and Czecho-Slovakia.

The significance of coke production from a power point of view lies in the fact that coke is used almost entirely for heating purposes, and the coal which goes towards its production should be subtracted from the total coal output of the world used for power purposes. Thus the coke statistics given bear almost entirely on metallurgical and foundry coke and not on gasworks, so that the statistics given here are not complete. Even so, at least 150,000,000 tons of coal out of a total annual world production of 1,200,000,000 tons are devoted to coke production.

The by-products derived from coal distillation form in themselves power resources of some considerable importance. Thus, we find from the German statistics that one ton of coke supplies 100 cubic metres of gas for illuminating, power, heating, and metallurgical purposes, so that the world output on this basis would account for 11,300,000,000 cubic metres of gas, equivalent to 400,000,000,000 cubic feet. Similarly, other by-products include benzoles, fuel oils, motor oils, and light oils of various kinds, all of them capable of producing power. Any calculation made, therefore, of the power production of the world would require to make allowance for these by-products. In view, however, of the fact that no reliable statistics have been compiled of by-product recovery from the distillation of coal for more than the principal industrial countries, it is difficult to make an estimate which could be regarded as reliable.

In addition to this by-product gas, one must consider the output of natural gas, principally from the oil wells. The only statistics available, covering seven countries, show that the world's output of natural gas is about 1,360,000,000,000 cubic feet, which is almost four times the volume of gas available from the distillation of coal used in the manufacture of coke.

TABLE XVII

PRODUCTION OF NATURAL GAS

(000 cu. ft.)

Country	1924	1925	1926
U.S.A.	1,141,521,000	1,188,571,000	1,313,019,000
Canada	14,881,336	16,902,897	18,431,252
Poland	15,465,869	18,893,736	Not available
Roumania	12,795,223	13,060,119	13,304,994
Jugo-Slavia	3,000,000*	3,000,000*	3,000,000*
Japan	885,000	819,497	802,000
Italy	236,609	244,866	209,770

*Approximate.

The oil resources of the world, as estimated by the U.S. Geological Survey, are given in the following table in millions of barrels, the ratio of barrels to tons being 7 in 1, *i.e.*, seven barrels in one ton.

TABLE XVIII

OIL RESOURCES OF THE WORLD

Country	Millions of Barrels	Per cent. of World Production	Relation between U.S. resources and resources of other countries
U.S.A.	7,000	16·26	100·00
Canada	995	2·31	14·21
Mexico	4,525	10·51	64·64
Northern South America (including Peru)	5,730	13·31	81·86
Southern South America (including Bolivia)	3,550	8·25	50·71
Algeria and Egypt	925	2·15	13·21
Persia and Mesopotamia ...	5,821	13·52	83·14
S.E. Russia, S.W. Siberia and the Caucasus	5,830	13·54	83·29
Northern Russia and Sachalin	925	2·15	13·21
Roumania, Galicia and Western Europe	1,135	2·64	16·21
Japan and Formosa	1,235	2·87	17·64
China	1,375	3·19	19·64
India	995	2·31	14·21
East Indies	3,015	7·00	43·07
World	43,055	100·00	—

The third column of the table shows the relation between the output of the United States and the output of the principal countries of the world. The United States has still the highest volume of oil resources in the world, but it is followed closely by Southern

TABLE XIX

ESTIMATED WORLD PRODUCTION OF OIL

(000 Metric Tons)

Country	1919	1920	1921	1922	1923	1924	1925	1926	1927
Canada ...	31·92	26·08	25·17	23·71	22·77	23·33	21·34	48·27	63·51
India ...	1,156·95	993·38	909·14	1,026·49	1,003·31	1,086·67	1,000·00	1,059·60	1,086·09
Sarawak ...	—	—	186·89	390·73	514·83	600·00	595·00	569·54	662·25
Trinidad ...	243·85	275·90	311·81	323·81	404·09	537·30	580·99	658·47	712·61
France ...	45·56	51·48	51·92	60·00	66·62	58·13	63·65	75·03	82·58
Germany ...	30·99	28·09	26·49	34·97	46·89	46·67	54·67	79·47	92·72
Czecho-Slovakia ...	—	—	—	15·89	13·25	13·33	9·00	6·62	18·54
Italy ...	4·64	4·53	4·64	4·83	4·24	4·40	4·50	5·96	7·95
Poland ...	801·85	742·53	705·60	732·43	737·18	770·79	811·91	796·09	722·60
U.S.A. ...	50,029·01	59,120·26	62,618·53	73,006·23	97,864·53	95,461·09	100,641·93	102,723·35	119,715·32
Mexico ...	11,532·85	21,661·59	25,836·29	24,527·15	19,939·79	18,613·00	15,310·29	11,930·11	8,492·87
Colombia ...	—	—	—	42·38	56·42	66·67	134·27	853·78	1,933·78
Peru ...	346·49	373·07	472·52	715·23	844·37	1,053·33	1,221·90	1,456·95	1,298·01
Venezuela ...	56·29	60·53	142·78	288·74	503·31	1,200·87	2,790·00	4,930·60	8,529·80
Argentina ...	156·69	220·66	231·39	357·62	430·46	512·53	780·00	602·65	1,152·32
Russia ...	3,377·22	3,368·16	3,774·83	3,973·51	5,055·23	6,021·60	6,933·34	8,211·92	9,589·40
Roumania ...	876·03	984·81	1,105·56	1,365·77	1,509·80	1,851·23	2,313·42	3,241·33	3,661·36
Persia ...	849·27	1,636·11	1,933·78	2,960·27	3,311·26	4,246·00	4,622·00	4,688·74	4,874·17
Dutch East Indies ...	2,043·44	2,321·75	2,384·11	2,315·23	1,986·76	2,800·00	2,267·00	2,874·17	2,834·44
Japan and Formosa ...	288·08	283·41	344·37	257·62	224·50	213·33	266·00	241·06	225·17
Other Countries ...	100·25	135·47	133·24	13·84	27·81	19·14	17·27	8·24	26·49
TOTAL ...	72,170·19	92,425·82	101,355·47	112,594·72	134,704·78	135,347·02	140,610·33	145,227·52	165,950·18

Russia, South-Western Siberia, and the Caucasus, by Persia and Mesopotamia, and by the Northern States of South America, including Peru. Other countries which enter into consideration are Mexico, the Dutch East Indies, China, Japan, and India. These estimates, of course, represent very largely an intelligent guess, and suffer from the defects already indicated by Dr. Gustav Egloff. They can only be regarded as extremely provisional.

The world production of oil since 1919 is shown in the following table, the source of information being the "Petroleum Year Book, 1928." Production has increased 130 per cent. in eight years, the United States being responsible for the greater part of this increase. The American output has risen from 50,000,000 metric tons in 1919 to 120,000,000 tons in 1927—an increase of 138 per cent.—the American proportion of the world total being now 72.5 per cent. In Mexico, there has been a steady decline since 1921, Indian production has remained stationary, and the rate of expansion in the Dutch East Indies has shown a tendency to decline since 1924. In Japan and Formosa and in Poland the output has been stationary during the whole of eight years, and in both countries there is a tendency to decline. The countries in which the greatest progress has taken place are Colombia, Argentina, Venezuela, Peru, Persia, Russia, and Roumania, followed at a considerable distance by Trinidad. The American Continent, both North and South, with the exception of Mexico, is being developed as a whole much more rapidly than the rest of the world.

It is unnecessary to make any comparison between annual output and resources, with a view to establishing the rate of exhaustion. If this were done, the inevitable assumption would be that the United States would have only seven years or so before complete exhaustion will take place. It is hardly possible to place any credence in such a calculation, and a more reliable assumption would be that the estimate made of the oil resources of the world is subject to radical modification, as the technique of mining and of oil extraction changes and the distillation of the crude into more refined products becomes adapted to economic conditions and more complete technical knowledge.

[World Power Conference. International Executive Council]

STATISTICAL YEAR-BOOK

OF THE

WORLD POWER CONFERENCE

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by

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II. SOLID FUELS

A.—COALS, BROWN COAL, LIGNITE, AND PEAT

SCOPE AND MEANING OF THE STATISTICS

ALL the statistics of the resources, production, stocks, imports, exports, bunker shipments, and domestic consumption of coals, brown coal, lignite, and peat, which are printed in Tables 1-4 in roman type, were collected on the forms adopted by the World Power Conference; they should, therefore, conform to the standard definitions which precede those tables. Most of the statistics which are printed in italics were extracted by the Editor from various published sources, and do not necessarily conform to the standard definitions. Exceptionally, statistics of consumption printed in italics were computed by the Editor from the figures in the preceding columns, either by ignoring unascertained changes in stocks or on the basis of information extracted from published sources. The statistics of resources relate to various dates, and it is not always certain that the stated date of report (Table 1, Column 1) is the date at which the estimates were made. This is particularly true of the estimates of resources extracted from *The Mineral Industry of the British Empire and Foreign Countries—War Period—Coal, Coke, and By-Products* (1913–1919) and reproduced in Table 1 by permission of the Controller of H.M. Stationery Office. Most of these estimates were based, with adjustments for changes in international boundaries, upon the estimates obtained by the Executive Committee of the International Geological Congress held in Canada in 1913, but may have been made at earlier dates. In view of this uncertainty as to the dates of the actual estimates, and also in view of the very approximate nature of some of the figures, no attempt has been made to reduce them by the quantities of fuel extracted since the date of report.

The statistics of resources, especially of coal, presented in Table 1, are in one sense fairly comprehensive. The largest areas for which no estimates are presented are in Africa, Asia, and Central and South America; it is known that coal reserves exist in many countries in these areas, but for various reasons—the inaccessibility or poor quality of the coal, greater cheapness of imported or of other forms of fuel, or smallness of local need for fuel—exploitation of these resources has hardly begun, and their magnitude has not been even approximately estimated. The statistics of resources in Europe are nearly complete, the only countries for which no estimates for coals are presented being Iceland, Latvia, Lithuania, Luxemburg, Portugal, and Roumania—none of first importance in this connection. In North America only Greenland and Newfoundland are omitted, and the great bulk of the known reserves in Australasia is included. The statistics of reserves of brown coal, lignite, and peat are less complete, and, outside Europe, fragmentary.

The statistics of the production of coal (Table 2, Column 1) are very nearly complete. In Europe only Greece, Iceland, Lithuania, and Luxemburg, and in North America only Greenland and Newfoundland, are omitted. Most of the omissions in other continents are obviously due to the relative unimportance of coal production in the countries concerned. The statistics of coal stocks (Table 2, Columns 2 and 3) are fragmentary, it being evident that in many countries such statistics are not compiled. Despite a number of omissions, it is believed that the bulk of the foreign trade in coal is included in Columns 4 and 5 of Table 2. The figures for consumption, being dependent on the availability of several different statistics, are by no means complete; and in some of those returned by the National Committees and other reporting organizations, as well as in some of those compiled by the Editor, no account has been taken of possible, but unascertained, changes in stocks.

The statistics of the production of brown coal and lignite (Table 3, Column 1) are fairly complete as regards Europe, only Belgium, Denmark, Hungary, Latvia, Lithuania, Luxemburg, and Sweden being omitted; the statistics for the rest of the world are fragmentary. It is evident that in many countries statistics of stocks of brown coal and lignite (Table 3, Columns 2 and 3) are not compiled. Foreign trade in these fuels (Table 3, Columns 4 and 5) is nowhere of great importance, and many omissions are doubtless due to the negligibility of the statistics. As with coals, some of the figures for the consumption of brown coal and lignite have been computed without regard to possible changes in stocks.

The statistics of the production of peat (Table 4), all of which were supplied on the forms adopted by the World Power Conference, are not numerous.

CONTINENTAL AND WORLD TOTALS

The figures of total resources of coals, brown coal, lignite, and peat, presented in Table A, have been obtained by the simple addition of those contained in the corresponding columns of Table 1. In the latter table instances may be found where there is an entry for " proved resources " and none for " probable total resources "; and other instances in which there is an estimate of " probable total resources " but none of " proved resources ". Furthermore, the estimates for different countries relate to different dates. The significance of the totals in Table A is therefore merely the literal one that available estimates of proved or of probable total resources amount, in the aggregate, to so many million metric tons.

TABLE A: COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES
(In Millions of Metric Tons *)

	Coals		Brown Coal and Lignite		Peat
	Proved Reserves	Probable Total Reserves	Proved Reserves	Probable Total Reserves	Probable Total Reserves
Column Numbers in Table 1:	2	3	4	5	6
Certain countries in :—					
Europe	548,400	1,561,800	60,100	270,600	104,600
North America	30,300	2,286,400	391,300	1,441,400	13,400
Central and S. America	2,100	1,100	—	—	100
Africa	9,300	209,700	—	11,900	—
Asia	10,900	10,155,500	100	1,100	—
Australasia	21,400	140,800	10,700	600	—
Totals	622,400	14,355,300	462,200	1,725,600	118,100

* The figures in this table are stated correct to the nearest hundred million metric tons.

The large figure for probable total reserves of coals in Asia is due almost entirely to the estimate for China (10,112,000 million metric tons). With this exception the estimates of coal reserves in the United States of America are by far the largest, with the U.S.S.R. next, and Germany and the United Kingdom following, in order of magnitude.

Continental and world totals of the production of coals in 1933 and 1934, based on the statistics of Table 2, Column 1, are presented in Table B; they include the bulk of coals produced, the figures for Europe being particularly comprehensive, and relate to the same countries in both years. The proportions produced in the different continents are shown, together with the percentage changes from 1933 to 1934; in view of the approximate nature of the totals for the continents, these percentages are stated only to the nearest unit. Statistics of stocks, imports, exports, bunker shipments, and domestic consumption being less complete than those of production, no attempt has been made to compute continental or world totals of these figures.

TABLE B: PRODUCTION OF COALS—1933 AND 1934

	1933		1934		1934 as Percentage of 1933
	Millions of Metric Tons	Percentage of Total	Millions of Metric Tons	Percentage of Total	
Certain countries in :—					
Europe (25 countries *a*)	530	*55*	578	*55*	*109*
North America *b* (2 countries)	355	*37*	387	*37*	*109*
Central & S. America (6 countries)	3	*c*	3	*c*	*113 d*
Africa (8 countries)	11	*1*	13	*1*	*115 d*
Asia (7 countries)	57	*6*	68	*6*	*119 d*
Australasia (2 countries)	11	*1*	11	*1*	*104 d*
Totals (50 countries)	967	*100*	1060	*100*	*110*

a Not counting Saar but including the production in that territory.
b Using revised figure for U.S.A., 1933 (see Table 2—1933, footnote *o*).
c Less than one per cent.
d Based on more precise figures of quantities than those given in this table.

The statistics of the production of brown coal, lignite, and peat outside Europe are fragmentary; those of the production of peat are by no means complete even for Europe. The statistics of stocks, imports, exports, and consumption of brown coal and lignite are not an adequate basis upon which to compute continental and world totals. Accordingly, only the statistics of the production of brown coal and lignite (Table 3, Column 1) and of peat (Table 4) in Europe, and in the world as a whole, are summarized.

TABLE C: PRODUCTION OF BROWN COAL AND LIGNITE, AND OF PEAT—1933 AND 1934

(In Millions of Metric Tons)

	1933	1934	1934 as Percentage of 1933
Brown Coal and Lignite:			
22 countries in Europe	168	182	*108*
31 countries in the world *a*	174	188	*108*
Peat:			
12 countries in Europe	19·4	23·1	*120*

a Assuming the production in the United States of America to be 3 million metric tons in 1933 and 1934 (see Table 2—1933, note *p*; and Table 2—1934, note *k*).

The large increase in the production of peat is mainly due to an increase of nearly 32 per cent in the U.S.S.R.

TABLES 1, 2, 3, AND 4—DEFINITIONS

The following definitions (including the introductory paragraph), adopted by the World Power Conference, were distributed with the forms for the guidance of the organizations which supplied the statistics :

On account of the varying characteristics of coal in the several countries, of the different bases of classification employed, and of the fact that international study of coal classification is already in progress, it has been deemed inadvisable to attempt to segregate the higher ranking coals—anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from lignite and brown coal or which separate the latter from peat. It will, therefore, be the responsibility of each reporting country when submitting its statistics of solid fuels to determine for itself the basis of classification to be used in distinguishing the three groups to be reported : viz. coals, brown coal and lignite, and peat.

13. *Proved Reserves—Coals, Lignite and Brown Coal*

"Proved reserves" of coals, of lignite and of brown coal shall mean the total amounts thereof, occurring within the limits hereinafter prescribed, as are of economic value and with respect to which there exist reliable data of actual thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows :

(*a*) Coals : Seams containing not less than 30 centimetres of merchantable coal and situated not more than 1200 metres below the surface, including workable submarine seams.

(*b*) Lignite and Brown Coal : Seams containing not less than 30 centimetres of merchantable lignite or brown coal and situated not more than 500 metres below the surface.

14. *Probable Reserves—Coals, Lignite and Brown Coal*

"Probable reserves" of coals, of lignite and of brown coal shall mean the aggregate within the reporting country of proved reserves thereof plus such further reserves of economic value within the limits of thickness and depth of seams specified in paragraph 13 hereof, as may, from uncompleted investigations or from relation to proved reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

15. *Peat*

A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent of organic matter.

16. *Probable Reserves of Peat*

"Probable reserves of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

17. *Domestic Production—Coals, Lignite and Brown Coal*

"Domestic production" of coals, of lignite and of brown coal shall mean the gross amounts thereof raised to the pit-head, less the amounts of dirt or other waste removed in washeries or cleaning plants, plus any increase in weight between the pit-head and weighing-point due to absorption of water in washeries, but without deduction for other losses beyond point of weighing or for amounts used in operation of mines or collieries.

18. *Coal Stocks*

"Coal stocks" shall include the following:

(*a*) "Mine stocks," or the amounts held or stored at the producing properties, whether in dumps at pit-heads, in cars at colliery sidings, or otherwise, and whether billed to purchasers or not.

(*b*) "Stocks in transit," or amounts held or stored in railway classification yards or at points of transhipment from rail to water or water to rail while in process of domestic transit from producers to consumers.

(*c*) "Dealers' and consumers' stocks," or the amounts held in storage by coal dealers and by large industrial users, such as by-product coke ovens, railways, electric-power utilities, steel and rolling mills, etc. This item will, in general, include the stocks of only those dealers and consumers to whom, except in case of transhipment, delivery is made directly from mine or water terminal in car-load lots or in boats or barges.

(*d*) "Import stocks," or amounts of foreign coal held in storage at ports of entry pending shipment in domestic trade.

(*e*) "Export stocks," or amounts in storage at export points pending actual export.

(*f*) "Bunker stocks," or amounts held in storage at ports for fuelling vessels engaged in either foreign or domestic trade.

Statistics of stocks shall be reported in totals and may also be reported by the several classes above defined; but each reporting country in submitting its statistics shall state which of the preceding classes, if any, have been omitted from the total which it reports.

19. *Lignite and Brown Coal Stocks*

In so far as there regularly are within any reporting country stocks of lignite or of brown coal in significant quantities within the several classes as specified for coal in paragraph 18 hereof, data for such classes shall be considered necessary for a complete report on stocks. Each reporting country in which complete data are not available, or are not reported, shall state what classes have been included in making up its report.

20. *Conversion of Statistics of Products*

Where coal, brown coal or lignite are imported, exported, or carried in stock in the form of coke or briquettes or other manufactured product, such statistics before being reported shall be converted into terms of "raw" coal, brown coal or lignite, as the case may be, and the conversion factor or factors shall be given in the report.

TABLE 1

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In Millions of Metric Tons)

Name of Country	Date of Report	Coals		Brown Coal and Lignite		Peat
		Proved Reserves	Probable Total Reserves	Proved Reserves	Probable Total Reserves	Probable Total Reserves
0	1	2	3	4	5	6
EUROPE—						
Austria	1930	13	19	611	2,337	80
Belgium	1913	*11,000 a*	—	—	—	—
Bulgaria	1934	0·5	1·2	500	1,000	—
Czechoslovakia	1932	6,450	25,000	12,500	—	—
Danzig	1933	0	0	0	0	N
Denmark	1913	0	0	U	U	*240 b*
Estonia	1935	0	0	0	0	2,030
Finland	1932	0	0	0	0	U
France (including Saar)	1935	6,000	17,000	1,600	1,600	U
Saar	1922	9,205	9,205	0	0	0
Germany *c*	1922	71,240	270,311	28,837	56,758	10,000
Greece	1913	*0*	U	*10*	*30*	—
Hungary	1932	200	200	1,550	1,550	120
Irish Free State	1934	107	—	U	U	3,600
Italy	1913	*1*	*146*	*51·5*	*101*	—
Latvia	1934	N	N	N	N	1,665
Netherlands	1913	*212·5*	*4,474 d*	U	U	U
Norway	1933	U	8,000 *A, e*	U	U	U
Poland	1934	13,988	47,793	1,500	5,000	5,500 *A, f*
Spain	1913	*4,500 g*	*5,500 g*	*h*	*h*	—
Sweden	1933	97	105	N	N	9,000 *A, f*
Switzerland	1934	0	0	0	0	N
U.S.S.R.	1933	295,900	998,000	12,890	202,000	72,330
United Kingdom	1933	129,500	176,000	N	—	U
Yugoslavia	1913	*2*	*33 i*	*58·6*	*247·5 i*	—
NORTH AMERICA—						
Canada	1913	*30,319*	*242,400*	*391,260*	*572,686*	U
United States of America *j*	1928	U	2,040,640	U	852,128	13,380
Alaska	1913	U	*3,354*	U	*16,559*	—
CENTRAL & S. AMERICA—						
Argentine	1933	0	50	0	0	80
Chile	1913	*2,116*	—	—	—	—
Honduras	1913	—	*1*	—	*4*	—
Peru	1919	—	*1,000*	—	—	—
AFRICA—						
Southern Rhodesia	1913	*420*	*570*	—	—	—
Union of S. Africa	1921–7	7,914	205,682 *k*	—	—	—
Belgian Dependencies, etc.—						
Belgian Congo	1913	—	*100*	—	—	—
British Dependencies, etc.—						
Nigeria *n*	1934	113	3,360	0	11,856	0
Nyasaland	1933	U	U	0	0	0
Tanganyika	1934	800	U	—	—	—
French Dependencies, etc.—						
French Morocco	1934	30	—	—	—	—
Tunis	1934	—	—	0·1	1	—
ASIA—						
China	1913	—	*10,112,000*	—	*600*	—
Japan Proper	1932	5,895	16,218	66	473	—
Manchuria	1913	—	*1,129*	—	—	—
British Dependencies, etc.—						
Federated Malay States	1935	U	U	*l*	*l*	*l*
India	1932	5,000	20,600	U	U	U
Sarawak	1934	0	0	2·66	13	0
Japanese Dependencies, etc.—						
Korea	1913	—	*5,585*	—	*27*	—
Netherlands Dependencies, etc.—						
Netherlands E. Indies	1933	U	U	U	U	U
AUSTRALASIA—						
Australia *m*	1927	*20,900*	*139,400*	*10,621*	U	—
New Zealand	1934	480	1,400	80	600	—

TABLE 1—NOTES

Figures compiled or computed by the Editor are shown in *italics*.

A	Approximate.
N	Negligible, unimportant.
U	Unrecorded, not available.
a	Within a depth of 1500 metres.
b	With a fuel value equal to that of 100 million metric tons of coal. Date of report of this figure : 1920.
c	Columns 3-6 exclude, and Columns 1 and 2 apparently exclude, Saar. (EDITOR.)
d	" Actual, probable, and possible reserves."
e	In Spitzbergen.
f	Computed on the basis of 25 per cent water content.
g	Including lignite.
h	Included in Columns 2 and 3.
i	" Possible reserves."
j	Excluding Alaska and other non-contiguous territories.
k	" Proved, estimated, and undetermined resources." " Proved and estimated resources " reported as 21,524 million metric tons.
l	No known deposits of economic value.
m	Large areas remain unprospected, and the figures presented relate only to resources which have been quantitatively estimated.
n	Including Cameroons under British Mandate.

TABLE 1—SOURCES

Where statistics were supplied on the forms adopted by the World Power Conference, the organization responsible for completing the forms is mentioned in roman type ; the sources from which the statistics were obtained, if reported, are mentioned in brackets. Where statistics were extracted from published sources by the Editor, the sources are mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference ; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Austrian National Committee (Columns 2-5 : Ministry of Commerce and Communications ; Column 6 : Ministry of Lands and Forests — Department of Research in Agricultural Chemistry).
Belgium	*Mineral Industry 1913–19.**
Bulgaria	Society of Bulgarian Engineers and Architects—Committee on Power.
Czechoslovakia	Czechoslovak National Committee (Association of Mine-owners of the Czechoslovak Republic).
Danzig	Danzig National Committee.
Denmark	Columns 2-5 : Danish National Committee. Column 6 : *Mineral Industry 1913–19.**
Estonia	Ministry for Economic Affairs.
Finland	Finnish National Committee (Finnish Industries Association for Power and Fuel Economy).
France	Central Committee for French Coal-mines.
Germany	German National Committee.
Greece	*Mineral Industry 1913–19.**
Hungary	Hungarian National Committee.
Irish Free State	Irish National Committee.
Italy	*Mineral Industry 1913–19.**
Latvia	Latvian National Committee.
Netherlands	Federation of Electro-technical and Allied Societies (Central Statistical Bureau).
Norway	Norwegian National Committee (Norwegian Scientific Exploration of Svalbard and Arctic Regions).
Poland	Polish National Committee (Ministry of Industry and Commerce).
Spain	*Mineral Industry 1913–19.**
Sweden	Swedish National Committee.
Switzerland	Swiss National Committee.
U.S.S.R.	Committee of International Scientific and Technical Conferences, Moscow
United Kingdom	Mines Department.
Yugoslavia	*Mineral Industry 1913–19.**
NORTH AMERICA—	
Canada	*Mineral Industry 1913–19.**
United States of America	American National Committee (Geological Survey).
Alaska	*Mineral Industry 1913–19.**
CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
Chile	*Mineral Industry 1913–19.**
Honduras	*Mineral Industry 1913–19.**
Peru	*Mineral Industry 1913–19.**
AFRICA—	
Southern Rhodesia	*Mineral Industry 1913–19.**
Union of S. Africa	South African National Committee (Office of Census and Statistics).
Belgian Dependencies, etc.—	
Belgian Congo	*Mineral Industry 1913–19.**
British Dependencies, etc.—	
Nigeria	Nigerian Railway (Geological Survey).
Nyasaland	Government Secretariat.
Tanganyika	Government Secretariat.
French Dependencies, etc.—	
French Morocco	French National Committee.
Tunis	French National Committee.
ASIA—	
China	*Mineral Industry 1913–19.**
Japan Proper	Japanese National Committee (Department of Commerce and Industry—Bureau of Mines).
Manchuria	*Mineral Industry 1913–19.**
British Dependencies, etc.—	
Federated Malay States	Chief Secretary to Government.
India	Department of Commercial Intelligence and Statistics (Geological Survey).
Sarawak	Sarawak Government Offices, London.
Japanese Dependencies, etc.—	
Korea	*Mineral Industry 1913–19.**
Netherlands Dependencies, etc.—	
Netherlands E. Indies	Netherlands E. Indies National Committee.
AUSTRALASIA—	
Australia	*Official Year Book of the Commonwealth of Australia, 1927.*
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

* The full title of this publication is *The Mineral Industry of the British Empire and Foreign Countries—War Period—Coal, Coke, and By-products (1913–1919)*, and it was issued by the Imperial Mineral Resources Bureau, London. Most of the estimates of resources presented in this publication were based, with adjustments for changes in international boundaries, upon the estimates obtained by the Executive Committee of the International Geological Congress held in Canada in 1913 and published in *Coal Resources of the World* (1913). Statistics have been reproduced from *The Mineral Industry of the British Empire and Foreign Countries* by permission of the Controller of H.M. Stationery Office.

TABLE 2

COALS—ANNUAL STATISTICS
(In Millions of Metric Tons)

1933

Name of Country	Production	Stocks: At Beginning of Year	Stocks: At End of Year	Imports	Exports	Bunker Coal Laden on Vessels engaged in Foreign Trade	Total Domestic Consumption (Cols. 1+2+4) −(Cols. 3+5 +6)
0	1	2	3	4	5	6	7
EUROPE—							
Austria	0·239	—	—	2·690	N	0	*2·929*
Belgium	*25·278*	—	—	—	—	—	—
Bulgaria	0·081	—	—	N	N	—	0·081
Czechoslovakia	10·532	0·324	0·400	1·147	1·369	0	10·231
Danzig	0	U	U	U, a	U, a	U	U
Denmark	0	U	U	5·334	U	U	U
Estonia	0	U	U	0·048	N	U	U
Finland	0	U	U	1·14 b	0	U	1·14 A
France (excluding Saar)	46·9	4·3	4·0	25·2 c	1·9	N	*70·5*
Saar	10·561	0·460	0·345	0·497 d	5·819 d	0	5·354
Germany (excluding Saar)	109·7	14·1	13·9	5·1	26·4 e	f	88·6
Hungary	0·8	—	—	0·19	0·11	0	0·88
Irish Free State	0·107	U	U	2·310	0·008 g	0	2·409
Italy	*0·334*	—	—	—	—	—	—
Latvia	0	—	—	0·482	0	0	0·482
Netherlands	12·6	1·2 h	1·5 h	7·4	5·6	1·7	12·4
Norway	0·355	—	—	2·313	0·075	—	2·593
Poland	27·4	2·5	1·7	0·1 x	9·4 x	0·3 x	18·6
Portugal	*0·2*	—	—	—	—	—	—
Roumania	*0·197*	—	—	—	—	—	—
Spain	*5·999*	—	—	—	—	—	—
Sweden	0·35	U	U	6·4	0·01	U	U
Switzerland	0	U	U	2·828	0	0	2·828
U.S.S.R.	66·93	4·37	5·83	0·55 i	1·86	j	64·16
United Kingdom	211·25	U	U	0·05	44·09 k	13·73 k	153·48
Yugoslavia l	0·379	0·108E	0·101 E	0·371	0·002	0·009 E	0·746
NORTH AMERICA—							
Canada	7·8	U	U	9·8	0·26 m	0·32 n	*17·0*
United States of America o	342·2 P, p, q	45·6 q	48·0 q	0·8 r	10·0 r	1·2 r	329·5
CENTRAL & S. AMERICA—							
Argentine	0	U	U	2·44	0	0·02	2·42
Brazil	*0·570*	—	—	—	—	—	—
Chile	*1·538*	—	—	—	—	—	—
Colombia	*0·2 E*	—	—	—	—	—	—
Mexico	*0·565*	—	—	—	—	—	—
Peru	*0·030*	—	—	—	—	—	—
AFRICA—							
Southern Rhodesia	*0·484*	—	—	—	—	—	—
Union of S. Africa	10·7	—	—	N	0·9	0·7	9·1
British Dependencies, etc.—							
Gambia	0	N	N	0·002	0	0	0·002
Nigeria	0·240	0·002 s	0·001 s	*0·026*	*0·024*	0	*0·243*
Nyasaland	0	0	0	*0·003*	0	0	*0·003*
Tanganyika	0	0	0	0·008 t	0	0	0·008 t
French Dependencies, etc.—							
Algeria	*0·030*	—	—	—	—	—	—
French Morocco	*0·027*	—	—	—	—	—	—
Tunis	0	0·051	0·056	0·219	0	0·013	0·201

TABLE 2—*continued*

COALS—ANNUAL STATISTICS
(In Millions of Metric Tons)

1933

Name of Country	Production	Stocks		Imports	Exports	Bunker Coal Laden on Vessels engaged in Foreign Trade	Total Domestic Consumption (Cols. 1+2+4) − (Cols. 3+5+6)
		At Beginning of Year	At End of Year				
0	1	2	3	4	5	6	7
ASIA—							
China	*19*	—	—	*2·0*	*0·6*	*N*	*20*
Japan Proper	32·524	1·847	1·226	3·496	1·560	3·592	31·489
Manchuria	*9 y*	—	—	—	—	—	—
Philippine Islands	*0·016*	—	—	—	—	—	—
Turkey	*1·860*	—	—	—	—	—	—
British Dependencies, etc.—							
Federated Malay States	0·223	*U*	*U*	*N*	0·033	0	*0·190*
India *u*	20·2	*U*	*U*	0·03 *v*	0·5 *v*	0·6 *v*	*19·3*
Sarawak	0	0	0	0	0	0	0
French Dependencies, etc.—							
French Indo-China	*1·591*	—	—	—	—	—	—
Japanese Dependencies, etc.—							
Formosa	1·533	0·119	0·072	—	—	—	—
Korea	1·306	—	—	0·491	0·006	—	—
Sakhalin	0·889	—	—	—	—	—	—
Netherlands Dependencies, etc.—							
Netherlands E. Indies	1·04 *y*	0·08	0·05	*U*	*U*	*U*	*U*
AUSTRALASIA—							
Australia	*9·24*	—	—	*N*	*0·30*	*0·57 w*	*8·37*
New Zealand	1·85	—	—	0·10	*N*	0·03	1·92

Figures compiled or computed by the Editor are shown in *italics*.

A Approximate.
E Wholly or partly estimated.
N Negligible, unimportant.
P Provisional, preliminary.
U Unrecorded, not available, not yet available.
a In consequence of the Customs Union with Poland, statistics of the trade across the Danzig-Polish frontier are not compiled.
b Including 0·186 million metric tons of coke reckoned as the same weight of coal, the calorific value of the coke being about the same (6,500-6,800 calories) as that of the imported coal.
c Including 4 million metric tons received from French-owned mines in the Saar.
d Year ended 31st March 1934.
e Including bunker shipments.
f Included in exports.
g Entirely or almost entirely re-exports of imported coal.
h Mine stocks only.
i " Production from old coal pits and bunker coal laden on vessels bound for foreign voyage." This quantity was treated wholly as an addition to the quantity available for consumption in obtaining the figure in Column 7.
j See note *i* (to Column 4).
k Including coke and manufactured fuel converted to coal equivalent at the rates: 67 tons of coke = 100 tons of coal, and 100 tons of manufactured fuel = 94 tons of coal.
l For conversion of coke and briquettes into coal equivalent it was assumed that 100 tons of coke = 150 tons of coal, and that 100 tons of briquettes = 93 tons of coal.
m Including Canadian coal delivered for bunker purposes to ships engaged in foreign trade.
n Includes only foreign coal ex-warehoused for ships' stores in both foreign and coastwise trades.
o The statistics presented for the United States of America are based upon a preliminary figure for production of 342·2 million metric tons; this has subsequently been officially revised to 347·6 million metric tons. (EDITOR.)
p Including lignite, which does not account for more than one per cent of the total.
q Including Alaska but excluding other non-contiguous territories of the United States.
r Customs area includes Alaska, Hawaii, and Puerto Rico.
s Excluding " Dealers' and consumers' stocks "—Item (*c*) of Definition 18 (see page 19).
t Imported and used by the railways.
u British India and Indian States.
v Sea-borne trade of British India only.
w Year ended 30th June 1933.
x In view of the Customs Union between Poland and Danzig the figures in Columns 4 and 5 must relate to the combined area; the same is probably true of the figure in Column 6. (EDITOR.)
y Including a small proportion of lignite.

TABLE 2—*continued*

COALS—ANNUAL STATISTICS
(In Millions of Metric Tons)

1934

Name of Country	Production	Stocks: At Beginning of Year	Stocks: At End of Year	Imports	Exports	Bunker Coal Laden on Vessels engaged in Foreign Trade	Total Domestic Consumption (Cols. 1 + 2 + 4) − (Cols. 3 + 5 + 6)
0	1	2	3	4	5	6	7
EUROPE—							
Austria	0·251	—	—	2·604	0	0	*2·855*
Belgium	*26·366*	—	—	—	—	—	—
Bulgaria	0·076	—	—	0	0	0	0·076
Czechoslovakia	*10·775*	—	—	—	—	—	—
Danzig	0	*U*	*U*	*U*, *a*	*U*, *a*	0·26	0·30 *E*
Denmark	0	*U*	*U*	5·613	*U*	*U*	*U*
Estonia	0	*U*	*U*	—	—	—	—
Finland	0	*U*	*U*	1·3	0	*U*	1·3
France (excluding Saar)	47·6	4·0	4·3	24·2 *b*	1·9	*N*	*69·6*
Saar	11·318	0·345	0·171	—	—	0	—
Germany (excluding Saar)	124·8	14·2	11·8	6·0	30·9 *c*	*d*	102·3
Hungary	0·76	—	—	0·24	0·09	0	0·91
Irish Free State	0·113	—	—	2·385	0·008 *e*	—	*2·490*
Italy	*0·367*	—	—	—	—	—	—
Latvia	0	—	—	0·469	0	0	0·469
Netherlands	12·3 *P*	1·5 *f*	*U*	8·4	5·55	2·35	*U*
Norway	0·449	—	—	2·309	0·149	—	2·609
Poland	29·2	1·7	1·7	0·1 *q*	10·4 *q*	0·4 *q*	18·5
Portugal	*0·2*	—	—	—	—	—	—
Roumania	*0·227*	—	—	—	—	—	—
Spain	*5·337*	—	—	—	—	—	—
Sweden	0·42	*U*	*U*	8·5	0·01	*U*	*U*
Switzerland	0	—	—	2·793	0	0	2·793
U.S.S.R.	81·94	5·83	8·00	0·25 *g*	2·05	—	77·97
United Kingdom	225·14	*U*	*U*	0·06	44·48 *h*	13·76 *h*	166·96
Yugoslavia	*0·387*	—	—	—	—	—	—
NORTH AMERICA—							
Canada *P*	9·6	*U*	*U*	11·5	0·31 *i*	0·26 *j*	*20·5*
United States of America	*377·3 P, k, l*	—	—	—	—	—	—
CENTRAL & S. AMERICA—							
Brazil	*0·622*	—	—	—	—	—	—
Chile	*1·804*	—	—	—	—	—	—
Colombia	*0·2 E*	—	—	—	—	—	—
Mexico	*0·630*	—	—	—	—	—	—
Peru	*0·035*	—	—	—	—	—	—
AFRICA—							
Southern Rhodesia	*0·643*	—	—	—	—	—	—
Union of S. Africa	12·2	—	—	*N*	1·2	0·7	10·3
Belgian Dependencies, etc.—							
Belgian Congo	*0·005*	—	—	—	—	—	—
British Dependencies, etc.—							
Gambia	0	*N*	0·001	0·002	0	0	0·001
Nigeria	*0·270*	—	—	—	—	—	—
Nyasaland	0	0	0	*0·004*	0	0	*0·004*
Tanganyika	0	0	0	0·006 *m*	0	0	0·006 *m*
French Dependencies, etc.—							
Algeria	*0·034*	—	—	—	—	—	—
French Morocco	0·036	0·034	0·050	0·150	0·005	—	—

TABLE 2—*continued*

COALS—ANNUAL STATISTICS
(In Millions of Metric Tons)

1934

Name of Country	Production	Stocks: At Beginning of Year	Stocks: At End of Year	Imports	Exports	Bunker Coal Laden on Vessels engaged in Foreign Trade	Total Domestic Consumption (Cols. 1+2+4) – (Cols. 3+5+6)
0	1	2	3	4	5	6	7
ASIA—							
China	*U*	—	—	*1·0*	*0·8*	*N*	—
Japan	40·332	1·376	1·560	4·687	1·263	4·292	39·280
Turkey	*2·288*	—	—	—	—	—	—
British Dependencies, etc.—							
Federated Malay States	0·328	*U*	*U*	0·001	0·035	0	*0·294*
India *n*	22·499	*U*	*U*	0·06 *o*	0·33 *o*	0·5 *o*	21·7
Sarawak	0	0	0	0	0	0	0
French Dependencies, etc.—							
French Indo-China	*1·592*	—	—	—	—	—	—
Netherlands Dependencies, etc.—							
Netherlands E. Indies	*1·032 r*	—	—	—	—	—	—
AUSTRALASIA—							
Australia	*9·51*	—	—	*0·01*	*0·62*	*0·53 p*	*8·37*
New Zealand	1·975	—	—	0·103	*N*	0·041	2·037

Figures compiled or computed by the Editor are shown in *italics*.

E Wholly or partly estimated.
N Negligible, unimportant.
P Provisional, preliminary.
U Unrecorded, not available, not yet available.
a In consequence of the Customs Union with Poland, statistics of the trade across the Danzig-Polish frontier are not compiled.
b Including 4·4 million metric tons received from French-owned mines in the Saar.
c Including bunker shipments.
d Included in exports.
e Entirely or almost entirely re-exports of imported coal.
f Mine stocks only.
g " Production from old coal pits and bunker coal laden on vessels bound for foreign voyage." This quantity was treated wholly as an addition to the quantity available for consumption in obtaining the figure in Column 7.
h Including coke and manufactured fuel converted to coal equivalent at the rates: 66 tons of gas coke = 100 tons of coal, 68 tons of other sorts of coke = 100 tons of coal, and 100 tons of manufactured fuel = 94 tons of coal.
i Including Canadian coal delivered for bunker purposes to ships engaged in foreign trade.
j Includes only foreign coal ex-warehoused for ships' stores in both foreign and coastwise trades.
k Including lignite, which does not account for more than one per cent of the total.
l Including Alaska but excluding other non-contiguous territories of the United States.
m Imported and used by the railways.
n British India and Indian States.
o Sea-borne trade of British India only.
p Year ended 30th June 1934.
q In view of the Customs Union between Poland and Danzig, the figures in Columns 4 and 5 must relate to the combined area; the same is probably true of the figure in Column 6. (EDITOR.)
r Including a small proportion of lignite.

TABLE 2—SOURCES

Where statistics were supplied on the forms adopted by the World Power Conference, the organization responsible for completing the forms is mentioned in roman type; the sources from which the statistics were obtained, if reported, are mentioned in brackets. Where statistics were extracted from published sources by the Editor, the sources are mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—

Austria	Austrian National Committee (Ministry of Commerce and Communications).
Belgium	*League of Nations—Statistical Year-book, 1934–35.*
Bulgaria	Society of Bulgarian Engineers and Architects—Committee on Power.
Czechoslovakia	Czechoslovak National Committee (Association of Mine-owners of the Czechoslovak Republic). *League of Nations—Statistical Year-book, 1934–35.*

TABLE 2—SOURCES—*continued*

EUROPE—*continued*	
Danzig	Danzig National Committee (National Statistical Office).
Denmark	Danish National Committee.
Estonia	Ministry for Economic Affairs.
Finland	Finnish National Committee (Finnish Industries Association for Power and Fuel Economy).
France	Central Committee for French Coal-mines.
Saar	German National Committee.
Germany	German National Committee.
Hungary	Hungarian National Committee.
Irish Free State	Irish National Committee.
Italy	*League of Nations—Statistical Year-book, 1934–35.*
Latvia	Latvian National Committee (Statistical Year Book of Latvia).
Netherlands	Federation of Electro-technical and Allied Societies (Central Statistical Bureau).
Norway	Norwegian National Committee (Norwegian Scientific Exploration of Svalbard and Arctic Regions).
Poland	Polish National Committee (Ministry of Industry and Commerce).
Portugal	*Mineral Industry, 1932–34.**
Roumania	*League of Nations—Statistical Year-book, 1934–35.*
Spain	*League of Nations—Statistical Year-book, 1934–35.*
Sweden	Swedish National Committee.
Switzerland	Swiss National Committee (Customs Administration).
U.S.S.R.	Committee of International Scientific and Technical Conferences, Moscow.
United Kingdom	Mines Department.
Yugoslavia	Yugoslav National Committee (Columns 1-3, 6, and 7 : Ministry of Forests and Mines—Department of Mines ; Columns 4 and 5 : Ministry of Finances—Excise Department) ; *League of Nations—Statistical Year-book, 1934–35.*
NORTH AMERICA—	
Canada	Canadian National Committee (Dominion Bureau of Statistics).
United States of America	American National Committee (Bureau of Mines and Bureau of Foreign and Domestic Commerce) ; *Bureau of Mines—Minerals Year-book, 1935.*
CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
Brazil	*League of Nations—Statistical Year-book, 1934–35.*
Chile	*League of Nations—Statistical Year-book, 1934–35.*
Colombia	*League of Nations—Statistical Year-book, 1934–35.*
Mexico	*Mineral Industry 1932–34.**
Peru	*League of Nations—Statistical Year-book, 1935–36.*
AFRICA—	
Southern Rhodesia	*League of Nations—Statistical Year-book, 1934–35.*
Union of S. Africa	South African National Committee (Office of Census and Statistics).
Belgian Dependencies, etc.—	
Belgian Congo	*League of Nations—Statistical Year-book, 1934–35.*
British Dependencies, etc.—	
Gambia	Colonial Secretary, Gambia.
Nigeria	Department of Railways ; *Nigeria Blue Book, 1933 and 1934.*
Nyasaland	Government Secretariat ; *Mineral Industry 1932–34.**
Tanganyika	Government Secretariat.
French Dependencies, etc.—	
Algeria	*League of Nations—Statistical Year-book, 1934–35.*
French Morocco	French National Committee ; *League of Nations—Statistical Year-book, 1934–35.*
Tunis	French National Committee.
ASIA—	
China	*Mineral Industry 1932–34.**
Japan	Japanese National Committee (Department of Commerce and Industry—Bureau of Mines).
Manchuria	*League of Nations—Statistical Year-book, 1934–35.*
Philippine Islands	*League of Nations—Statistical Year-book, 1934–35.*
Turkey	*League of Nations—Statistical Year-book, 1934–35.*
British Dependencies, etc.—	
Federated Malay States	Chief Secretary to Government (Department of Statistics).
India	Department of Commercial Intelligence and Statistics (Column 1 : Geological Survey ; other columns : Department of Commercial Intelligence and Statistics).
Sarawak	Sarawak Government Offices, London.
French Dependencies, etc.—	
French Indo-China	*League of Nations—Statistical Year-book, 1934–35.*
Japanese Dependencies, etc.—	
Formosa	Japanese National Committee (Government of Formosa—Bureau of Industry).
Korea	Japanese National Committee (Government of Korea—Bureau of Industry).
Sakhalin	Japanese National Committee (Government of Sakhalin—Bureau of Agriculture and Forestry).
Netherlands Dependencies, etc.—	
Netherlands E. Indies	Netherlands E. Indies National Committee ; *League of Nations—Statistical Year-book, 1934–35.*
AUSTRALASIA—	
Australia	*Mineral Industry 1932–34.**
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

* The full title of this publication is *The Mineral Industry of the British Empire and Foreign Countries—Statistical Summary (Production, Imports and Exports), 1932–1934*, and it was issued by the Imperial Institute, London. Statistics have been reproduced from this publication by permission of the Controller of H.M. Stationery Office.

TABLE 3

BROWN COAL AND LIGNITE—ANNUAL STATISTICS

(In Millions of Metric Tons)

1933

Name of Country	Production	Stocks		Imports	Exports	Total Consumption (Cols. 1 + 2 + 4) − (Cols. 3 + 5)
		At Beginning of Year	At End of Year			
0	1	2	3	4	5	6
EUROPE—						
Austria	3·014	—	—	0·161	0	*3·175*
Bulgaria	1·505	—	—	0	0·001	1·504
Czechoslovakia	15·063	0·659	0·724	0·056	1·630	13·424
Danzig	0	—	—	*U*, *a*	*U*, *a*	—
Denmark	*U*	*U*	*U*	0·030	0	*U*
Estonia	0	—	—	—	—	—
Finland	0	0	0	*U*	0	*U*
France	1·1	*U*	*U*	0·36	0	*1·5*
Germany (excluding Saar)	126·8	3·5	2·2	5·0 *b*	3·9	129·2
Greece	*0·099*	—	—	—	—	—
Hungary	5·90	—	—	0	0·16	5·74
Irish Free State	0	0	0	0	0	0
Italy	*0·383*	—	—	—	—	—
Latvia	*N*	*N*	*N*	*N*	*N*	*N*
Netherlands	0·10	*U*	*U*	0·15	0·006	*0·24*
Norway	0	0	0	0	0	0
Poland	0·034	0·001	0·001	0 *a*	0 *a*	0·034
Portugal	*0·011*	—	—	—	—	—
Roumania	*1·314*	—	—	—	—	—
Spain	*0·301*	—	—	—	—	—
Sweden	*N*	*N*	*N*	*N*	*N*	*N*
Switzerland	0	—	—	0·336	0	0·336
U.S.S.R.	8·79	0·32	0·89	0	0	8·22
United Kingdom	0	0	0	0	0	0
Yugoslavia	3·777	0·370 *E*	0·333 *E*	0·002	0·051	3·765
NORTH AMERICA—						
Canada	3·0	*U*	*U*	0·002	0·01	*3·0*
United States of America	*U*, *c*	—	—	—	—	—
AFRICA—						
British Dependencies, etc.—						
Nigeria *d*	0	0	0	0	0	0
Nyasaland	0	0	0	0	0	0
Tanganyika	0	0	0	0	0	0
ASIA—						
Japan Proper	0·116	—	—	—	—	—
British Dependencies, etc.—						
Federated Malay States	0	—	—	—	—	—
Sarawak	0	0	0	0	0	0
Netherlands Dependencies, etc.—						
Netherlands E. Indies	1·04	0·08	0·05	*U*	*U*	*U*
AUSTRALASIA—						
Australia	*2·621*	—	—	—	—	—
New Zealand	0·12	—	—	—	—	0·12

Figures compiled or computed by the Editor are shown in *italics*.

E Wholly or partly estimated.
N Negligible, unimportant.
U Unrecorded, not available, not yet available.
a In consequence of the Customs Union with Poland, statistics of the trade across the Danzig-Polish frontier are not compiled.
b Bohemian brown coal converted into raw brown coal equivalent.
c No brown coal is produced in the United States. The production of lignite is less than one per cent of bituminous production and is included in Table 2, Column 1.
d Including Cameroons under British Mandate.

TABLE 3—*continued*

BROWN COAL AND LIGNITE—ANNUAL STATISTICS

(In Millions of Metric Tons)

1934

Name of Country	Production	Stocks: At Beginning of Year	Stocks: At End of Year	Imports	Exports	Total Consumption (Cols. 1 + 2 + 4) – (Cols. 3 + 5)
0	1	2	3	4	5	6
EUROPE—						
Austria	2·851	—	—	0·156	0	*3·007*
Bulgaria	1·557	—	—	0	0	1·557
Czechoslovakia	*15·261*	—	—	—	—	—
Danzig	0	—	—	*U*, *a*	*U*, *a*	—
Denmark	*U*	*U*	*U*	0·073	0	*U*
Estonia	0	—	—	—	—	—
Finland	0	0	0	*U*	0	*U*
France	1	*U*	*U*	0·35	0	*1·35*
Germany (excluding Saar)	137·3	2·2	4·1	5·6 *b*	3·7	137·3
Hungary	6·20	—	—	0	0·16	6·04
Irish Free State	0	0	0	0	0	0
Italy	*0·388*	—	—	—	—	—
Netherlands	0·09 *P*	*U*	*U*	0·14	0·007	*0·22*
Norway	0	0	0	0	0	0
Poland	0·026	0·001	0·001	0 *a*	0 *a*	0·026
Portugal	*0·015*	—	—	—	—	—
Roumania	*1·611*	—	—	—	—	—
Spain	*0·280*	—	—	—	—	—
Sweden	*N*	*N*	*N*	*N*	*N*	*N*
Switzerland	0	—	—	0·325	0	0·325
U.S.S.R.	11·46	0·89	1·00	0	0	11·35
United Kingdom	0	0	0	0	0	0
Yugoslavia	*3·926*	—	—	—	—	—
NORTH AMERICA—						
Canada *P*	2·9	*U*	*U*	0·003	0·01	*2·9*
United States of America	*U*, *c*	—	—	—	—	—
AFRICA—						
British Dependencies, etc.—						
Nigeria *d*	0	0	0	0	0	0
Nyasaland	0	0	0	0	0	0
Tanganyika	0	0	0	0	0	0
ASIA—						
Japan Proper	0·125	—	—	—	—	—
British Dependencies, etc.—						
Federated Malay States	0	—	—	—	—	—
Sarawak	0	0	0	0	0	0
AUSTRALASIA—						
New Zealand	0·127	—	—	—	—	0·127

Figures compiled or computed by the Editor are shown in *italics*.

N Negligible, unimportant.
P Provisional, preliminary.
U Unrecorded, not available, not yet available.
a In consequence of the Customs Union with Poland, statistics of the trade across the Danzig-Polish frontier are not compiled.
b Bohemian brown coal converted into raw brown coal equivalent.
c No brown coal is produced in the United States. The production of lignite is less than one per cent of bituminous production and is included in Table 2, Column 1.
d Including Cameroons under British Mandate.

TABLE 3—SOURCES

Where statistics were supplied on the forms adopted by the World Power Conference, the organization responsible for completing the forms is mentioned in roman type; the sources from which the statistics were obtained, if reported, are mentioned in brackets. Where statistics were extracted from published sources by the Editor, the sources are mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Austrian National Committee (Ministry of Commerce and Communications).
Bulgaria	Society of Bulgarian Engineers and Architects—Committee on Power.
Czechoslovakia	Czechoslovak National Committee (Association of Mine-owners of the Czechoslovak Republic); *Mineral Industry 1932–34.**
Danzig	Danzig National Committee.
Denmark	Danish National Committee.
Estonia	Ministry for Economic Affairs.
Finland	Finnish National Committee.
France	Central Committee for French Coal-mines.
Germany	German National Committee.
Greece	*League of Nations—Statistical Year-book, 1934–35.*
Hungary	Hungarian National Committee.
Irish Free State	Irish National Committee.
Italy	*League of Nations—Statistical Year-book, 1934–35.*
Latvia	Latvian National Committee.
Netherlands	Federation of Electro-technical and Allied Societies (Central Statistical Bureau).
Norway	Norwegian National Committee.
Poland	Polish National Committee (Ministry of Industry and Commerce).
Portugal	*League of Nations—Statistical Year-book, 1934–35.*
Roumania	*League of Nations—Statistical Year-book, 1934–35.*
Spain	*League of Nations—Statistical Year-book, 1934–35.*
Sweden	Swedish National Committee.
Switzerland	Swiss National Committee (Customs Administration).
U.S.S.R.	Committee of International Scientific and Technical Conferences, Moscow.
United Kingdom	Mines Department.
Yugoslavia	Yugoslav National Committee (Columns 1-3 and 6: Ministry of Forests and Mines—Department of Mines; Columns 4 and 5: Ministry of Finances—Excise Department); *League of Nations—Statistical Year-book, 1934–35.*
NORTH AMERICA—	
Canada	Canadian National Committee (Dominion Bureau of Statistics).
United States of America	American National Committee.
AFRICA—	
British Dependencies, etc.—	
Nigeria	Nigerian Railway (Geological Survey).
Nyasaland	Government Secretariat.
Tanganyika	Government Secretariat.
ASIA—	
Japan Proper	Japanese National Committee (Department of Commerce and Industry—Bureau of Mines).
British Dependencies, etc.—	
Federated Malay States	Chief Secretary to Government.
Sarawak	Sarawak Government Offices, London.
Netherlands Dependencies, etc.—	
Netherlands E. Indies	Netherlands E. Indies National Committee.
AUSTRALASIA—	
Australia	*League of Nations—Statistical Year-book, 1934–35.*
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

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TABLE 4

PEAT—ANNUAL STATISTICS
(Millions of Metric Tons)

1933

Name of Country	Production
0	1
EUROPE—	
Austria	0·009
Danzig	*N*
Estonia	0·074
Finland	0·018 *a*
France	0·2
Germany (excluding Saar)	0·4
Hungary	*N*
Irish Free State	3·6
Latvia	0·019
Netherlands	*U*
Norway	*U*
Poland	2 *A*
Sweden	0·03
Switzerland	*U*
U.S.S.R.	13·02 *b*
United Kingdom	*U*
Yugoslavia	*N*
NORTH AMERICA—	
Canada	0·001
United States of America	*U, c*
CENTRAL & S. AMERICA—	
Argentine	0
AFRICA—	
British Dependencies, etc.—	
Nigeria *d*	0
Nyasaland	0
Tanganyika	0
ASIA—	
British Dependencies, etc.—	
Federated Malay States	0
India	*U*
Sarawak	0

A Approximate.
N Negligible, unimportant.
U Unrecorded, not available, not yet available.
a With about 36 per cent of moisture.
b Computed at 30 per cent moisture.
c Information for 1927–33 was not collected by the Government.
d Including Cameroons under British Mandate.

TABLE 4—*continued*

PEAT—ANNUAL STATISTICS
(In Millions of Metric Tons)

1934

Name of Country	Production
0	1
EUROPE—	
Austria	0·006
Danzig	*N*
Estonia	0·079
Finland	*U*
France	0·02
Germany (excluding Saar)	0·4
Hungary	*N*
Irish Free State	3·4
Latvia	0·025
Netherlands	*U*
Norway	*U*
Poland	2 *A*
Sweden	0·03
Switzerland	*U*
U.S.S.R.	17·18 *a*
United Kingdom	*U*
Yugoslavia	*N*
NORTH AMERICA—	
Canada	*N*
United States of America *b*	0·036
AFRICA—	
British Dependencies, etc.—	
Nigeria *c*	0
Nyasaland	0
Tanganyika	0
ASIA—	
British Dependencies, etc.—	
Federated Malay States	0
India	*U*
Sarawak	0

A Approximate.
N Negligible, unimportant.
U Unrecorded, not available, not yet available.
a Computed at 30 per cent moisture.
b Excluding Alaska.
c Including Cameroons under British Mandate.

TABLE 4—SOURCES

All the statistics presented in this table were supplied on the forms adopted by the World Power Conference. The organization responsible for completing the forms is mentioned first; the sources from which the statistics were obtained, if reported, are mentioned in brackets. The National Committees mentioned are National Committees of the World Power Conference; Ministries, Departments, Bureaux, etc., are Government Departments of the countries concerned, unless otherwise indicated.

EUROPE—	
Austria	Austrian National Committee (Ministry of Agriculture and Forestry—Department of Research in Agricultural Chemistry).
Danzig	Danzig National Committee.
Estonia	Ministry for Economic Affairs.
Finland	Finnish National Committee (Finnish Industries Association for Power and Fuel Economy).
France	French National Committee.
Germany	German National Committee.
Hungary	Hungarian National Committee.
Irish Free State	Irish National Committee.
Latvia	Latvian National Committee (Amelioration Department).
Netherlands	Federation of Electro-technical and Allied Societies.
Norway	Norwegian National Committee.
Poland	Polish National Committee (Ministry of Industry and Commerce).
Sweden	Swedish National Committee.
Switzerland	Swiss National Committee.
U.S.S.R.	Committee of International Scientific and Technical Conferences, Moscow.
United Kingdom	Mines Department.
Yugoslavia	Yugoslav National Committee (Ministry of Forests and Mines—Department of Mines).
NORTH AMERICA—	
Canada	Canadian National Committee (Dominion Bureau of Statistics).
United States of America	American National Committee.
CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
AFRICA—	
British Dependencies, etc.—	
Nigeria	Nigerian Railway (Geological Survey).
Nyasaland	Government Secretariat.
Tanganyika	Government Secretariat.
ASIA—	
British Dependencies, etc.—	
Federated Malay States	Chief Secretary to Government.
India	Department of Commercial Intelligence and Statistics.
Sarawak	Sarawak Government Offices, London.

II. SOLID FUELS

A.—COALS, BROWN COAL, LIGNITE, PEAT, AND COKE

SCOPE AND MEANING OF THE STATISTICS

In this number of the *Statistical Year-book of the World Power Conference* statistics of production, stocks, imports, exports, and domestic consumption of coke are included for the first time. The inclusion of these statistics has involved some rearrangement and modifications. Table 4 contains statistics relating to coke, while statistics of the production of peat, which in *Statistical Year-book* No. 1 were presented in Table 4, now appear in Table 3, Column 7. It is obvious that, since for any country the total production and total imports of coals are stated in Table 2, the production of coke in that country, stated in Table 4, represents a duplication. Similarly, since coals converted into coke enter into the total domestic consumption of coals presented in Table 2, Column 7, the domestic consumption of coke, presented in Table 4, Columns 6 and 7, likewise represents a duplication. In other words, the production and consumption of coke should not be added to the production and consumption of coals, since the former are already represented in the latter figures. Another and more serious duplication would have been involved if the organizations reporting the imports, exports, and stocks of coal had included in these statistics the raw-coal equivalent of coke imported, exported, and carried in stock, in addition to reporting the imports, exports, and stocks of coke for inclusion in Table 4. These organizations were, however, requested to avoid this duplication and to consider Definition 20 to be amended to that effect (see footnote, page 20).

The statistics of resources relate to various dates, and it is not always certain that the stated date of report (Table 1, Column 1) is the date at which the estimates were made. This is particularly true of the estimates of resources extracted from *The Mineral Industry of the British Empire and Foreign Countries—War Period—Coal, Coke, and By-Products* (1913–1919) and reproduced in Table 1 by permission of the Controller of H.M. Stationery Office. Most of these estimates were based, with adjustments for changes in international boundaries, upon the estimates obtained by the Executive Committee of the International Geological Congress held in Canada in 1913, but may have been made at earlier dates. In view of this uncertainty as to the dates of the actual estimates, and also in view of the very approximate nature of some of the figures, no attempt has been made to reduce them by the quantities of fuel extracted since the date of report.

The statistics of resources, especially of coal, presented in Table 1, are in one sense fairly comprehensive. The largest areas for which no estimates are presented are in Africa, Asia, and Central and South America; it is known that coal reserves exist in many countries in these areas, but for various reasons—the inaccessibility or poor quality of the coal, greater cheapness of imported or of other forms of fuel, or smallness of local need for fuel—exploitation of these resources has hardly begun, and their magnitude has not been even approximately estimated. The statistics of resources in Europe are nearly complete, the only countries for which no estimates for coals are presented being Albania, Iceland, Lithuania, Luxemburg, and Portugal—none of first importance in this connection. In North America only Greenland and Newfoundland are omitted, and the great bulk of the known reserves in Australasia is included. The statistics of reserves of brown coal, lignite, and peat are less complete, and, outside Europe, fragmentary.

The statistics of the production of coal (Table 2, Column 1) are nearly complete. In Europe only Albania, Greece, Iceland, and Lithuania, in North America only Greenland and Newfoundland, are omitted. Most of the omissions in other continents are obviously due to the relative unimportance of coal production in the countries concerned. The statistics of coal stocks (Table 2, Columns 2 and 3) are fragmentary, it being evident that in many countries such statistics are not compiled. Despite a number of omissions, it is believed that the bulk of the foreign trade in coal is included in Columns 4 and 5 of Table 2. The figures for consumption, being dependent on the availability of several different statistics, are by no means complete; and in some of those returned by the National Committees and other reporting organizations, as well as in some of those compiled by the Editor, no account has been taken of possible, but unascertained, changes in stocks.

The statistics of the production of brown coal and lignite (Table 3, Column 1) in Europe are almost complete, only Belgium, Iceland, Lithuania, and Luxemburg being omitted; the statistics for the rest of the world are fragmentary. It is evident that in many countries statistics of stocks of brown coal and lignite (Table 3, Columns 2 and 3) are not compiled. Foreign trade in these fuels (Table 3, Columns 4 and 5) is nowhere of great importance, and many omissions are doubtless due to the negligibility of the statistics. As with coals, some of the figures for the consumption of brown coal and lignite have been computed without regard to possible changes in stocks.

The statistics of the production of peat (Table 3, Column 7) are not numerous.

The statistics relating to coke, presented in Table 4, cover the bulk of coke production, imports, and exports in Europe and North America, the most important omission being that of the U.S.S.R. Statistics for only a few countries in other continents are presented, but there probably the only really important omission is that of Japan.

CONTINENTAL AND WORLD TOTALS

The figures of total resources of coals, brown coal, lignite, and peat, presented in Table A, have been obtained by the simple addition of those contained in the corresponding columns of Table 1. In the latter table instances may be found where there is an entry for " proved resources " but none for " probable total resources "; and other instances in which there is an estimate of " probable total resources " but none of " proved resources." Furthermore, the estimates for different countries relate to different dates. The significance of the totals in Table A is therefore merely the literal one that available estimates of proved or of probable total resources amount, in the aggregate, to so many million metric tons.

The large figure for probable total reserves of coals in Asia is due almost entirely to the estimate for China (10,112,000 million metric tons). With this exception the estimates of coal reserves in the United States of America are by far the largest, with the U.S.S.R. next, and Germany and the United Kingdom following, in order of magnitude.

TABLE A: COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES
(In Millions of Metric Tons *)

	Coals		Brown Coal and Lignite		Peat
	Proved Reserves	Probable Total Reserves	Proved Reserves	Probable Total Reserves	Probable Total Reserves
Column Numbers in Table 1:	2	3	4	5	6
Certain countries in:—					
Europe	544,000	1,615,000	60,000	280,000	105,000
North America	30,000	2,283,000	391,000	1,441,000	13,000
Central and S. America	2,000	1,000	—	—	—
Africa	9,000	207,000	—	—	—
Asia	11,000	10,155,000	—	1,000	—
Australasia	21,000	139,000	11,000	—	—
Totals	617,000	14,400,000	462,000	1,722,000	118,000

* The figures in this table are stated correct to the nearest thousand million metric tons.

Comparable figures for the production of coals in Europe, North America, and the world, in 1933, 1934, and 1935, based upon the statistics of Table 2, Column 1, as presented in *Statistical Year-book* No. 1 and No. 2, are shown in Table B. They include the great bulk of the coals produced, the principal omissions being the production in the U.S.S.R., Japan, and Manchuria; statistics of production in these countries in 1935, and in Manchuria in 1934, were not available. Comparable world totals for 1933 and 1934, in which the production in the U.S.S.R. and Japan is included, are 990 and 1082 million metric tons respectively. The decline in 1935 in the figure for "other continents" is due to a marked decline of production of coals in China. It is, however, noteworthy that even in Europe and North America the increase in production proceeded at a lower rate between 1934 and 1935 than between 1933 and 1934. This slackening in the rate of increase is to be observed in almost all the individual countries, and in some there was a decrease from 1934 to 1935.

TABLE B: PRODUCTION OF COALS—1933, 1934, AND 1935
(In Millions of Metric Tons)

	1933	1934	1935	As Percentage of 1933	
				1934	1935
Certain countries in:—					
Europe	463	496	504	*107*	*109*
North America	355	388	395	*109*	*111*
Other continents	70	72	67	*103*	*96*
Totals	888	956	966	*108*	*109*

Comparable figures for the production of brown coal and lignite in Europe and the rest of the world in 1933, 1934, and 1935, are presented in

Table C. The most important omission from the European figures is that of the U.S.S.R., for which no statistics relating to 1935 were available; the totals for " other continents " are based upon fragmentary data, and no great significance should be attached to them. It is noteworthy that the increase between 1933 and 1934 was approximately maintained between 1934 and 1935; this is also true of Germany, whose production accounts for more than three-quarters of the totals reported in Table C.

TABLE C: PRODUCTION OF BROWN COAL AND LIGNITE—1933, 1934, AND 1935

(In Millions of Metric Tons)

	1933	1934	1935	As Percentage of 1933	
				1934	1935
Certain countries in :—					
Europe	159	171	181	*108*	*114*
Other continents	6	6	8	*107 a*	*132 a*
Totals	165	177	189	*107*	*115*

a Based upon more precise figures than those presented in this table.

Comparable figures for the production of peat in Europe in 1933 and 1934 are 19 and 23 million metric tons respectively, an increase of 21 per cent which is mainly due to increased production in the U.S.S.R. No statistics for 1935 relating to the U.S.S.R. having been received, no significant comparable totals for that year can be presented.

Comparable figures for the production of coke in Europe, North America, and the world, in 1934 and 1935, are presented in Table D. They probably include the bulk of the production of the respective areas, with the exception

TABLE D: PRODUCTION, IMPORTS, AND EXPORTS OF COKE—1934 AND 1935

(In Millions of Metric Tons)

	Production			Imports		Exports	
	1934	1935	1935 as Percentage of 1934	1934	1935	1934	1935
Certain countries in :—							
Europe	66	77	*116 a*	9·7	9·9	12·5	13·2
North America	36	39	*109 a*	1·0	0·9	1·0	0·7
Other continents	3	3	*111 a*	*b*	*b*	*b*	*b*
Totals	105	119	*113*	10·7	10·8	13·5	13·9

a Based upon more precise figures than those presented in this table.
b Less than 0·1 million metric tons.

of the U.S.S.R. and Japan. It will be seen that there was a considerable increase in production generally; the increase in the total for Europe was very largely due to a large increase in production in Germany, which amounted to about 40 per cent. Exports of coke from those countries included in the computation of totals of production exceeded imports into the same countries, which is not unexpected, since we believe the countries omitted to be consumers rather than producers of coke. It appears that in

B

Europe about 19 per cent of the coke produced was exported from the countries of origin in 1934, and about 17 per cent in 1935; in North America the proportion exported was less than 3 per cent.

From an examination of the statistics for those five European and two North American countries for which the domestic consumption for household purposes and for other purposes is stated separately, it appears that 31 or 32 per cent of the domestic consumption was for household purposes, the proportion being higher in North America and lower in Europe. In those seven countries, which include the leading producers of coke (the U.S.A., Germany, and the U.K.), domestic consumption for household purposes increased by 18½ per cent from 1934 to 1935, and for other purposes by 21 per cent.

By way of summary, it is interesting to notice that while the production of coals appears to have increased much less rapidly from 1934 to 1935 than from 1933 to 1934, there was little or no diminution in the growth of production of brown coal and lignite, while the production of coke increased from 1934 to 1935 by a very considerable proportion.

TABLES 1, 2, 3, AND 4—DEFINITIONS

The following definitions (including the introductory paragraph), adopted by the World Power Conference, were distributed with the forms for the guidance of the organizations which supplied the statistics:

On account of the varying characteristics of coal in the several countries, of the different bases of classification employed, and of the fact that international study of coal classification is already in progress, it has been deemed inadvisable to attempt to segregate the higher ranking coals—anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from lignite and brown coal or which separate the latter from peat. It will, therefore, be the responsibility of each reporting country when submitting its statistics of solid fuels to determine for itself the basis of classification to be used in distinguishing the three groups to be reported: viz. coals, brown coal and lignite, and peat.

13. *Proved Reserves—Coals, Lignite and Brown Coal*

"Proved reserves" of coals, of lignite and of brown coal shall mean the total amounts thereof, occurring within the limits hereinafter prescribed, as are of economic value and with respect to which there exist reliable data of actual thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

(*a*) Coals: Seams containing not less than 30 centimetres of merchantable coal and situated not more than 1200 metres below the surface, including workable submarine seams.

(*b*) Lignite and Brown Coal: Seams containing not less than 30 centimetres of merchantable lignite or brown coal and situated not more than 500 metres below the surface.

14. *Probable Reserves—Coals, Lignite and Brown Coal*

"Probable reserves" of coals, of lignite and of brown coal shall mean the aggregate within the reporting country of proved reserves thereof plus such further reserves of economic value within the limits of thickness and depth of seams specified in paragraph 13 hereof, as may, from uncompleted investigations or from relation to proved reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

15. *Peat*

A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent of organic matter.

16. *Probable Reserves of Peat*

"Probable reserves of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

17. *Domestic Production—Coals, Lignite and Brown Coal*

"Domestic production" of coals, of lignite and of brown coal shall mean the gross amounts thereof raised to the pit-head, less the amounts of dirt or other waste removed in washeries or cleaning plants, plus any increase in weight between the pit-head and weighing-point due to absorption of water in washeries, but without deduction for other losses beyond point of weighing or for amounts used in operation of mines or collieries.

18. *Coal Stocks*

"Coal stocks" shall include the following:

(*a*) "Mine stocks," or the amounts held or stored at the producing properties, whether in dumps at pit-heads, in cars at colliery sidings, or otherwise, and whether billed to purchasers or not.

(*b*) "Stocks in transit," or amounts held or stored in railway classification yards or at points of transhipment from rail to water or water to rail while in process of domestic transit from producers to consumers.

(*c*) "Dealers' and consumers' stocks," or the amounts held in storage by coal dealers and by large industrial users, such as by-product coke ovens, railways, electric-power utilities, steel and rolling mills, etc. This item will, in general, include the stocks of only those dealers and consumers to whom, except in case of transhipment, delivery is made directly from mine or water terminal in car-load lots or in boats or barges.

(*d*) "Import stocks," or amounts of foreign coal held in storage at ports of entry pending shipment in domestic trade.

(*e*) " Export stocks," or amounts in storage at export points pending actual export.

(*f*) " Bunker stocks," or amounts held in storage at ports for fuelling vessels engaged in either foreign or domestic trade.

Statistics of stocks shall be reported in totals and may also be reported by the several classes above defined; but each reporting country in submitting its statistics shall state which of the preceding classes, if any, have been omitted from the total which it reports.

19. *Lignite and Brown Coal Stocks*

In so far as there regularly are within any reporting country stocks of lignite or of brown coal in significant quantities within the several classes as specified for coal in paragraph 18 hereof, data for such classes shall be considered necessary for a complete report on stocks. Each reporting country in which complete data are not available, or are not reported, shall state what classes have been included in making up its report.

20. *Conversion of Statistics of Products*

Where coal, brown coal, or lignite are imported, exported, shipped as bunker fuel, or carried in stock in the form of coke * or briquettes or other manufactured product, such statistics before being reported shall be converted into terms of " raw " coal, brown coal, or lignite, as the case may be, and the conversion factor or factors shall be given in the report.

* A letter which accompanied the Definitions when they were circulated to the organizations which supplied statistics for inclusion in *Statistical Year-book* No. 2 contained the following instruction: " Special care should be taken to ensure that the figures relating to coke are not duplicated. They should now be reported in Table 4 only, and should *not* be reported in Tables 2 and 3 in terms of coal. On the other hand, other manufactured products of coal, brown coal, lignite, etc. (that is, briquettes, etc.) *should* continue to be reported in terms of coal in Tables 2 and 3. In this respect Definition 20 is hereby amended."

TABLE 1

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In Millions of Metric Tons)

Name of Country	Date of Report	Coals		Brown Coal and Lignite		Peat
		Proved Reserves	Probable Total Reserves	Proved Reserves	Probable Total Reserves	Probable Total Reserves
0	1	2	3	4	5	6
EUROPE—						
Austria	1930	13	19	611	2,337	80
Belgium	1935	—	11,000	—	—	—
Bulgaria	1934	0·5	1·2	500	1,000	*N*
Czechoslovakia	1936	6,450	25,000	12,500	—	—
Danzig	1933	0	0	0	0	*N*
Denmark	1935	0	0	2·0	7·0	250
Estonia *o*	1935	0	0	0	0	2,030
Finland	1934	0	0	0	0	*U*
France (excluding Saar)	1935	6,000	17,000	1,600	1,600	*U*
Germany (including Saar)	*c*	80,445	279,516	28,837	56,758	10,000
Greece	1913	*0*	*U*	*10*	*30*	—
Hungary	1935	210	210	1,500	1,500	120
Irish Free State	1935	107	—	*U*	*U*	3,600
Italy	1913	*1*	*146*	*51·5*	*101*	—
Latvia	1934	0	0	0	0	1,665
Netherlands	*r*	2,930 *q*	*4,474 d*	*U*	*U*	*U*
Norway	1933	*U*	8,000 *A, e*	*U*	*U*	*U*
Poland	1935	15,000	91,000	—	5,500	6,000
Roumania	1937	—	30·9	—	2,839	67·6
Spain	1913	*4,500 g*	*5,500 g*	*h*	*h*	—
Sweden	1933	97	105	*N*	*N*	9,000 *A, f*
Switzerland	1935	0	0	0	0	*N*
U.S.S.R.	1933	295,900	998,000	12,890	202,000	72,330
United Kingdom	1936	132,442	174,745	*N*	—	*U*
Yugoslavia	1936	6·7	39·0	1,123	6,325	*N*
NORTH AMERICA—						
Canada	1913	*30,319*	*242,400*	*391,260*	*572,686*	*U*
United States of America *j*	1935	*U*	2,037,331 *s, u*	*U*	852,281 *t, u*	13,379 *f*
Alaska	1913	*U*	*3,354*	*U*	*16,559*	—
Hawaii	1935	—	*v*	—	*v*	*v*
Puerto Rico	1935	—	*v*	—	*v*	*v*
Virgin Islands	1935	—	*v*	—	*v*	*v*
CENTRAL & S. AMERICA—						
Argentine	1935	0	0	0	0	80
Chile	1913	*2,116*	—	—	—	—
Honduras	1913	—	*1*	—	*4*	—
Peru	1919	—	*1,000*	—	—	—
AFRICA—						
Egypt	1936	0	*U*	0	*U*	0
Southern Rhodesia	1913	*420*	*570*	—	—	—
Union of S. Africa	1921–7	7,914	205,682 *k*	—	—	—
Belgian Dependencies, etc.—						
Belgian Congo	1913	—	*100*	—	—	—
British Dependencies, etc.—						
Nigeria	1937	113	300 *B*	13	200 *B*	—
Nyasaland	1933	*U*	*U*	0	0	0
Tanganyika	1934	800	*U*	—	—	—
French Dependencies, etc.—						
Algeria	1935	—	*w*	0	0	0
French Morocco	1935	—	*w*	0	0	0
Madagascar	1935	—	*x*	0	0	0
Tunis	1934	—	—	0·1	1	—

TABLE 1—*continued*

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In Millions of Metric Tons)

Name of Country	Date of Report	Coals		Brown Coal and Lignite		Peat
		Proved Reserves	Probable Total Reserves	Proved Reserves	Probable Total Reserves	Probable Total Reserves
0	1	2	3	4	5	6
ASIA—						
China	1913	—	*10,112,000*	—	*600*	—
India	1932	5,000	20,600	*U*	*U*	*U*
Japan Proper	1932	5,895	16,218	66	473	—
Manchuria	1913	—	*1,129*	—	—	—
British Dependencies, etc.—						
Federated Malay States	1935	*U*	*U*	*l*	*l*	
Sarawak	1934	0	0	2·66	13	0
French Dependencies, etc.—						
French Indo-China	1935	—	*x*	0	0	0
Japanese Dependencies, etc.—						
Korea	1913	—	*5,585*	—	*27*	—
Netherlands Dependencies, etc.—						
Netherlands E. Indies	1933	*U*	*U*	*U*	*U*	*U*
AUSTRALASIA—						
Australia *m*	1927	*20,900*	*139,400*	*10,621*	*U*	—
New Zealand	1927	270 *s*	*n*	403 *t*	*n*	—

TABLE 1—NOTES

Figures compiled or computed by the Editor are shown in *italics*.

A Approximate.
B "Very approximate."
N Negligible, unimportant.
U Unrecorded, not available.
c Dates of report: coal, 1922; brown coal and lignite, 1935; peat, 1932.
d "Actual, probable, and possible reserves."
e In Svalbard.
f Computed on the basis of 25 per cent water content.
g Including lignite.
h Included in Columns 2 and 3.
j Excluding Alaska and other non-contiguous territories.
k "Proved, estimated, and undetermined resources." "Proved and estimated resources" reported as 21,524 million metric tons.
l No known deposits of economic value.
m Large areas remain unprospected, and the figures presented relate only to resources which have been quantitatively estimated.
n Probable total resources of coals, brown coal, and lignite: 1,657 million metric tons.
o In Estonia oil shale is used as solid fuel; reserves are estimated as 3,500 million metric tons.
q "Proved reserves under 1,200 metres."
r Dates of report: Columns 2, 4, 5, 6, 1935; Column 3, 1913.
s Includes sub-bituminous coals.
t Excludes sub-bituminous coals.
u The estimate upon which this figure is based was limited to seams within a depth of 900 metres and with a minimum thickness of 36 centimetres in the case of anthracite, semi-bituminous and bituminous coals, 60 centimetres in the case of sub-bituminous coal, and 90 centimetres in the case of lignite; the maximum permissible ash content was 30 per cent. The estimates by volume were converted to tons by assuming the average specific gravity of coals in general to be 1·3; as recent determinations show this figure to be too low, the estimates of reserves are probably also somewhat too low. In correcting the estimate for subsequent extraction, it has been assumed that losses and wastage in mining amounted to 30 per cent of the recorded production.
v Believed to be negligible.
w Reserves are known to be moderate in quantity.
x Reserves are known to be considerable.

TABLE 1—SOURCES

Where statistics were supplied on the form adopted by the World Power Conference, the source (or if the source was not reported, the name of the organization which transmitted the form) is mentioned in roman type. Where statistics were extracted from published sources, the source is mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Columns 2-5: Bundesministerium für Handel und Verkehr; Column 6: Bundesministerium für Land- und Forstwirtschaft—Landwirtschaftlich-chemische Versuchsanstalt.
Belgium	Administration des Mines.
Bulgaria	Industrieministerium—Section des Mines.
Czechoslovakia	Mine-owners' Association of Czechoslovakia.
Danzig	Danzig National Committee.
Denmark	Danish National Committee.
Estonia	Ministry for Economic Affairs.
Finland	Finnish National Committee.
France	Comité Central des Houillères de France.
Germany	Geologische Landesanstalt.
Greece	*Mineral Industry 1913–19.**
Hungary	Ministry of Industry.
Irish Free State	Irish Committee of the World Power Conference.
Italy	*Mineral Industry 1913–19.**
Latvia	Latvian National Committee.
Netherlands	Columns 2, 4, 5, 6: Centraal Bureau voor de Statistiek; Instituut voor brandstoffeneconomie; Column 3: *Mineral Industry 1913–19.**
Norway	Norwegian Scientific Exploration of Svalbard and Arctic Regions.
Poland	Ministry of Industry and Commerce.
Roumania	Ministère de l'Industrie et du Commerce—Direction des Mines.
Spain	*Mineral Industry 1913–19.**
Sweden	Swedish National Committee.
Switzerland	Swiss National Committee.
U.S.S.R.	U.S.S.R. National Committee.
United Kingdom	Geological Survey.
Yugoslavia	Ministry of Forests and Mines—Department for the Supreme Survey of Mines.
NORTH AMERICA—	
Canada	*Mineral Industry 1913–19.**
United States of America	Prepared by the American National Committee from estimates of reserves published by the U.S. Geological Survey and from statistics of production published by the U.S. Bureau of Mines.
Alaska	*Mineral Industry 1913–19.**
Hawaii	American National Committee.
Puerto Rico	American National Committee.
Virgin Islands	American National Committee.
CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
Chile	*Mineral Industry 1913–19.**
Honduras	*Mineral Industry 1913–19.**
Peru	*Mineral Industry 1913–19.**
AFRICA—	
Egypt	"The Competent Department in Egypt." Transmitted by the Royal Egyptian Embassy in London.
Southern Rhodesia	*Mineral Industry 1913–19.**
Union of S. Africa	Office of Census and Statistics.
Belgian Dependencies, etc.—	
Belgian Congo	*Mineral Industry 1913–19.**
British Dependencies, etc.—	
Nigeria	Director of Geological Survey.
Nyasaland	Government Secretariat.
Tanganyika	Government Secretariat.

TABLE 1—SOURCES—*continued*

AFRICA—*continued*	
French Dependencies, etc.—	
Algeria	Comité Central des Houillères de France.
French Morocco	Comité Central des Houillères de France.
Madagascar.	Comité Central des Houillères de France.
Tunis	French National Committee.
ASIA—	
China	*Mineral Industry 1913–19*.*
India	Department of Commercial Intelligence and Statistics.
Japan Proper	Department of Commerce and Industry—Bureau of Mines.
Manchuria	*Mineral Industry 1913–19*.*
British Dependencies, etc.—	
Federated Malay States	Chief Secretary to Government.
Sarawak	Sarawak Government Offices, London.
French Dependencies, etc.—	
French Indo-China	Comité Central des Houillères de France.
Japanese Dependencies, etc.—	
Korea	*Mineral Industry 1913–19*.*
Netherlands Dependencies, etc.—	
Netherlands E. Indies.	Netherlands E. Indies National Committee.
AUSTRALASIA—	
Australia	*Official Year Book of the Commonwealth of Australia, 1927.*
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

* The full title of this publication is *The Mineral Industry of the British Empire and Foreign Countries—War Period—Coal, Coke, and By-products (1913–1919)*, and it was issued by the Imperial Mineral Resources Bureau, London. Most of the estimates of resources presented in this publication were based, with adjustments for changes in international boundaries, upon the estimates obtained by the Executive Committee of the International Geological Congress held in Canada in 1913 and published in *Coal Resources of the World* (1913). Statistics have been reproduced from *The Mineral Industry of the British Empire and Foreign Countries* by permission of the Controller of H.M. Stationery Office.

TABLE 2

COALS—ANNUAL STATISTICS
(In Millions of Metric Tons)

1934

Name of Country	Production	Stocks		Imports	Exports	Bunker Coal Laden on Vessels engaged in Foreign Trade	Total Domestic Consumption (Cols. 1 + 2 + 4) − (Cols. 3 + 5 + 6)
		At Beginning of Year	At End of Year				
0	1	2	3	4	5	6	7
EUROPE—							
Austria	0·251	0	0	2·604	0	0	2·855
Belgium and Luxemburg	26·389	2·908 *f*	3·550 *f*	4·652	3·860	0·316	26·223
Bulgaria	0·076	*N*	*N*	*N*	*N*	*N*	0·076
Czechoslovakia	11·2	—	—	1·2	1·4	—	—
Danzig	0	*U, N*	*U, N*	*U, a*	*U, a*	0·26	0·30 *E*
Denmark	0	*U*	*U*	5·613	*U*	*U*	*U*
Estonia	0	*U*	*U*	—	—	—	—
Finland	0	*U*	*U*	1·089	0	*U*	1·089
France	47·63	3·67 *b*	3·90 *b*	21·56 *b*	1·50 *b*	*U*	67·46 *b*
Saar	11·318	0·345	0·171	—	—	0	—
Germany (excluding Saar)	124·8	5·7 *f*	4·8 *f*	5·0	22·7	*U*	108·0
Greece	—	—	—	*0·760 t*	—	—	—
Hungary	0·76	*N*	*N*	0·24	0·09	0	0·91
Irish Free State	0·113	*U*	*U*	2·367	0	0·020	2·460
Italy	*0·374*	—	—	—	—	—	—
Latvia	0	*U*	*U*	0·469	0	0	0·469
Lithuania	—	—	—	*0·228*	—	—	—
Netherlands	12·3	1·5 *f*	*U*	8·4	5·55	2·35	*U*
Norway *x*	0	*U*	*U*	2·125 *v*	0·002	*U*	2·123
Svalbard *x*	0·533	*U*	*U*	—	0·454 *w*	*w*	—
Poland	29·233	1·671	1·666	0·090 *q*	9·968 *q*	0·436 *q*	18·924
Portugal	*0·203*	—	—	*1·110 y*	*0·169*	—	—
Roumania	0·228	—	—	—	—	—	—
Spain	*5·959*	—	—	*1·125 y*	—	—	—
Sweden	0·42	*U*	*U*	5·26	*U*	*U*	*U*
Switzerland	0	*U*	*U*	2·050	0	0	2·050
U.S.S.R.	81·94	5·83	8·00	0·25 *g*	2·05	—	77·97
United Kingdom	224·27	*U*	*U*	0·02	41·00 *h*	13·70 *h*	169·59
Yugoslavia	0·387	0·005	0·004	0·161	0·004	*N*	0·545
NORTH AMERICA—							
Canada	9·4 *z*	*U*	*U*	11·5	0·31 *i*	0·26 *j*	*20·5*
United States of America	378·311 *l*	39·739 *k*	43·136 *k*	0·592 *Z*	11·037 *Z*	1·198	363·271
CENTRAL & S. AMERICA—							
Argentine	0	*U*	*U*	2·718	0	0·015	2·703
Brazil	*0·708*	—	—	*1·135 y*	—	—	—
Chile	*1·808*	—	—	—	—	—	—
Colombia	*0·25 P*	—	—	*3·070*	*0*	—	—
Mexico	*0·631*	—	—	—	—	—	—
Peru	*0·035*	—	—	—	—	—	—
Uruguay	—	—	—	*0·308 P*	—	—	—
AFRICA—							
Southern Rhodesia	*0·643 V*	—	—	—	—	—	—
Union of S. Africa	11·80	*U*	*U*	*N*	1·15	0·69	9·96
Belgian Dependencies, etc.—							
Belgian Congo	*0·005*	—	—	—	—	—	—
British Dependencies, etc.—							
Gambia	0	*N*	0·001	0·002	0	0	0·001
Nigeria	0·264	0·001	0·004	0	0	0	0·261
Nyasaland	0	0	0	*0·004*	0	0	*0·004*
Tanganyika	0	0	0	0·006 *m*	0	0	0·006 *m*
French Dependencies, etc.—							
Algeria	0·034	0·103 *d*	0·076 *d*	1·540	0·011	0·982	0·608
French Morocco	0·036	—	—	0·147	0·005	0·050	0·128
Madagascar	—	—	—	0·018	—	0·011	0·007

TABLE 2—*continued*

COALS—ANNUAL STATISTICS
(In Millions of Metric Tons)

1934

Name of Country	Production	Stocks		Imports	Exports	Bunker Coal Laden on Vessels engaged in Foreign Trade	Total Domestic Consumption (Cols. 1+2+4) − (Cols. 3+5+6)
		At Beginning of Year	At End of Year				
0	1	2	3	4	5	6	7
ASIA—							
Burma	—	—	—	0·255	—	—	—
China	*21 M*	—	—	*1·038 y*	*0·81*	e	—
India *n*	22·499	*U*	*U*	0·06 *o*	0·33 *o*	0·5 *o*	21·7
Japan	40·332	1·376	1·560	4·687	1·263	4·292	39·280
Turkey	*2·288*	—	—	—	—	—	—
British Dependencies, etc.—							
Federated Malay States	0·328	*U*	*U*	0·001	0·035	0	*0·294*
Sarawak	0	0	0	0	0	0	0
French Dependencies, etc.—							
French Indo-China	1·592	0·486 *f*	0·505 *f*	0·016	1·178 *X*	*e*	0·411
Netherlands Dependencies, etc.—							
Netherlands E. Indies	*1·032 r*	—	—	—	—	—	—
AUSTRALASIA—							
Australia *p*	10·156	*U*	*U*	0·011	0·310	0·585	9·272
New Zealand	0·845	—	—	0·103 *V*	*N*	0·163 *T, V*	0·785 *S*

TABLE 2—(*continued*)

COALS—ANNUAL STATISTICS
(In Millions of Metric Tons)

1935

Name of Country	Production	Stocks: At Beginning of Year	Stocks: At End of Year	Imports	Exports	Bunker Coal Laden on Vessels engaged in Foreign Trade	Total Consumption Domestic (Cols. 1+2+4) − (Cols. 3+5+6)
0	1	2	3	4	5	6	7
EUROPE—							
Austria	0·261	0	0	2·480	0	0	2·741
Belgium and Luxemburg	26·506	3·550 *f*	2·578 *f*	3·900	4·280	0·401	26·697
Bulgaria	0·076	*N*	*N*	*N*	*N*	*N*	0·076
Czechoslovakia	11·3	—	—	1·3	1·3	—	—
Danzig	0	*U, N*	*U, N*	0·63	0	0·25	0·38
Denmark	0	*U*	*U*	5·919 *c*	0	*U*	*U*
Estonia	0	*U*	*U*	0·054	0	*U*	*U*
Finland	0	*U*	*U*	1·014	0	*U*	1·014
France	46·21	3·90 *b*	3·73 *b*	19·24 *b*	1·14 *b*	*U*	64·48 *b*
Germany *s*	143·0	4·9 *f*	4·2 *f*	4·4	27·6	*U*	120·5
Hungary	0·82	*N*	*N*	0·19	0·08	0	0·93
Irish Free State	0·115	*U*	*U*	2·274	0	0·021	2·368
Italy	*0·443*	—	—	—	—	—	—
Latvia	0	*U*	*U*	0·587	0	0	0·587
Lithuania	—	—	—	*0·221*	—	—	—
Netherlands	11·87	*U*	*U*	5·86	3·37	0·10	14·39 *u*
Norway *x*	0	*U*	*U*	2·185 *v*	0·003	*U*	2·182
Svalbard	0·709	*U*	*U*	—	0·635 *w*	*w*	—
Poland	28·54	1·67	1·14	0·10 *q*	8·59 *q*	0·58 *q*	20·00
Portugal	—	—	—	*1·119y,P*	*0·153*	—	—
Roumania	0·278	—	—	—	—	—	—
Spain	*7·016*	—	—	*1·171 y*	—	—	—
Sweden	0·42	*U*	*U*	5·25	*U*	*U*	*U*
Switzerland	0	*U*	*U*	1·958	0	0	1·958
United Kingdom	225·82	*U*	*U*	0·01	40·01 *h*	12·73 *h*	173·09
Yugoslavia	0·400	0·004	0·003	0·220	0·003	*N*	0·618
NORTH AMERICA—							
Canada	9·193	*U*	*U*	10·67	0·40 *i*	0·28 *j*	*19·18*
United States of America	385·907 *l*	43·136 *k*	44·272 *k*	0·713 *Y*	10·297 *Y*	1·430	373·756
CENTRAL & S. AMERICA—							
Argentine	0	*U*	*U*	2·631	0	0·017	2·614
Brazil	*0·757 P*	—	—	*1·437 P,y*	—	—	—
Chile	*1·900 P*	—	—	—	—	—	—
Mexico	*0·990 P*	—	—	—	—	—	—
Uruguay	—	—	—	*0·330 P*	—	—	—
AFRICA—							
Southern Rhodesia	*0·695 V*	—	—	—	—	—	—
Union of S. Africa	13·19	*U*	*U*	0·01	1·42	0·81	10·97
British Dependencies, etc.—							
Nigeria	0·263	0·004	0·004	0	0	0	0·263
French Dependencies, etc.—							
Algeria	0·038	0·076 *d*	0·101 *d*	1·675	0·015	0·918	0·755
French Morocco	0·053	—	—	0·136	0·012	0·028	0·149
Madagascar	—	—	—	0·019	—	0·010	0·009
ASIA—							
Burma	—	—	—	0·339	—	—	—
China	*12 M*	—	—	*0·774 y*	*0·877 X*	*e*	—
India	23·38	—	—	0·07	0·22	0·56	—
French Dependencies, etc.—							
French Indo-China	1·774	0·505 *f*	0·285 *f*	0·020	1·513 *X*	*e*	0·501
AUSTRALASIA—							
Australia *W*	10·914	*U*	*U*	0·040	0·312	0·624	10·018
New Zealand	0·838	—	—	0·099 *V*	*N*	0·164*R,V*	0·773 *Q*

TABLE 2 (1934–1935)—NOTES

Figures compiled or computed by the Editor are shown in *italics*.

E Wholly or partly estimated.
M Includes about 0·3 million metric tons of lignite.
N Negligible, unimportant.
P Provisional, preliminary.
Q In view of notes *R* and *V* to Columns 4 and 6, this figure must be regarded as having only approximate significance. (EDITOR.)
R This figure relates to the year ended 31st March 1936.
S In view of notes *T* and *V* to Columns 4 and 6, this figure must be regarded as having only approximate significance. (EDITOR.)
T This figure relates to the year ended 31st March 1935.
U Unrecorded, not available, not yet available.
V Includes brown coal and lignite.
W The statistics for this country relate to the year ended 30th June 1936. Production in the calendar year 1935 was 11·063 million metric tons.
X Includes bunker shipments.
Y Including Alaska, Hawaii, Puerto Rico, and the Virgin Islands. Including briquettes reckoned at the rate: 1 ton of briquettes =1 ton of coal.
Z Including Alaska, Hawaii, and Peurto Rico. Including briquettes reckoned at the rate: 1 ton of briquettes=1 ton of coal.
a In consequence of the Customs Union with Poland, statistics of the trade across the Danzig-Polish frontier were not compiled.
b Including briquettes converted to coal equivalent at the rate: 100 tons of briquettes=92 tons of coal.
c Includes coke, which is also reported in Table 4. Conversion factor for coke and cinders: 1·42857.
d Mine and dealers' stocks.
e Included in exports.
f Mine stocks only.
g "Production from old coal pits and bunker coal laden on vessels bound for foreign voyage." This quantity was treated wholly as an addition to the quantity available for consumption in obtaining the figure in Column 7.
h Including manufactured fuel converted to coal equivalent at the rate: 100 tons of manufactured fuel=94 tons of coal.
i Including most of the Canadian coal delivered for bunker purposes to ships engaged in foreign trade.
j Includes only foreign coal ex-warehoused for ships' stores.
k Excludes coals in transit on rail, and import, export, and bunker stocks.
l Including Alaska but excluding other non-contiguous territories of the United States; there is no production of coals in Hawaii or Puerto Rico. This figure includes estimated illegal production of anthracite, but excludes production of bituminous coal by small mines producing less than 900 metric tons a year; the latter are estimated to produce a total of less than 1,900,000 tons a year.
m Imported and used by the railways.
n British India and Indian States.
o Sea-borne trade of British India only.
p The statistics for this country relate to the year ended 30th June 1935. Production in the calendar year 1934 was 9·958 million metric tons.
q Relates to the combined area of Poland and Danzig, which are united in a Customs Union.
r Including a small proportion of lignite.
s Includes the Saar Territory from March 1935.
t Excluding anthracite; imports of anthracite and lignite together amounted to 0·034 million metric tons.
u This figure is not equal to (Columns 1+2+4)−(Columns 3+5+6) on account of differences in stocks at the beginning and end of the year.
v Includes imports from Svalbard.
w Exports to Norway, including bunkers: 1934, 0·305 million metric tons; 1935, 0·316 million metric tons.
x The statistics for this country include brown coal and lignite.
y Including coke.
z Sum of Canadian coal-mine sales, colliery consumption, coal supplied to employees, and coal used in the manufacture of coke and briquettes.

TABLE 2 (1934–1935)—SOURCES

Where statistics were supplied on the form adopted by the World Power Conference, the source (or if the source was not reported, the name of the organization which transmitted the form) is mentioned in roman type. Where statistics were extracted from published sources, the source is mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Bundesministerium für Handel und Verkehr.
Belgium and Luxemburg	Administration des Mines.
Bulgaria	Industrieministerium—Section des Mines.
Czechoslovakia	State Office of Statistics.
Danzig	Statistisches Landesamt.
Denmark	Danish National Committee.
Estonia	Central Statistical Bureau.
Finland	Custom House—Statistical Department.
France	Comité Central des Houillères de France.
Saar	German National Committee.
Germany	Statistisches Reichsamt.
Greece	*Annuaire Statistique de la Grèce, 1935.*
Hungary	Ministry of Industry.
Irish Free State	Irish Committee of the World Power Conference.
Italy	*Annuario Statistico Italiano, 1936.*
Latvia	Statistical Year-Book of Latvia.
Lithuania	*League of Nations—International Trade Statistics, 1934–35.*
Netherlands	Centraal Bureau voor de Statistiek; Instituut voor brandstoffeneconomie.
Norway	Central Statistical Bureau.
Poland	Ministry of Industry and Commerce.
Portugal	Column 1: *Anuário Estatístico de Portugal*; Columns 4-5: *League of Nations—International Trade Statistics, 1934–35.*
Roumania	Ministère de l'Industrie et du Commerce—Direction des Mines.
Spain	Column 1: *Mineral Industry 1933–35**; Column 4: *League of Nations—International Trade Statistics, 1934–35.*
Sweden	Swedish National Committee.
Switzerland	Direction générale des douanes fédérales.
U.S.S.R.	U.S.S.R. National Committee.
United Kingdom	Board of Trade—Mines Department.
Yugoslavia	Ministry of Forests and Mines—Department for the Supreme Survey of Mines.
NORTH AMERICA—	
Canada	Dominion Bureau of Statistics.
United States of America	Columns 1-3: Bureau of Mines; Columns 4-6: Bureau of Foreign and Domestic Commerce. (Production of illegal anthracite, included in Column 1, estimated by the Anthracite Institute.)

TABLE 2 (1934–1935)—SOURCES—*continued*

CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
Brazil	Column 1 : *League of Nations—Statistical Year-book, 1935–36* ; Column 4 : *League of Nations —International Trade Statistics, 1934–35.*
Chile	——
Colombia	Column 1 : *Mineral Industry 1933–35* ; Columns 4-5 : *Comercio Exterior de Colombia.*
Mexico	*Mineral Industry 1932–34.**
Peru	*League of Nations—Statistical Year-book, 1935–36.*
Uruguay	*League of Nations—International Trade Statistics, 1934–35.*
AFRICA—	
Southern Rhodesia	*Mineral Industry 1933–35.**
Union of S. Africa	Office of Census and Statistics.
Belgian Dependencies, etc.—	
Belgian Congo	*League of Nations—Statistical Year-book, 1934–35.*
British Dependencies, etc.—	
Gambia	Colonial Secretary, Gambia.
Nigeria	Director of Transport ; Acting Colliery Manager, Government Colliery.
Nyasaland	Government Secretariat ; *Mineral Industry 1932–34.**
Tanganyika	Government Secretariat.
French Dependencies, etc.—	
Algeria	Comité Central des Houillères de France.
French Morocco	Comité Central des Houillères de France.
Madagascar	Comité Central des Houillères de France.
ASIA—	
Burma	Government of Burma.
China	Column 1 : *Mineral Industry 1933–35** ; Columns 4, 5 : *League of Nations—International Trade Statistics, 1934–35.*
India	Column 1 : Geological Survey ; Columns 4-6 : Department of Commercial Intelligence and Statistics.
Japan	Japanese National Committee.
Turkey	*League of Nations—Statistical Year-book, 1934–35.*
British Dependencies, etc.—	
Federated Malay States	Department of Statistics.
Sarawak	Sarawak Government Offices, London.
French Dependencies, etc.—	
French Indo-China	Comité Central des Houillères de France.
Netherlands Dependencies, etc.—	
Netherlands E. Indies	*League of Nations—Statistical Year-book, 1934–35.*
AUSTRALASIA—	
Australia	Commonwealth Bureau of Census and Statistics.
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

* The full title of this publication is *The Mineral Industry of the British Empire and Foreign Countries—Statistical Summary (Production, Imports and Exports)*, and it was issued by the Imperial Institute, London. Statistics have been reproduced from this publication by permission of the Controller of H.M. Stationery Office.

TABLE 3

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In Millions of Metric Tons)

1934

Name of Country	Brown Coal and Lignite						Peat
	Production	Stocks: At Beginning of Year	Stocks: At End of Year	Imports	Exports	Total Consumption (Cols. 1 + 2 + 4) − (Cols. 3 + 5)	Production
0	1	2	3	4	5	6	7
EUROPE—							
Austria	2·851	—	—	0·156	0	*3·007*	0·006
Bulgaria	1·557	0·130	0·180	0	0·001	1·410 *n*	0
Czechoslovakia	15·3	—	—	0·05	1·8	—	—
Danzig	0	*U*	*U*	*U*	*U*	*U*	*N*
Denmark	0·007	0	0	0·073	0	0·080	0·375 *a*
Estonia	0	0	0	0	0	0	0·079
Finland	0	0	0	0	0	0	*U*
France *e*	1·03	0·03	0·04	0·95	0	1·97	*o*
Germany (excluding Saar)	137·3	2·2	4·1	5·6 *b*	3·7	137·3	0·4
Greece	*0·104*	—	—	—	—	—	—
Hungary	6·20	*N*	*N*	0	0·16	6·04	*N*
Irish Free State	0	0	0	0	0	0	3·4
Italy	*0·409*	—	—	—	—	—	—
Latvia	0	0	0	0	0	0	0·025
Netherlands	0·09	*U*	*U*	0·14	0·007	*0·22*	*U*
Norway	0	*U*	*U*	*g*	*g*	*g*	*U*
Poland	0·026	0·001	0·001	0·006	0	0·032	2·0 *A*
Portugal	*0·015*	—	—	—	—	—	—
Roumania	1·624	—	—	—	—	—	0
Spain	*0·280*	—	—	—	—	—	—
Sweden	*N*	*N*	*N*	*N*	*N*	*N*	0·03
Switzerland	0	*U*	*U*	0·325	0	0·325	*U*
U.S.S.R.	11·46	0·89	1·00	0	0	11·35	17·18 *h*
United Kingdom	0	0	0	0	0	0	*U*
Yugoslavia	3·926	0·267	0·246	0·001	0·052	3·896	*N*
NORTH AMERICA—							
Canada	2·9 *i*	*U*	*U*	0·003	0·01	*2·9*	0·002
United States of America *j*	2·337 *k*	*U, N*	*U, N*	0·005	*U, N*	2·342	0·037 *l*
CENTRAL & S. AMERICA—							
Argentine	0	0	0	0	0	0	0
AFRICA—							
Union of S. Africa	*N*	*N*	*N*	*N*	*N*	*N*	0
British Dependencies, etc.—							
Nigeria *d*	0	0	0	0	0	0	0
Nyasaland	0	0	0	0	0	0	0
Tanganyika	0	0	0	0	0	0	0
French Dependencies, etc.—							
Algiers	0	0	0	0	0	0	0
French Morocco	0	0	0	0	0	0	0
Madagascar	0	0	0	0	0	0	0
ASIA—							
Japan	0·125	—	—	—	—	—	—
British Dependencies, etc.—							
Federated Malay States	0	—	—	—	—	—	0
Sarawak	0	0	0	0	0	0	0
French Dependencies, etc.—							
French Indo-China	0	0	0	0	0	0	0
AUSTRALASIA—							
Australia *c*	2·023	*U*	*U*	*U*	*U*	2·023	—
New Zealand	1·249	—	—	*g*	*g*	1·249	—

TABLE 3—*continued*

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In Millions of Metric Tons)

1935

Name of Country	Brown Coal and Lignite						Peat
	Production	Stocks		Imports	Exports	Total Consumption (Cols. 1+2+4) −(Cols. 3+5)	Production
		At Beginning of Year	At End of Year				
0	1	2	3	4	5	6	7
EUROPE—							
Austria	2·971	—	—	0·170	—	—	0·008
Bulgaria	1·572	0·180	0·329	0	0·001	1·422	0
Czechoslovakia	15·3	—	—	0·1	1·7	—	—
Danzig	0	*U*	*U*	0·006	0	0·006	0·001
Denmark	0·007	0	0	0·090	0	0·097	0·325 *a*
Estonia	0	0	0	0	0	0	0·108
Finland	0	0	0	0	0	0	*U*
France *e*	0·90	0·04	0·02	0·89	0	1·81	*o*
Germany *f*	147·1	4·1	3·4	5·2 *b*	3·6	149·4	0·4
Hungary	6·72	*N*	*N*	0	0·18	6·54	*N*
Irish Free State	0	0	0	0	0	0	3·7
Italy	*0·545*	—	—	—	—	—	—
Latvia	0	0	0	0	0	0	0·029
Netherlands	0·07	*U*	*U*	0·13	0·004	0·20	0·69
Norway	0	*U*	*U*	*g*	*g*	*g*	*U*
Poland	0·018	0·001	0·002	0·007	0	0·024	2·0 *A*
Roumania	1·667	—	—	—	—	—	0
Spain	*0·30*	—	—	—	—	—	—
Sweden	*N*	*N*	*N*	*N*	*N*	*N*	0·03
Switzerland	0	*U*	*U*	0·318	0	0·318	*U*
United Kingdom	0	0	0	0	0	0	*U*
Yugoslavia	4·043	0·246	0·254	0·002	0·074	3·963	*N*
NORTH AMERICA—							
Canada	3·2 *i*	*U*	*U*	0·005	0·010	*3·2*	0·001
United States of America *j*	2·495 *k*	*U, N*	*U, N*	0·004	*U, N*	2·499	0·034 *l*
CENTRAL & S. AMERICA—							
Argentine	0	0	0	0	0	0	0
AFRICA—							
Union of S. Africa	*N*	*N*	*N*	*N*	*N*	*N*	0
British Dependencies, etc.—							
Nigeria *d*	0	0	0	0	0	0	0
French Dependencies, etc.—							
Algiers	0	0	0	0	0	0	0
French Morocco	0	0	0	0	0	0	0
Madagascar	0	0	0	0	0	0	0
ASIA—							
French Dependencies, etc.—							
French Indo-China	0	0	0	0	0	0	0
AUSTRALASIA—							
Australia *m*	3·036	*U*	*U*	*U*	*U*	3·036	—
New Zealand	1·311	—	—	*g*	*g*	1·311	—

TABLE 3 (1934–1935)—NOTES

Figures compiled or computed by the Editor are shown in *italics.*

A Approximate.
N Negligible, unimportant.
U Unrecorded, not available, not yet available.
a Peat moss not included.
b Bohemian brown coal converted into raw brown coal equivalent.
c Year ended 30th June 1935.
d Including Cameroons under British Mandate.
e Including lignite briquettes converted at the rate: 1 ton of briquettes = 2·25 tons of lignite.
f Including the Saar Territory from March 1935.
g Included with coals in Table 2.
h Computed at 30 per cent moisture.
i Sum of mine sales, colliery consumption, quantity supplied to employees, and quantity used in the manufacture of briquettes.
j Including Alaska, Hawaii, and Puerto Rico (and, in 1935, the Virgin Islands), although in fact the statistics relate almost entirely to the continental United States.
k Production of lignite in the four major lignite fields; sub-bituminous coal, sometimes known as "black lignite," is excluded, being included as coal in Table 2, Column 1.
l Peat is not used as a commercial fuel in the U.S.A., its chief use being for soil improvement.
m Year ended 30th June 1936.
n This figure is *not* equal to (Columns 1+2+4)−(Columns 3+5). (EDITOR.)
o Less than 0·1 million metric tons per annum.

TABLE 3 (1934–1935)—SOURCES

Where statistics were supplied on the form adopted by the World Power Conference, the source (or if the source was not reported, the name of the organization which transmitted the form) is mentioned in roman type. Where statistics were extracted from published sources, the source is mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Columns 1-6: Bundesministerium für Handel und Verkehr; Column 7: Bundesministerium für Land- und Forstwirtschaft—Landwirtschaftlich-chemische Versuchsanstalt.
Bulgaria	Industrieministerium—Section des Mines.
Czechoslovakia	State Office of Statistics.
Danzig	Statistisches Landesamt.
Denmark	Danish National Committee.
Estonia	Estonian National Committee.
Finland	Finnish National Committee.
France	Comité Central des Houillères de France.
Germany	Statistiches Reichsamt.
Greece	*Annuaire Statistique de la Grèce, 1935.*
Hungary	Ministry of Industry.
Irish Free State	Irish Committee of the World Power Conference.
Italy	*Annuario Statistico Italiano, 1936.*
Latvia	Latvian National Committee.
Netherlands	Centraal Bureau voor de Statistiek; Instituut voor brandstoffeneconomie.
Norway	Central Statistical Bureau.
Poland	Columns 1-6: Ministry of Industry and Commerce; Column 7: Ministry of Agriculture.
Portugal	*Anuário Estatistico de Portugal.*
Roumania	Ministère de l'Industrie et du Commerce—Direction des Mines.
Spain	*League of Nations—Statistical Year-Book, 1934–35.*
Sweden	Swedish National Committee.
Switzerland	Direction générale des douanes fédérales.
U.S.S.R.	U.S.S.R. National Committee.
United Kingdom	Board of Trade—Mines Department.
Yugoslavia	Ministry of Forests and Mines—Department for the Supreme Survey of Mines.
NORTH AMERICA—	
Canada	Dominion Bureau of Statistics.
United States of America	Prepared by the American National Committee from reports of the Bureau of Mines and the Bureau of Foreign and Domestic Commerce.
CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
AFRICA—	
Union of S. Africa	Office of Census and Statistics.
British Dependencies, etc.—	
Nigeria	Director of Transport; Acting Colliery Manager, Government Colliery.
Nyasaland	Government Secretariat.
Tanganyika	Government Secretariat.
French Dependencies, etc.—	
Algiers	Comité Central des Houillères de France.
French Morocco	Comité Central des Houillères de France.
Madagascar	Comité Central des Houillères de France.
ASIA—	
Japan	Japanese National Committee.
British Dependencies, etc.—	
Federated Malay States	Chief Secretary to Government.
Sarawak	Sarawak Government Offices, London.
French Dependencies, etc.—	
French Indo-China	Comité Central des Houillères de France.
AUSTRALASIA—	
Australia	Commonwealth Bureau of Census and Statistics.
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

TABLE 4

COKE—ANNUAL STATISTICS

(In Millions of Metric Tons)

1934

Name of Country	Production	Stocks: At Beginning of Year	Stocks: At End of Year	Imports	Exports	Total Domestic Consumption (Cols. 1+2+4) − (Cols. 3+5): For Household Purposes	Total Domestic Consumption (Cols. 1+2+4) − (Cols. 3+5): For other Purposes
0	1	2	3	4	5	6	7
EUROPE—							
Austria	0·577 *a*	0·014	0·094	0·323	0	*b*	*0·820 c*
Belgium and Luxemburg	4·236	—	—	2·338	0·960	—	—
Bulgaria	*N*	*N*	*N*	*N*	—	*N*	*N*
Czechoslovakia	1·3 *d*	—	—	0·2	0·3	—	—
Estonia	0·002	*U*	*U*	0·003	0	*U*	*U*
Finland	0·059	0·014	0·015	0·207	0	*b*	0·265 *c*
France	7·29 *e*	0·21	0·29	2·28	0·29	—	9·20
Germany (excluding Saar)	24·5 *e*	6·2	5·0	0·8	6·2	5·9	14·4
Greece	—	—	—	*0·064*	—	—	—
Hungary	0·158	0·013	0·016	0·178	0	0·154	0·179
Irish Free State	—	—	—	0·021	0·020	—	—
Latvia	*U*	*U*	*U*	0·054	0	*U*	*U*
Netherlands	0·783	*U*	*U*	0·358	2·075	—	—
Norway	0·07	*U*	*U*	0·54	0·008	*b*	0·60 *c*
Poland	1·333	0·322	0·222	0·054	0·405	0·179	0·903
Sweden	0·439	*U*	*U*	1·483	0	*b*	1·922 *c*
Switzerland	0·451	*U*	*U*	0·743	0	*b*	1·194 *c*
United Kingdom	24·511 *i*	1·049 *j,E*	1·446 *j,E*	*N*	2·229	5·527 *E, h*	15·495 *E,h*
Yugoslavia	0·020 *j*	0·001	0·003	0·181	0	0·193	0·006
NORTH AMERICA—							
Canada *k*	2·091	0·236	0·321	0·802	0·031	1·621 *E*	1·156
United States of America *l*	33·96 *m*	3·66	4·04	0·15	0·96	11·16 *E, n*	21·61 *o*
CENTRAL & S. AMERICA—							
Argentine	0·052	*U*	*U*	0·027	0	*b*	0·079 *c*
AFRICA—							
Union of S. Africa	0·24 *t*	*U*	*U*	*N*	0·02	*b*	0·22 *c*
ASIA—							
India	2·41	—	—	0·015	0·002	—	—
AUSTRALASIA—							
Australia *p*	1·463	*U*	*U*	0·001	0·017	—	—
New Zealand	0·066 *r*	*U*	*U*	0·001	*N*	*U*	*U*

TABLE 4—*continued*

COKE—ANNUAL STATISTICS

(In Millions of Metric Tons)

1935

Name of Country	Production	Stocks		Imports	Exports	Total Domestic Consumption (Cols. 1+2+4) −(Cols. 3+5)	
		At Beginning of Year	At End of Year			For Household Purposes	For other Purposes
0	1	2	3	4	5	6	7
EUROPE—							
Austria	0·509 *a*	0·094	0·038	0·369	0	*b*	*0·934 c*
Belgium and Luxemburg	4·444	—	—	2·279	0·919	—	—
Bulgaria	*N*	*N*	*N*	*N*	—	*N*	*N*
Czechoslovakia	1·6 *d*	—	—	0·2	0·4	—	—
Danzig	0·037	*U*	*U*	0·055	0	*b*	0·092*A*,*c*
Denmark	0·293	—	—	1·420	0	*U*	*U*
Estonia	0·002	*U*	*U*	0·003	0	*U*	*U*
Finland	0·060	0·015	0·015	0·206	0	*b*	0·266 *c*
France	7·05 *e*	0·29	0·31	2·13	0·29	*b*	8·87 *c*
Germany *f*	34·4 *g*	5·0	3·5	0·8	6·6	10·9	19·2
Hungary	0·213	0·016	0·025	0·178	0·010	0·159	0·213
Irish Free State	—	—	—	0·023	0·016	—	—
Latvia	*U*	*U*	*U*	0·081	0	*U*	*U*
Netherlands	0·740	*U*	*U*	0·311	2·138	—	—
Norway	0·07	*U*	*U*	0·63	0·01	*b*	0·7 *c*
Poland	1·387	0·222	0·208	0·061	0·338	0·204	0·920
Sweden	0·476	*U*	*U*	1·747	0	*b*	2·223 *c*
Switzerland	0·458	*U*	*U*	0·812	0	*b*	1·270 *c*
United Kingdom	25·141 *i*	1·446*j*, *E*	0·972*j*,*E*	0·006	2·489	5·996 *E*, *h*	16·320*E*,*h*
Yugoslavia	0·022 *j*	0·003	0·004	0·207	0	0·221	0·007
NORTH AMERICA—							
Canada *k*	2·114	0·321	0·329	0·648	0·034	1·326 *E*	1·394
United States of America *l*	37·15 *m*	4·04	3·17	0·29	0·68	10·63 *E*, *n*	27·00 *o*
CENTRAL & S. AMERICA—							
Argentine	0·118	*U*	*U*	0·026	0	*b*	0·144 *c*
AFRICA—							
Union of S. Africa	0·24 *t*	*U*	*U*	*N*	0·01	*b*	0·23 *c*
ASIA—							
India	2·70	—	—	0·013	0·002	—	—
AUSTRALASIA—							
Australia *q*	*V*	*U*	*U*	0·002	0·016	—	—
New Zealand	0·068 *s*	*U*	*U*	0·001	*N*	*U*	*U*

TABLE 4 (1934–1935)—NOTES

Figures compiled or computed by the Editor are shown in *italics*.

A Approximate.
E Wholly or partly estimated.
N Negligible, unimportant.
U Unrecorded, not available.
V Not yet available.
a Gas coke ; no foundry coke is produced in Austria.
b Included in Column 7.
c Domestic consumption for all purposes.
d Production at coke ovens only.
e Coke-oven coke only.
f Including the Saar territory from March 1935.
g Coke-oven and gas coke.
h The sum of Columns 6 and 7 is not in fact equal to (Columns 1+2+4)−(Columns 3+5). (EDITOR.)
i Includes breeze.
j Gas coke only.
k The statistics for this country include petroleum coke.
l Includes Alaska, Hawaii, Puerto Rico (and, in 1935, the Virgin Islands), although no production and little consumption is reported from the non-contiguous territories.
m Includes beehive and by-product oven coke, gas coke, screenings and breeze, and petroleum coke.
n Includes some coke used for commercial purposes.
o Estimated as the consumption by iron furnaces and other industrial users including producers ; includes all breeze consumed.
p Year ended 30th June 1935.
q Year ended 30th June 1936.
r Year ended 31st March 1935.
s Year ended 31st March 1936.
t Compiled from figures relating to the individual producers' financial years.

TABLE 4 (1934–1935)—SOURCES

Where statistics were supplied on the form adopted by the World Power Conference, the source (or if the source was not reported, the name of the organization which transmitted the form) is mentioned in roman type. Where statistics were extracted from published sources, the source is mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference ; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Bundesministerium für Handel und Verkehr.
Belgium	Administration des Mines.
Bulgaria	Bulgarian National Committee.
Czechoslovakia	State Office of Statistics.
Danzig	Statistisches Landesamt.
Denmark	Danish National Committee.
Estonia	Estonian National Committee.
Finland	The three gas supply undertakings in Finland.
France	Comité Central des Houillères de France.
Germany	Statistisches Reichsamt.
Greece	*Annuaire Statistique de la Grèce, 1935.*
Hungary	Ministry of Industry.
Irish Free State	Irish Committee of the World Power Conference.
Latvia	Statistical Year-Book of Latvia.
Netherlands	Association of Gas Producers in the Netherlands ; Centraal Bureau voor de Statistiek.
Norway	Central Statistical Bureau.
Poland	Polish Coal Convention.
Sweden	Swedish National Committee.
Switzerland	Column 1 : Société Suisse de l'Industrie du Gaz et des Eaux ; Column 4 : Direction générale des douanes.
United Kingdom	Columns 1, 4, 5 : Annual Report of the Secretary for Mines ; Columns 2, 3, 6, 7 : estimated by the National Gas Council of Great Britain and Ireland.
Yugoslavia	*Association of the Yugoslav Gas and Water Works.*
NORTH AMERICA—	
Canada	Dominion Bureau of Statistics.
United States of America	Prepared by the American National Committee from published reports of the Bureau of Mines, Bureau of the Census, and Bureau of Foreign and Domestic Commerce.
CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
AFRICA—	
Union of S. Africa	Office of Census and Statistics.
ASIA—	
India	Column 1 : Geological Survey ; Columns 4, 5 : Department of Commercial Intelligence and Statistics.
AUSTRALASIA—	
Australia	Commonwealth Bureau of Census and Statistics.
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

STATISTICAL YEAR-BOOK

OF THE

WORLD POWER CONFERENCE

No. 2

DATA ON RESOURCES AND ANNUAL STATISTICS FOR 1934 AND 1935

EDITED, WITH AN INTRODUCTION AND EXPLANATORY TEXT

by

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II. SOLID FUELS

A.—COALS, BROWN COAL, LIGNITE, PEAT, COKE, AND OTHER MANUFACTURED FUEL

SCOPE AND MEANING OF THE STATISTICS

In obtaining the data for Table 2, which relate to resources of coal, brown coal and lignite, and peat, organizations completing the forms adopted by the World Power Conference were instructed : " Where the estimated quantity has been reduced for the purpose of this report by the quantity extracted since the date of estimate, the date down to which the statistics of reserves have been brought should be reported." The estimates of resources extracted by the Editor from *The Mineral Industry of the British Empire and Foreign Countries—War Period—Coal, Coke, and By-Products* (1913–1919) and reproduced in Table 2 by permission of the Controller of H.M. Stationery Office were based, with adjustments for changes in international boundaries, upon the estimates obtained by the Executive Committee of the International Geological Congress held in Canada in 1913, and are reported as being of that date; they may, however, have been made at earlier dates. In view of this uncertainty as to the dates of these estimates, and also in view of the very approximate nature of some of the figures, no attempt has been made to reduce them by the quantities of fuel extracted since the date of report.

The statistics of resources, especially of coal, presented in Table 2, are in one sense fairly comprehensive. The largest areas for which no estimates are presented are in Africa, Asia, and Central and South America ; it is known that coal reserves exist in many countries in these areas, but for various reasons—the inaccessibility or poor quality of the coal, greater cheapness of imported or of other forms of fuel, or smallness of local need for fuel—exploitation of these resources has hardly begun, and their magnitude has not been even approximately estimated. The statistics of resources in Europe are nearly complete, the only countries for which no estimates for coals are presented being Albania, Lithuania, Luxemburg, and Portugal—none of first importance in this connection. In North America only Greenland is omitted, and the great bulk of the known reserves in Australasia is included. The statistics of reserves of brown coal, lignite, and peat are less complete, and, outside Europe, fragmentary.

This number of the *Statistical Year-book of the World Power Conference* contains statistics of production, stocks, imports, exports, and domestic consumption of coals, brown coal and lignite, coke (other than petroleum coke), and manufactured fuel (excluding coke). It is obvious that, if the statistics which represent the production in any country of all these different fuels were added together, duplication would occur, since the coal (or brown coal) from which the coke and manufactured fuel were made would be included both as coal (or brown coal) produced and, in the form of coke or manufactured fuel, in the production statistics relating to those fuels. Similarly, coal (or brown coal) converted into coke or manufactured fuel is included both in the statistics of coal (or brown coal) consumed and in the consumption statistics relating to coke or manufactured fuel. However, the raw coal equivalent of coke and manufactured fuel produced is stated, wherever possible, in Tables 5 and 6, so that it is possible to compute total figures free of duplication.

The statistics of the production of coal (Table 3, Column 1) are nearly complete. Most of the omissions are obviously due to the relative unimportance of coal production in the countries concerned. The statistics of coal stocks (Table 3, Columns 2 and 3) are fragmentary, it being evident that in many countries such statistics are not compiled. Despite a number of omissions, it is believed that the bulk of the foreign trade in coal is included in Columns 4 and 5 of Table 3. The figures for consumption, being dependent on the availability of several different statistics, are by no means complete; and in some of those returned by the National Committees and other reporting organizations, as well as in some of those compiled by the Editor, no account has been taken of possible, but unascertained, changes in stocks.

The statistics of the production of brown coal and lignite (Table 4, Column 1) in Europe are almost complete; the statistics for the rest of the world are fragmentary. It is evident that in many countries statistics of stocks of brown coal and lignite (Table 4, Columns 2 and 3) are not compiled. Foreign trade in these fuels (Table 4, Columns 4 and 5) is nowhere of great importance, and many omissions are doubtless due to the negligibility of the statistics. As with coals, some of the figures for the consumption of brown coal and lignite have been computed without regard to possible changes in stocks.

The statistics of the production of peat (Table 4, Column 7) are not numerous.

The statistics relating to coke, presented in Table 5, cover the bulk of coke production, imports, and exports in Europe and North America. Statistics for only a few countries in other continents are presented, but there probably the only really important omission is that of Japan.

Table 6 relates to solid manufactured fuel derived from coal and brown coal, other than coke; *i.e.*, principally to briquettes.

CONTINENTAL AND WORLD TOTALS

The figures of total resources of coals, brown coal, lignite, and peat, presented in Table A, have been obtained by the simple addition of those contained in the corresponding columns of Table 2. In the latter table instances may be found where there is an entry for " proved resources " but none for " probable total resources "; and other instances in which there is an estimate of " probable total resources " but none of " proved resources." Furthermore, the estimates for different countries relate to different dates. The significance of the totals in Table A is therefore merely the literal one that available estimates of proved or of probable total resources amount, in the aggregate, to so many million metric tons. These totals differ slightly from those presented in *Statistical Year-book of the World Power Conference*, No. 2, partly because the estimates for some countries have now for the first time been reduced by the quantities extracted since the date of estimate, and partly because for some countries new estimates have been made.

The large figure for probable total reserves of coals in Asia is due almost entirely to the estimate for China (10,112,000 million metric tons). With this exception the estimates of coal reserves in the United States of America are by far the largest, with the U.S.S.R. next, and Germany and the United Kingdom following, in order of magnitude.

TABLE A: COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES
(In Millions of Metric Tons *)

	Coals		Brown Coal and Lignite		Peat
	Proved Reserves	Probable Total Reserves	Proved Reserves	Probable Total Reserves	Probable Total Reserves
Column Numbers in Table 2:	2	4	6	8	10
Certain countries in:—					
Europe	535,000	1,589,000	46,000	290,000	105,000
North America	30,000	2,286,000	391,000	1,432,000	13,000
Central and S. America	2,000	1,000	—	—	—
Africa	9,000	211,000	—	—	—
Asia	11,000	10,157,000	—	1,000	—
Australasia	—	17,000	—	41,000	—
Totals	587,000	14,261,000	437,000	1,764,000	118,000

* The figures in this table are stated correct to the nearest thousand million metric tons.

Comparable figures for the production of coals in Europe, North America, and the world, in 1933, 1934, 1935, and 1936, based upon the statistics of Table 3, Column 1, and corresponding statistics presented in *Statistical Year-book* No. 1 and No. 2, are shown in Table B. They include the great bulk of the coals produced, the principal omission being the production in China (including Manchuria). It is worthy of note that, while there was a general increase in production of coals throughout the period 1933–1936, amounting to about 26 per cent in aggregate, the rate of increase fluctuated considerably. The total for all continents increased from 1933 to 1934 by 10 per cent, from 1934 to 1935 by only 4 per cent, and from 1935 to 1936 by 10 per cent. This slackening in 1935 in the rate of increase in production is to be observed in most of the principal coal-producing countries, and was most marked in Japan, where there was in fact a decline from 1934 to 1935. Exceptionally, production in the U.S.S.R. appears to have increased more rapidly from 1934 to 1935 than at any other time in the period under review.

TABLE B: PRODUCTION OF COALS—1933, 1934, 1935, AND 1936
(In Millions of Metric Tons)

	1933	1934	1935	1936	As Percentage of 1933		
					1934	1935	1936
Certain countries in:—							
Europe	524	572	605	646	*109*	*115*	*123*
North America	355	388	395	457	*109*	*111*	*129*
Other continents	79	91	98	105	*115*	*124*	*133*
Totals	958	1,051	1,098	1,208	*110*	*115*	*126*

Comparable figures for the production of brown coal and lignite in Europe and the rest of the world in 1933, 1934, 1935, and 1936, are presented in Table C. The most important omission from the European figures is that of the U.S.S.R.; the totals for " other continents " are based upon fragmentary data, and no great significance should be attached to them. Production increased by about 6 per cent per annum between 1933 and 1935, and by about 9 per cent between 1935 and 1936. Germany accounts for more than three-quarters of the total production reported in Table C.

TABLE C: PRODUCTION OF BROWN COAL AND LIGNITE—1933, 1934, 1935, AND 1936

(In Millions of Metric Tons)

	1933	1934	1935	1936	As Percentage of 1933		
					1934	1935	1936
Certain countries in :—							
Europe	156	167	177	192	*107*	*113*	*123*
Other continents	6	5	5	6	—	—	—
Totals	162	172	182	198	*106*	*112*	*122*

The bulk of peat production in Europe occurs in the U.S.S.R., from which unfortunately no statistics for inclusion in this number of the *Year-book* were received. In other European countries aggregate production amounted to rather more than 7 million metric tons in 1935 and 1936, and appears to have been approximately constant throughout the period 1933–1936.

Statistics relating to coke are not sufficiently complete to justify the presentation of comparable continental and world totals for different years, but it may be stated that in Europe (including the whole of the U.S.S.R.) aggregate production was of the order of 100 million tons per annum, in North America of the order of 50 million tons per annum, and that elsewhere production of coke was *relatively* unimportant. In all the important coke-producing countries, and especially in Germany and the United States of America, production increased rapidly between 1934 and 1936.

The principal reported production of solid manufactured fuel other than coke occurred in Germany, and elsewhere, except in France, production was unimportant. In Germany a considerable proportion of this fuel was produced from brown coal, a fact which is reflected in the high ratio between the weight of raw coal used and the weight of manufactured fuel produced.

TABLES 2, 3, 4, 5, AND 6—DEFINITIONS

The following definitions (including the introductory paragraph), adopted by the World Power Conference, were distributed with the forms for the guidance of the organizations which supplied the statistics :

On account of the varying characteristics of coal in the several countries, of the different bases of classification employed, and of the fact that international study of coal classification is already in progress, it has been deemed inadvisable to attempt to segregate the higher ranking coals—anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from lignite and brown coal or which separate the latter from peat. It will, therefore, be the responsibility of each reporting country when submitting its statistics of solid fuels to determine for itself the basis of classification to be used in distinguishing the three groups to be reported: viz. coals, brown coal and lignite, and peat.

13. *Proved Reserves—Coals, Lignite and Brown Coal*

"Proved reserves" of coals, of lignite and of brown coal shall mean the total amounts thereof, occurring within the limits hereinafter prescribed, as are of economic value and with respect to which there exist reliable data of actual thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

(*a*) Coals: Seams containing not less than 30 centimetres of merchantable coal and situated not more than 1200 metres below the surface, including workable submarine seams.

(*b*) Lignite and Brown Coal: Seams containing not less than 30 centimetres of merchantable lignite or brown coal and situated not more than 500 metres below the surface.

14. *Probable Reserves—Coals, Lignite and Brown Coal*

"Probable reserves" of coals, of lignite and of brown coal shall mean the aggregate within the reporting country of proved reserves thereof plus such further reserves of economic value within the limits of thickness and depth of seams specified in paragraph 13 hereof, as may, from uncompleted investigations or from relation to proved reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

15. *Peat*

A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent of organic matter.

16. *Probable Reserves of Peat*

"Probable reserves of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

17. *Domestic Production—Coals, Lignite and Brown Coal*

"Domestic production" of coals, of lignite and of brown coal shall mean the gross amounts thereof raised to the pit-head, less the amounts of dirt or other waste removed in washeries or cleaning plants, plus any increase in weight between the pit-head and weighing-point due to absorption of water in washeries, but without deduction for other losses beyond point of weighing or for amounts used in operation of mines or collieries.

18. *Coal Stocks*

" Coal stocks " shall include the following :

(*a*) " Mine stocks," or the amounts held or stored at the producing properties, whether in dumps at pit-heads, in cars at colliery sidings, or otherwise, and whether billed to purchasers or not.

(*b*) " Stocks in transit," or amounts held or stored in railway classification yards or at points of transhipment from rail to water or water to rail while in process of domestic transit from producers to consumers.

(*c*) " Dealers' and consumers' stocks," or the amounts held in storage by coal dealers and by large industrial users, such as by-product coke ovens, railways, electric-power utilities, steel and rolling mills, etc. This item will, in general, include the stocks of only those dealers and consumers to whom, except in case of transhipment, delivery is made directly from mine or water terminal in car-load lots or in boats or barges.

(*d*) " Import stocks," or amounts of foreign coal held in storage at ports of entry pending shipment in domestic trade.

(*e*) " Export stocks," or amounts in storage at export points pending actual export.

(*f*) " Bunker stocks," or amounts held in storage at ports for fuelling vessels engaged in either foreign or domestic trade.

Statistics of stocks shall be reported in totals and may also be reported by the several classes above defined ; but each reporting country in submitting its statistics shall state which of the preceding classes, if any, have been omitted from the total which it reports.

19. *Lignite and Brown Coal Stocks*

In so far as there regularly are within any reporting country stocks of lignite or of brown coal in significant quantities within the several classes as specified for coal in paragraph 18 hereof, data for such classes shall be considered necessary for a complete report on stocks. Each reporting country in which complete data are not available, or are not reported, shall state what classes have been included in making up its report.

20. *Statistics of Products*

Where coal, brown coal or lignite are imported, exported, shipped as bunker fuel, or carried in stock in the form of coke or briquettes or other manufactured product, such statistics shall be separately reported in Tables 5 and 6. Petroleum coke shall not be reported in Table 5, but shall be reported in Table 10, Column 7.

TABLE 2

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In Millions of Metric Tons)

Name of Country	Coals				Brown Coal and Lignite				Peat	
	Proved Reserves		Probable Total Reserves		Proved Reserves		Probable Total Reserves		Probable Total Reserves	
	Date to which Estimate Refers †	Quantity	Date to which Estimate Refers †	Quantity	Date to which Estimate Refers †	Quantity	Date to which Estimate Refers †	Quantity	Date to which Estimate Refers †	Quantity
0	1	2	3	4	5	6	7	8	9	10
EUROPE										
Austria	1930	13	1930	19	1930	611	1930	2,337	1930	80
Belgium	—	—	1935	11,000	—	—	—	—	—	—
Bulgaria	1936	0·8	1936	1·5	1936	497·1	1936	1,000·2	1936	*N*
Czechoslovakia *y*	—	—	—	6,450	—	—	—	12,500	—	—
Danzig	1933	0	1933	0	1933	0	1933	0	1938	23
Denmark	—	0	—	0	1937	2·0	1937	7·0	1937	250
Estonia *o*	—	0	—	0	—	0	—	0	1935	2,030
Finland	1938	0	1938	0	1938	0	1938	0	1938	*U*
France *z*	1936–37	4,000	1936–37	8,500	1936–37	320	1936–37	500	—	—
Germany	1937	80,445	1922	279,516	1937	28,837	1937	56,758	1932	10,000
Greece	1913	*0*	—	*U*	1913	*10*	1913	*30*	—	—
Hungary	1931	210	1931	210	1931	1,500	1931	1,500	1931	120
Iceland	—	0	—	0	—	*U*	—	*U*	—	*U*
Irish Free State	1935	107	—	*U*	—	*U*	—	*U*	1935	3,600
Italy	1913	*1*	1913	*146*	1913	*51·5*	1913	*101*	—	—
Latvia	1936	0	1936	0	1936	0	1936	0	1936	1,665
Netherlands	1935	2,930 *q*	1913	*4,474 d*	1935	*U*	1935	*U*	1935	*U*
Norway— Svalbard	—	*U*	1925	8,000 *P*	—	0	—	0	—	0
Poland	1930–35	15,000 *E*	1930–35	91,000 *E*	—	—	1930–35	5,500 *E*	1932–35	6,000 *E*
Portugal	—	*D*	—	*D*	—	*D*	—	*D*	—	*D*
Roumania	—	*U*	1931	1,620	—	*U*	1931	996	1931	74
Spain	1913	*4,500 g*	1913	*5,500 g*	1913	*h*	1913	*h*	—	—
Sweden	1936	97 *A*	1936	105 *A*	1936	0	1936	0	1936	9,000 *A, f*
Switzerland	1935	0	1935	0	1935	0	1935	0	1935	*N*
U.S.S.R.	1933	295,900	1933	998,000	1933	12,890	1933	202,000	1933	72,330
United Kingdom	1937	132,198	1937	174,501	1937	*N*	1937	*N*	1937	*U*
Yugoslavia	1936	6·7	1936	39·0	1936	1,123	1936	6,325	1936	*N*
NORTH AMERICA—										
Canada	1913	*30,319*	1913	*242,400*	1913	*391,260*	1913	*572,686*	—	*U*
Newfoundland	—	0	—	0	—	0	—	0	—	*U*
United States of America *j*	—	*U*	1936	2,036,749 *u*	—	*U*	1936	852,278 *u*	1936	12,544 *Z*
Alaska	—	*U*	1908	6,986 *e*	—	*U*	1908	6,717 *e*	—	*U, r*
Hawaii	—	—	1938	*v*	—	—	1938	*v*	1938	*v*
Puerto Rico	—	—	1938	*v*	—	—	1938	*v*	1938	*v*
Virgin Islands	—	—	1938	*v*	—	—	1938	*v*	1938	*v*

CENTRAL & S. AMERICA—										
Argentine	1935	0	1935	0	1935	0	1935	0	1935	0
Chile	1913	*2,116*	—	—	—	—	—	—	—	—
Honduras	—	—	1913	*1*	—	—	1913	*4*	—	—
Peru	—	—	1913	*1,000*	—	—	—	—	—	—
AFRICA—										
Egypt	1936	0	—	*U*	1936	0	—	*U*	1936	0
Southern Rhodesia	1936	195	1936	4,150	1936	0	1936	0	1936	0
Union of South Africa	1927	7,915	1927	205,723 *k*	1927	*N*	1927	*N*	1927	0
Belgian Dependencies, etc.—										
Belgian Congo	—	—	1913	*100*	—	—	—	—	—	—
British Dependencies, etc.—										
Nigeria	1937	113	1937	300 *B*	1937	13	1937	200 *B*	—	—
Nyasaland	—	*U*	—	*U*	1933	0	1933	0	1933	0
Tanganyika	1934	800	—	*U*	—	—	—	—	—	—
French Dependencies, etc.—										
Algeria *x*	1937	0·5	1937	2	1937	0	1937	*N*	1937	0
French Morocco *x*	1937	10	1937	70	1937	0	1937	0	1937	0
Madagascar *x*	1937	20	1937	350	1937	0	1937	*N*	1937	0
Tunis *x*	1937	0	1937	0	1937	0	1937	*N*	1937	0
ASIA—										
China	—	—	1913	*10,112,000*	—	—	1913	*600*	—	—
India	1932	5,000	1932	20,600	—	*U*	—	*U*	—	*U*
Japan Proper	1932	5,895	1932	16,218	1932	66	1932	473	—	—
Manchuria	—	—	1913	*1,129*	—	—	—	—	—	—
British Dependencies, etc.—										
Federated Malay States	1935	*U*	1935	*U*	1935	*l*	1935	*l*	1935	*l*
Sarawak	1934	0	1934	0	1934	2·66	1934	13	1934	0
French Dependencies, etc.—										
French Indo-china *x*	1937	40	1937	1,125	1937	0	1937	*N*	1937	0
Japanese Dependencies, etc.—										
Korea	—	—	1913	*5,585*	—	—	1913	*27*	—	—
Netherlands Dependencies, etc.—										
Netherlands E. Indies	1933	*U*	1933	*U*	1933	*U*	1933	*U*	1933	*U*
AUSTRALASIA—										
Australia	—	—	1929–30	16,715 *t*	—	—	1929–30	41,276 *s*	—	—
New Zealand	1927	270 *s*	1927	*n*	1927	403 *t*	1927	*n*	—	—
French Dependencies, etc.—										
New Caledonia *x*	1937	0	1937	*N*	1937	0	1937	0	1937	0

TABLE 2—NOTES

Figures compiled or computed by the Editor are shown in *italics*.

† Organizations completing the forms adopted by the World Power Conference were asked, " where the estimated quantity has been reduced for the purpose of this report by the quantity extracted since the date of estimate, the date down to which the statistics of reserves have been brought should be reported."

A Approximate.
B " Very approximate."
D Recorded but not yet available.
E Estimate.
N Negligible, unimportant.
P Provisional.
U Unrecorded.
Z Calculated as " air dried " peat, actual moisture content unknown.
d " Actual, probable, and possible reserves."
e Minimum rather than ultimate resources, since large areas are unexplored. Reserves are probably many times the estimates shown, but some of the best coals have no present economic value since they cannot be marketed under any demand that can be foreseen.
f Computed on the basis of 25 per cent water content.
g Including lignite.
h Included in Columns 2 and 4.
j Excluding Alaska and other non-contiguous territories.
k " Proved, estimated, and undetermined resources." " Proved and estimated resources " reported as 21,528 million metric tons.
l No known deposits of economic value.
n Probable total resources of coals, brown coal, and lignite: 1,657 million metric tons.
o In Estonia oil shale is used as solid fuel; reserves are estimated as 3,500 million metric tons.
q " Proved reserves under 1,200 metres."
r Large, but no quantitative estimates available.
s Includes sub-bituminous coals.
t Excludes sub-bituminous coals.
u The estimate upon which this figure is based was limited to seams within a depth of 915 metres and with a minimum thickness of 36 centimetres in the case of anthracite, semi-bituminous and bituminous coals, 61 centimetres in the case of sub-bituminous coal, and 91 centimetres in the case of lignite; the maximum permissible ash content was 30 per cent. The estimates by volume were converted to tons by assuming the average specific gravity of coals in general to be 1·3; as recent determinations show this figure to be too low, the estimates of reserves are probably also somewhat too low.
v Believed to be negligible.
x The estimates for this country are particularly uncertain.
y Ostrava-Karlin, Kladno-Rakovník, Plzeň, Žacléř, and Rosice basins.
z The estimates upon which these figures are based are very conservative, and in order to obtain figures corresponding to the Definitions adopted by the World Power Conference, the " certain " and " probable " reserves of the estimates have been taken as Proved Reserves, and the " possible " reserves of the estimates have been taken as Probable Total Reserves. In the case of coals, the estimates give a further category, " future " reserves, of 1,500 million metric tons, which, however, are situated more than 1,200 metres below the surface.

TABLE 2—SOURCES

Where statistics were supplied on the form adopted by the World Power Conference, the source (or if the source was not reported, the name of the organization which transmitted the form) is mentioned in roman type. Where statistics were extracted from published sources, the source is mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Columns 1-8: Ministerium für Wirtschaft und Arbeit; Column 10: Staatliche Landwirtschaftlich-chemische Versuchsanstalt.
Belgium	Administration des Mines.
Bulgaria	Ministère du Travail—Section des Mines.
Czechoslovakia	Mine-owners' Association of Czechoslovakia.
Danzig	Statistisches Landesamt.
Denmark	Danish National Committee.
Estonia	Ministry of Economic Affairs.
Finland	Finnish National Committee.
France	Ministère des Travaux Publics: Statistique de l'Industrie Minérale pour 1937, 1er fasc.
Germany	Preussische Geologische Landesanstalt.
Greece	*Mineral Industry 1913–19.**
Hungary	Royal Hungarian Geological Institute.
Iceland	Statistical Bureau.
Irish Free State	Department of Industry and Commerce—Statistics Branch.
Italy	*Mineral Industry 1913–19.**
Latvia	Latvian National Committee.
Netherlands	Columns 2, 6, 8, 10: Centraal Bureau voor de Statistiek; Instituut voor Brandstoffeneconomie; Column 4: *Mineral Industry 1913–19.**
Norway	Norwegian Scientific Exploration of Svalbard and Arctic Regions.
Poland	Ministry of Industry and Commerce.
Portugal	Portuguese National Committee.
Roumania	" Petrosani " S.A.R.
Spain	*Mineral Industry 1913–19.**
Sweden	Swedish National Committee.
Switzerland	Swiss National Committee.
U.S.S.R.	U.S.S.R. National Committee.
United Kingdom	Geological Survey.
Yugoslavia	Ministry of Forests and Mines—Department for the Supreme Survey of Mines.
NORTH AMERICA—	
Canada	*Mineral Industry 1913–19.**
Newfoundland	Department of Public Health and Welfare.
United States of America	Prepared by the United States National Committee from estimates of reserves published by the U.S. Geological Survey and from statistics of production published by the U.S. Bureau of Mines.
Alaska	U.S. Department of the Interior—Geological Survey.
Hawaii	United States National Committee.
Puerto Rico	United States National Committee.
Virgin Islands	United States National Committee.

TABLE 2—SOURCES—*continued*

CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
Chile	*Mineral Industry 1913–19*.*
Honduras	*Mineral Industry 1913–19*.*
Peru	*Mineral Industry 1913–19*.*
AFRICA—	
Egypt	"The Competent Department in Egypt." Transmitted by the Royal Egyptian Embassy in London.
Southern Rhodesia	Geological Survey.
Union of S. Africa	Office of Census and Statistics.
Belgian Dependencies, etc.—	
Belgian Congo	*Mineral Industry 1913–19*.*
British Dependencies, etc.—	
Nigeria	Nigerian Transport Services.
Nyasaland	Government Secretariat.
Tanganyika	Government Secretariat.
French Dependencies, etc.—	
Algeria	Comité d'Études Minières pour la France d'Outre-Mer.
French Morocco	Comité d'Études Minières pour la France d'Outre-Mer.
Madagascar	Comité d'Études Minières pour la France d'Outre-Mer.
Tunis	Comité d'Études Minières pour la France d'Outre-Mer.
ASIA—	
China	*Mineral Industry 1913–19*.*
India	Department of Commercial Intelligence and Statistics.
Japan Proper	Department of Commerce and Industry—Bureau of Mines.
Manchuria	*Mineral Industry 1913–19*.*
British Dependencies, etc.—	
Federated Malay States	Chief Secretary to Government.
Sarawak	Sarawak Government Offices, London.
French Dependencies, etc.—	
French Indo-China	Comité d'Études Minières pour la France d'Outre-Mer.
Japanese Dependencies, etc.—	
Korea	*Mineral Industry 1913–19*.*
Netherlands Dependencies, etc.—	
Netherlands E. Indies.	Netherlands E. Indies National Committee.
AUSTRALASIA—	
Australia	Official Year Book of the Commonwealth of Australia, 1937.
New Zealand	The Consulting Engineer to the Government of New Zealand, London.
French Dependencies, etc.—	
New Caledonia	Comité d'Études Minières pour la France d'Outre-Mer.

* The full title of this publication is *The Mineral Industry of the British Empire and Foreign Countries—War Period—Coal, Coke, and By-products (1913–1919)*, and it was issued by the Imperial Mineral Resources Bureau, London. Most of the estimates of resources presented in this publication were based, with adjustments for changes in international boundaries, upon the estimates obtained by the Executive Committee of the International Geological Congress held in Canada in 1913 and published in *Coal Resources of the World* (1913). Statistics have been reproduced from *The Mineral Industry of the British Empire and Foreign Countries* by permission of the Controller of H.M. Stationery Office.

TABLE 3

COALS—ANNUAL STATISTICS

(In Millions of Metric Tons)

1935

Name of Country	Production	Stocks: At Beginning of Year	Stocks: At End of Year	Imports	Exports	Bunker Coal Laden on Vessels Engaged in Foreign Trade	Total Domestic Consumption (Cols. 1 + 2 + 4) – (Cols. 3 + 5 + 6)
0	1	2	3	4	5	6	7
EUROPE—							
Austria	0·261	*U*	*U*	2·480	0	0	2·741
Belgium and Luxembourg	26·506	3·550 *a*	2·578 *a*	3·900	4·280	0·401	26·697
Bulgaria	0·21	*N*	*N*	0	0	*N*	0·21
Czechoslovakia	10·89	0·47	0·45	1·47 *b*	1·74 *b*	0	10·64
Danzig	0	*U, N*	*U, N*	0·63	0	0·25	0·38
Denmark	0	*U*	*U*	5·919 *e*	0	*U*	*U*
Estonia	0	*U*	*U*	0·054	0	*U*	*U*
Finland	0	*U*	*U*	1·014	0	*U*	1·014
France	46·20	3·66	3·54	18·41	1·04	*U*	63·69
Germany	143·0 *f*	4·5 *a*	4·0 *a*	4·3	26·8	*U*	121·0
Hungary	0·82	*N*	*N*	0·19	0·08	0	0·93
Irish Free State	0·115	*U*	*U*	2·274	0	0·021	2·368
Italy	*0·443*	—	—	*13·3*	*0·017*	*0·016*	*13·7*
Latvia	0	*U*	*U*	0·586	0	0	0·586
Lithuania	—	—	—	*0·221*	—	—	—
Netherlands	11·88	*U*	*U*	5·06	3·07	0·10	13·77
Norway—							
Svalbard	0·709	*U*	*U*	1·815 *i*	0·403	*U*	2·121
Poland	28·54	1·67	1·14	0·10	8·59	0·58	20·00
Portugal	0·230	*U*	*U*	1·170	0·163	0·161	—
Roumania	0·278 *j*	—	—	—	—	—	—
Spain	*7·017*	—	—	*1·07*	—	—	—
Sweden	0·42	*U*	*U*	5·25	*N*	*U*	*U*
Switzerland	0	*U*	*U*	1·958	0	0	1·958
U.S.S.R.	*109·000 l*	—	—	—	*2·182*	—	—
United Kingdom	225·82	*U*	*U*	0·01	39·34	12·73	173·76
Yugoslavia	0·400	0·004	0·003	0·220	0·003	*N*	0·618
NORTH AMERICA—							
Canada	9·25	*U*	*U*	10·7	0·406	0·278 *m*	—
United States of America *n*	385·907 *o*	43·136 *p*	44·272 *p*	0·698	10·297	1·430	373·741
CENTRAL & S. AMERICA—							
Argentine	0	*U*	*U*	2·631	0	0·017	2·614
Brazil	*0·757*	—	—	—	—	—	—
Chile	*1·900*	—	—	—	*0·152 g*	*h*	—
Mexico	*0·990*	—	—	*0·013*	*N*	—	—
Peru	*0·085*	—	—	*0·020*	—	—	—
AFRICA—							
Egypt	—	—	—	*1·596*	—	—	—
Southern Rhodesia	0·766	0	0	0	0	0	0·766
Union of S. Africa	13·58 *w*	*U*	*U*	0·01	1·42	0·81	11·36 *w*
British Dependencies, etc.—							
Nigeria	0·263	0·004	0·004	0	0	0	0·262
French Dependencies, etc.—							
Algeria	0·038	0·076 *q*	0·101 *q*	1·675	0·015	0·918	0·755
French Morocco	0·053	—	—	0·136	0·012	0·028	0·149
Madagascar	—	—	—	0·019	—	0·010	0·009

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In Millions of Metric Tons)

1935

Name of Country	Production	Stocks		Imports	Exports	Bunker Coal Laden on Vessels engaged in Foreign Trade	Total Domestic Consumption (Cols. 1 + 2 + 4) − (Cols. 3 + 5 + 6)
		At Beginning of Year	At End of Year				
0	1	2	3	4	5	6	7
ASIA—							
Burma	—	—	—	0·339	—	—	—
China—							
Manchuria	*11·474 i*	—	—	—	—	—	—
India	23·38	—	—	0·07	0·22	0·56	—
Japan Proper	*37·762*	—	—	*4·049*	*1·019*	*2·415*	—
Formosa	*1·597*	—	—	*0·006*	*0·229 u*	*0·343 v*	—
Korea	*1·999*	—	—	*1·367*	*0·649*	—	—
Sakhalin	*1·516*	—	—	—	—	—	—
French Dependencies, etc.—							
French Indo-China	1·774	0·505 *a*	0·285 *a*	0·020	1·513 *g*	*h*	0·501
Netherlands Dependencies, etc.—							
Netherlands E. Indies	*1·111 i*	—	—	*0·055*	*0·231*	*0·018*	—
AUSTRALASIA—							
Australia	11·1	*U*	*U*	0·04	0·3	0·6	10·2
New Zealand	0·838	—	—	0·099 *i*	*N*	0·164 *i, s*	0·773 *t*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In Millions of Metric Tons)

1936

Name of Country	Production	Stocks: At Beginning of Year	Stocks: At End of Year	Imports	Exports	Bunker Coal Laden on Vessels Engaged in Foreign Trade	Total Domestic Consumption (Cols. 1 + 2 + 4) − (Cols. 3 + 5 + 6)
0	1	2	3	4	5	6	7
EUROPE—							
Austria	0·244	*U*	*U*	2·369	0	0	2·613
Belgium and Luxembourg	*27·867*	*2·558*	*1·062*	*3·862*	*4·735*	*0·379*	*28·111*
Bulgaria	0·23	*N*	*N*	0	0	*N*	0·21
Czechoslovakia	12·21	0·45	0·42	1·33 *b*	1·88 *b*	0	11·71
Danzig	0	*U*	*U*	0·32 *c*	0	0·315	0·635 *d*
Denmark	0	*U*	*U*	4·109	0·001	*U*	4·108 *E*
Estonia	0	*U*	*U*	0·063	0	*U*	*U*
Finland	0	*U*	*U*	1·442	0	*U*	1·442
France	45·22	3·54	1·98	18·64	0·88	*U*	64·54
Germany	158·3 *f*	3·8 *a*	2·2 *a*	4·3	28·6	*U*	135·6
Hungary	0·83	*N*	*N*	0·19	0·08	0	0·94
Iceland	0	0·026 *E*	0·031 *E*	0·154	0	0·007 *E*	0·142
Irish Free State	0·127	*U*	*U*	2·502	0	0·015	2·614
Italy	*0·806*	—	—	*8·6*	*0·007 g*	*h*	*9·4*
Latvia	0	*U*	*U*	0·644	0	0	0·644
Lithuania	—	—	—	*0·253*	—	—	—
Netherlands	12·80	*U*	*N*	4·87	3·32	0·21	14·14
Norway—							
Svalbard	0·784 *A*	*U*	*U*	2·018 *i*	0·485	*U*	2·317
Poland	29·75	1·14	0·79	0	8·145	0·678	21·287
Portugal	0·238	*U*	*U*	1·099	0·220	0·113	—
Roumania	1·403 *k*	*N*	*N*	0·023	*N*	0	1·426
Sweden	0·45	*U*	*U*	5·61	*N*	*U*	*U*
Switzerland	—	—	—	*1·85*	—	—	—
U.S.S.R.	*123·679 l*	—	—	*0·002*	*1·802*	—	—
United Kingdom	232·12	*U*	*U*	0·03	35·07	12·14	184·94
Yugoslavia	*0·441*	—	—	*0·171*	*0·002*	—	—
NORTH AMERICA—							
Canada	10·06	*U*	*U*	11·6	0·407	0·324 *m*	*U*
United States of America *n*	447·295 *o*	44·272 *p*	51·642 *p*	0·799	11·188	1·471	428·064
CENTRAL & S. AMERICA—							
Brazil	*0·648*	—	—	—	—	—	—
Chile	*1·875*	—	—	*0·018*	*0·132 g*	*h*	—
Mexico	*1·072*	—	—	*0·012*	*N*	—	—
Peru	*0·090*	—	—	*0·023*	—	—	—
AFRICA—							
Egypt	—	—	—	*1·108*	—	—	—
Union of S. Africa	14·84	*U*	*U*	0·02	1·35	0·96	12·55
British Dependencies, etc.—							
Nigeria	0·298	0·004	0·004	0	0	0	0·298
French Dependencies, etc.—							
Algeria	*0·007*	—	—	*0·528*	*0·015*	*0·719 r*	—
French Morocco	*0·049*	—	—	*0·093*	*0·022*	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In Millions of Metric Tons)

1936

Name of Country	Production	Stocks		Imports	Exports	Bunker Coal Laden on Vessels Engaged in Foreign Trade	Total Domestic Consumption (Cols. 1 + 2 + 4) − (Cols. 3 + 5) + 6)
		At Beginning of Year	At End of Year				
0	1	2	3	4	5	6	7
ASIA—							
China—							
Manchuria	*12·020 i*	—	—	—	—	—	—
India	*22·974*	—	—	*0·076*	*0·199*	*0·565*	—
Japan Proper	*41·803*	—	—	*4·189*	*1·113*	—	—
Formosa	*1·744*	—	—	—	—	—	—
Korea	*2·282*	—	—	*1·568*	*0·683*	—	—
Sakhalin	*2·075*	—	—	—	—	—	—
French Dependencies, etc.—							
French Indo-China	*2·186*	—	—	*0·019*	*1·707*	*0·013*	—
Netherlands Dependencies, etc.—							
Netherlands E. Indies	*1·147 i*	—	—	*0·068*	*0·227*	*0·019*	—
AUSTRALASIA							
Australia	11·6	*U*	*U*	0·01	0·3	0·6	10·7

TABLE 3 (1935–1936)—NOTES

Figures compiled or computed by the Editor are shown in *italics*.

A Approximate.
E Estimated.
N Negligible.
U Not recorded.
a Mine stocks only.
b Includes coke and briquettes; coke was converted to raw coal equivalent at the rate 1 : 1·3.
c This figure is subject to a margin of error of ± 20 per cent.
d This figure is subject to a margin of error of ± 10 per cent.
e Includes coke, which is also reported in Table 5. Conversion factor for coke and cinders: 1·42857.
f Saleable coal.
g Includes bunker shipments.
h Included in Column 5.
i Includes brown coal and lignite.
j This figure was compiled by the Roumania Direction des Mines for inclusion in *Statistical Year-book of the World Power Conference*, No. 2. It corresponds with the figures presented in the *Statistical Year-book of the League of Nations, 1937–38*. See note *k*.
k This figure, compiled by "Petrosani" S.A.R., was supplied by the Roumanian National Committee as being more complete than a figure, supplied earlier, which had been compiled by the Direction des Mines du Ministère de l'Économie Nationale. This latter figure was approximately equal to the figure (*0·293* million metric tons) which is presented in the *Statistical Year-book of the League of Nations, 1937–38*. Examination of statistics for brown coal and lignite suggests that the figure (1·403 million metric tons) presented in Table 3 includes brown coal and lignite. (EDITOR.)
l Includes a certain quantity of lignite.
m Includes only foreign coal ex-warehoused for ships' stores.
n Including the non-contiguous territories and possessions—Alaska, Hawaii, Puerto Rico, and the Virgin Islands, which consume small quantities of coal. Alaska is the only one which produces any coal.
o Includes estimated illegal production of anthracite, but excludes production by small mines producing less than 900 metric tons a year; the latter are estimated to produce a total of less than one million tons a year. Includes small quantities of coal and lignite produced in Alaska.
p Excludes coals in transit on rail; import, export, and bunker stocks; and anthracite stocks in the hands of retail dealers.
q Mine and dealers' stocks.
r Foreign coal.
s This figure relates to the year ended 31st March 1936.
t In view of notes *i* and *s* in Columns 4 and 6, this figure must be regarded as having only approximate significance. (EDITOR.)
u Includes 0·171 million metric tons of coal dust.
v Includes 0·279 million metric tons of coal dust.
w In the figure supplied for inclusion in this table the quantity of coal used in this country to produce coke had been deducted. As this was not the intention of the Central Office (see text), the estimated raw coal equivalent of coke produced, reported for inclusion in Table 5, Column 2, has been added in to obtain the figure here presented. (EDITOR.)

TABLE 3 (1935–1936)—SOURCES

Where statistics were supplied on the form adopted by the World Power Conference, the source (or if the source was not reported, the name of the organization which transmitted the form) is mentioned in roman type. Where statistics were extracted from published sources, the source is mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Ministerium für Wirtschaft und Arbeit.
Belgium and Luxembourg	1935: Administration des Mines; 1936: Column 1, *League of Nations—Statistical Year-book, 1937–38*; Columns 2, 3, *Institut International du Commerce—Receuil de Statistique*, 20 septembre 1938; Columns 4, 6, *Mineral Industry 1934–36* *; Column 5, *League of Nations—International Trade Statistics, 1936*.
Bulgaria	Ministère du Travail—Section des Mines.
Czechoslovakia	Mine-owners' Association.
Danzig	Statistisches Landesamt.
Denmark	Danish National Committee.
Estonia	Central Statistical Bureau.
Finland	Custom House—Statistical Department.
France	Comité Central des Houillères de France.
Germany	Statistisches Reichsamt.
Hungary	Ministry of Industry.
Iceland	Statistical Bureau.
Irish Free State	Department of Industry and Commerce—Statistics Branch.
Italy	Column 1, *League of Nations—Statistical Year-book, 1937–38*; Columns 4, 5, 6, *Mineral Industry 1934–36*.*
Latvia	Statistical Year-book of Latvia.
Lithuania	*League of Nations—International Trade Statistics, 1936.*
Netherlands	Centraal Bureau voor de Statistiek; Instituut voor Brandstoffeneconomie.
Norway—	
Svalbard	Norwegian Central Bureau of Statistics.
Poland	Ministry of Industry and Commerce.
Portugal	Portuguese National Committee.
Roumania	1935: Ministère de l'Industrie et du Commerce—Direction des Mines; 1936: "Petrosani" S.A.R.
Spain	Column 1, *League of Nations—Statistical Year-book, 1937–38*; Column 4, *Mineral Industry 1934–36*.*
Sweden	Swedish National Committee.
Switzerland	1935: Direction générale des douanes fédérales; 1936: *Mineral Industry 1934–36*.*
U.S.S.R.	Column 1, *League of Nations—Statistical Year-book, 1937–38*; Columns 4, 5, *League of Nations—International Trade Statistics, 1936*.
United Kingdom	Board of Trade—Mines Department.
Yugoslavia	1935: Ministry of Forests and Mines—Department for the Supreme Survey of Mines; 1936: Column 1, *League of Nations—Statistical Year-book, 1937–38*; Columns 4, 5, *Mineral Industry 1934–36*.*
NORTH AMERICA—	
Canada	Dominion Bureau of Statistics.
United States of America	United States National Committee, based upon reports of the Bureau of Mines, except bituminous coal production in 1936 from the National Bituminous Coal Commission, and imports, exports, and bunker shipments (Columns 4-6) from the Bureau of Foreign and Domestic Commerce.

TABLE 3 (1935–1936)—SOURCES—*continued*

CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
Brazil	*League of Nations—Statistical Year-book, 1937–38.*
Chile	Column 1, *League of Nations—Statistical Year-book, 1937–38* ; Column 4, *League of Nations——International Trade Statistics, 1936* ; Column 5, *Mineral Industry 1934–36.**
Mexico	Column 1, *League of Nations—Statistical Year-book, 1937–38* ; Columns 4, 5, *Mineral Industry 1934–36.**
Peru	Column 1, *League of Nations—Statistical Year-book, 1937–38* ; Column 4, *League of Nations—International Trade Statistics*, 1936.
AFRICA—	
Egypt	*League of Nations—International Trade Statistics, 1936.*
Southern Rhodesia	Geological Survey.
Union of S. Africa	Office of Census and Statistics.
British Dependencies, etc.—	
Nigeria	Manager of Government Collieries.
French Dependencies, etc.—	
Algeria	1935 : Comité Central des Houillères de France ; 1936 : Column 1, *League of Nations—Statistical Year-book, 1937–38* ; Columns 4-6, *Mineral Industry 1934–36.**
French Morocco	1935 : Comité Central des Houillères de France ; 1936 : Column 1, *League of Nations—Statistical Year-book, 1937–38* ; Columns 4, 5, *Mineral Industry 1934–36.**
Madagascar	Comité Central des Houillères de France.
ASIA—	
Burma	Government of Burma.
China—	
Manchuria	*League of Nations—Statistical Year-book, 1937–38.*
India	1935 : Column 1, Geological Survey ; Columns 4-6, Department of Commercial Intelligence and Statistics ; 1936 : Column 1, *League of Nations—Statistical Year-book, 1937–38* ; Columns 4-6, *Mineral Industry 1934–36.**
Japan and Dependencies	Column 1, *League of Nations—Statistical Year-book, 1937–38* ; Columns 4-6, *Mineral Industry 1934–36.**
French Dependencies, etc.—	
French Indo-China	1935 : Comité Central des Houillères de France ; 1936 : Column 1, *League of Nations—Statistical Year-book, 1937–38* ; Columns 4-6, *Mineral Industry 1934–36.**
Netherlands Dependencies, etc.—	
Netherlands E. Indies	Column 1, *League of Nations—Statistical Year-book, 1937–38* ; Columns 4-6, *Mineral Industry 1934–36.**
AUSTRALASIA—	
Australia	Commonwealth Bureau of Census and Statistics.
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

* The full title of this publication is *The Mineral Industry of the British Empire and Foreign Countries—Statistical Summary* (*Production, Imports and Exports*), and it was issued by the Imperial Institute, London. Statistics have been reproduced from this publication by permission of the Controller of H.M. Stationery Office.

TABLE 4

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In Millions of Metric Tons)

1935

Name of Country	Brown Coal and Lignite						Peat
	Production	Stocks		Imports	Exports	Total Consumption (Cols. 1+2+4) −(Cols. 3+5)	Production
		At Beginning of Year	At End of Year				
0	1	2	3	4	5	6	7
EUROPE—							
Austria	2·971	*U*	*U*	0·170	0	3·141	0·008
Bulgaria	1·572	0·180	0·329	0	0·001	1·422	0
Czechoslovakia	15·11	0·65	0·58	0·08	1·79	13·47	—
Danzig	0	*U*	*U*	0·006	0	0·006	0·001
Denmark	0·007	0	0	0·090	0	0·097	0·325 *a*
Estonia	0	0	0	0	0	0	0·108
Finland	0	0	0	0	0	0	*U*
France	0·90	0·04	0·02	*N*	*N*	0·92	*U*
Germany *f*	147·1	—	—	5·0 *b*	*N*	152·1	0·4
Hungary	6·72	*N*	*N*	*N*	0·18	6·54	*N*
Irish Free State	0	0	0	0	0	0	3·7
Italy	*0·545*	—	—	—	—	—	—
Latvia	0	0	0	0	0	0	0·029
Netherlands	0·086	*U*	*U*	*N*	0	0·086	0·69
Norway	0	*U*	*U*	*g*	*g*	*g*	*U*
Poland	0·018	0·001	0·002	0·007	0	0·024	2·0 *E*
Roumania	1·667	—	—	—	—	—	0
Spain	*0·30*	—	—	—	—	—	—
Sweden	0	*U*	*U*	*N*	0	*N*	*U*
Switzerland	0	*U*	*U*	0·318	0	0·318	*U*
United Kingdom	0	0	0	0	0	0	*U*
Yugoslavia	4·043	0·246	0·254	0·002	0·074	3·963	*N*
NORTH AMERICA—							
Canada	3·20 *i*	*U*	*U*	0·005	0·011	*3·2*	0·001
United States of America *j*	2·495	*U, N*	*U, N*	0·004	0	2·499	0·034 *l*
CENTRAL & S. AMERICA—							
Argentine	0	0	0	0	0	0	0
AFRICA—							
Southern Rhodesia	0	0	0	0	0	0	0
Union of South Africa	0	0	0	0	0	0	0
British Dependencies, etc.—							
Nigeria *d*	0	0	0	0	0	0	0
French Dependencies, etc.—							
Algiers	0	0	0	0	0	0	0
French Morocco	0	0	0	0	0	0	0
Madagascar	0	0	0	0	0	0	0
ASIA—							
Japan	*e*	*e*	*e*	*e*	*e*	*e*	*e*
French Dependencies, etc.—							
French Indo-China	0	0	0	0	0	0	0
AUSTRALASIA—							
Australia	2·2	*U*	*U*	0	0	2·2	—
New Zealand	1·311	—	—	*g*	*g*	1·311	—

TABLE 4—*continued*

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In Millions of Metric Tons)

1936

Name of Country	Brown Coal and Lignite						Peat
	Production	Stocks		Imports	Exports	Total Consumption (Cols. 1 + 2 + 4) − (Cols. 3 + 5)	Production
		At Beginning of Year	At End of Year				
0	1	2	3	4	5	6	7
EUROPE—							
Austria	2·897	*U*	*U*	0·159	0	3·056	0·017
Bulgaria	3·148	*N*	*N*	0	*N*	3·148	0
Czechoslovakia	15·95	0·58	0·51	0·09	1·77	14·34	—
Danzig	0	*U*	*U*	0	0	0	*N*
Denmark	0·015	*U*	*U*	0·070	0	0·085	0·351
Estonia	0	0	0	0	0	0	0·163
Finland	0	0	0	0	0	0	*U*
France	0·93	0·02	0·01	*N*	*N*	0·94	*U*
Germany	161·4	—	—	4·9 *b*	*N*	166·3	0·5
Hungary	7·10	*N*	*N*	*N*	0·18	6·92	*N*
Iceland	0	0	0	0	0	0	0·015
Irish Free State	0	0	0	0	0	0	3·7
Latvia	0	0	0	0	0	0	0·040
Netherlands	0·089	*U*	*U*	*N*	0	0·089	0·72
Norway	0	*U*	*U*	*g*	*g*	*g*	*U*
Poland	0·014	0·002	0·002	0	0	0·013	2·0 *E*
Roumania	0·562	*N*	*N*	*N*	*N*	0·562	*N*
Sweden	0	*U*	*U*	*N*	0	*N*	*U*
United Kingdom	0	0	0	0	0	0	*U*
NORTH AMERICA—							
Canada	3·48	*U*	*U*	0·004	0·009 *m*	*U*	0·001
United States of America *j*	2·821	*U, N*	*U, N*	0·006	0	2·827	0·042 *l*
AFRICA—							
Southern Rhodesia	0	0	0	0	0	0	0
Union of South Africa	0	0	0	0	0	0	0
British Dependencies, etc.—							
Nigeria *d*	0	0	0	0	0	0	0
ASIA—							
Japan	*e*	*e*	*e*	*e*	*e*	*e*	*e*
AUSTRALASIA—							
Australia	3·0	*U*	*U*	0	0	3·0	0

TABLE 4 (1935–1936)—NOTES

Figures compiled or computed by the Editor are shown in *italics*.

E Estimate.
N Negligible, unimportant.
U Unrecorded.
a Peat moss *not* included.
b Bohemian brown coal converted into German brown coal equivalent.
d Including Cameroons under British Mandate.
e No statistics were received from Japan; "the publication of statistical data regarding power is now prohibited in this country owing to the international conflict in the Far East."
f Including the Saar Territory from March 1935.
g Included with coals in Table 2.
i Sum of mine sales, colliery consumption, quantity supplied to employees, and quantity used in the manufacture of briquettes.
j Contiguous territory only.
l Peat is not used as a fuel in the U.S.A., its chief use being for soil improvement.
m Canadian coal only.

TABLE 4 (1935–1936)—SOURCES

Where statistics were supplied on the form adopted by the World Power Conference, the source (or if the source was not reported, the name of the organization which transmitted the form) is mentioned in roman type. Where statistics were extracted from published sources, the source is mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Columns 1-6: Ministerium für Wirtschaft und Arbeit; Column 7: Staatliche Landwirtschaftlich-chemische Versuchsanstalt.
Bulgaria	Ministère du Travail—Section des Mines.
Czechoslovakia	Mine-owners' Association of Czechoslovakia.
Danzig	Statistisches Landesamt.
Denmark	Danish National Committee.
Estonia	Estonian National Committee.
Finland	Finnish National Committee.
France	Comité Central des Houillères de France.
Germany	Statistiches Reichsamt.
Hungary	Ministry of Industry.
Iceland	Statistical Bureau.
Irish Free State	Department of Industry and Commerce—Statistics Branch.
Italy	*Annuario Statistico Italiano, 1936.*
Latvia	Latvian National Committee.
Netherlands	Centraal Bureau voor de Statistiek; Instituut voor Brandstoffeneconomie.
Norway.	Central Statistical Bureau.
Poland	Ministry of Industry and Commerce.
Roumania	1935: Ministère de l'Industrie et du Commerce—Direction des Mines; 1936: "Petrosani" S.A.R.
Spain	*League of Nations—Statistical Year-Book, 1934–35.*
Sweden	Swedish National Committee.
Switzerland	Direction générale des douanes fédérales.
United Kingdom	Board of Trade—Mines Department.
Yugoslavia	Ministry of Forests and Mines—Department for the Supreme Survey of Mines.
NORTH AMERICA—	
Canada	Dominion Bureau of Statistics.
United States of America	Prepared by the American National Committee from reports of the Bureau of Mines and the Bureau of Foreign and Domestic Commerce.
CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
AFRICA—	
Southern Rhodesia	Geological Survey.
Union of S. Africa	Office of Census and Statistics.
British Dependencies, etc.—	
Nigeria	Director of Transport; Acting Colliery Manager, Government Colliery.
French Dependencies, etc.—	
Algiers	Comité Central des Houillères de France.
French Morocco	Comité Central des Houillères de France.
Madagascar	Comité Central des Houillères de France.
ASIA—	
Japan	Japanese National Committee.
French Dependencies, etc.—	
French Indo-China	Comité Central des Houillères de France.
AUSTRALASIA—	
Australia	Commonwealth Bureau of Census and Statistics.
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

TABLE 5

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In Millions of Metric Tons)

1935

Name of Country	Production		Stocks		Imports	Exports	Domestic Consumption (Cols. 1 + 3 + 5) – (Cols. 4 + 6)		
	Quantity	Estimated Raw Coal Equivalent	At Beginning of Year	At End of Year			For Household Purposes	For other Purposes	Total (Cols. 7 + 8)
0	1	2	3	4	5	6	7	8	9
EUROPE—									
Austria	0·509 a	0·627	0·094	0·038	0·369	0	0·151	0·783	0·934
Belgium	4·444	—	—	—	2·279	0·919	—	—	—
Bulgaria	N	N	N	N	N	—	N	N	N
Czechoslovakia	1·6 d	—	—	—	0·2	0·4	—	—	—
Danzig	0·037	—	U	U	0·055	0	—	—	0·092 A
Denmark	0·293	—	—	—	1·420	0	U	U	U
Estonia	0·002	U	U	U	0·003	0	U	U	U
Finland	0·060	U	0·015	0·015	0·206	0	U	U	0·266
France	7·08 c	9·20 c	0·29	0·31	2·12	0·29	U	U	11·01
Germany	34·4	46·7	5·0 h	3·5 h	0·8	6·6	10·9	19·2	30·1
Hungary	0·213	0·284 A	0·016	0·025	0·178	0·010	0·159	0·213	0·372
Irish Free State	—	—	—	—	0·023	0·016	—	—	—
Latvia	U	U	U	U	0·081	0	U	U	0·081
Netherlands	3·58	3·21	U	U	0·311	2·138	1·45 A	0·3 A	1·75 A
Norway	0·068	U	U	U	0·625	0·009	0·520	0·164	0·684
Poland	1·387	1·858	0·222	0·208	U	0·337	0·204	0·858	1·125
Portugal	0·026	U	U	U	U	U	U	U	U
Sweden	0·476	—	U	U	1·747	0	—	—	2·223
Switzerland	0·458	—	U	U	0·812	0	—	—	1·270
U.S.S.R.	*16·73*	—	—	—	N	—	—	—	—
United Kingdom	25·141 w	35·7 E	1·446 j, E	0·972 j, E	0·03	2·489	5·996 x, E	16·320 x, E	22·316 y, E
Yugoslavia	0·022 j	—	0·003	0·004	0·207	0	0·221	0·007	0·228
NORTH AMERICA—									
Canada	2·048	2·845	0·317 k	0·325 k	0·483	0·019	U	U	2·504
United States of America l	35·641 m	47·862	3·670 f	2·812 f	0·288	0·557	9·262 A, e	26·966 A	36·288
CENTRAL & S. AMERICA—									
Argentine	0·118	—	U	U	0·026	0	—	—	0·144
AFRICA—									
Southern Rhodesia	0·043	0	0	0	0	0	0	0·043	0·043
Union of South Africa	0·24 t	0·39 t	U	U	N	0·01	U, N	U	0·23
ASIA—									
India	2·70	—	—	—	0·013	0·002	—	—	—
Japan Proper	*2·85* z	—	—	—	*0·005*	—	—	—	—
Formosa	—	—	—	—	*0·003*	N	—	—	—
Korea	*0·20*	—	—	—	*0·046*	—	—	—	—
British Dependencies, etc.—									
British Malaya	0·009	U	N	N	—	—	0	—	—
Cyprus	0	0	U	U	N	0	U	U	U
AUSTRALASIA—									
Australia q	1·535	—	U	U	0·002	0·016	U, N	U	1·521
New Zealand	0·068 s	—	U	U	0·001	N	U	U	U

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In Millions of Metric Tons)

1936

Name of Country	Production		Stocks		Imports	Exports	Domestic Consumption (Cols. 1 + 3 + 5) − (Cols. 4 + 6)		
	Quantity	Estimated Raw Coal Equivalent	At Beginning of Year	At End of Year			For Household Purposes	For other Purposes	Total (Cols. 7 + 8)
0	1	2	3	4	5	6	7	8	9
EUROPE—									
Austria	0·546 *a*	0·702	0·038	0·035	0·396	0	0·146	0·799	0·945
Bulgaria	0	0	0	0	0·005	0	0	0·005	0·005
Danzig	0·033	0·048	0·003	0·005	0·097 *i*	0	*U*	*U*	0·13 *i*
Denmark	0·315	0·630	*U*	*U*	1·659	0·037	*U*	*U*	1·937 *E*
Estonia	0·002	*U*	*U*	*U*	0·003	0	*U*	*U*	*U*
Finland	0·060	*U*	0·015	0·011	0·279	0	*U*	*U*	0·343
France	7·03 *c*	9·14 *c*	0·31	0·14	2·56	0·27	*U*	*U*	11·60
Germany	40·7	54·9	3·9 *g*	2·8 *g*	0·7	7·2	10·4	24·9	35·3
Hungary	0·212	0·283 *A*	0·025	0·022	0·273	0·008	0·161	0·319	0·480
Iceland	0·003	*U*	0	0	0·006	0	0·009	0	0·009
Irish Free State	0·133	0·284	*U*	*U*	0·023	0·013	0·084	0·059	0·143
Latvia	0·014	0·017	*U*	*U*	0·067	0	*U*	*U*	0·081
Netherlands	3·75	3·36	*U*	*U*	0·374	2·305	1·5 *A*	0·3 *A*	1·82 *A*
Norway	0·072	*U*	*U*	*U*	0·749	0·006	0·623	0·192	0·815
Poland	1·615	2·166	0·208	0·078	*N*	0·402	0·218	1·125	1·343
Portugal	0·024	*U*	*U*	*U*	*N*	*U*	*U*	*U*	*U*
Roumania	0·063	0·094	*N*	*N*	0·039	0	*U*	*U*	0·102
Sweden	0·533	*U*	*U*	*U*	2·078	0·010	*U*	*U*	1·535 *E*
U.S.S.R.	*19·89*	—	—	—	*N*	—	—	—	—
United Kingdom	27·997 *w*	39·744 *E*	0·972 *j, E*	0·906 *j, E*	0·103	2·351	5·840 *x, E*	20·103 *x, E*	25·943 *y, E*
NORTH AMERICA—									
Canada	2·182	3·047	0·325 *k*	0·254 *k*	0·556	0·017	*U*	*U*	2·792
United States of America *l*	46·264 *m*	61·585	2·812 *f*	1·834 *f*	0·299	0·608	9·757 *A, e*	37·176 *A*	46·933
AFRICA—									
Union of South Africa	0·26 *t*	0·41 *t*	*U*	*U*	*N*	0·02	*U, N*	*U*	0·24
British Dependencies, etc.—									
Uganda	0	0	0	0	0	0	0	0	0
ASIA—									
Japan Proper	*b*	*b*	*b*	*b*	*0·009*	*b*	*b*	*b*	*b*
Korea	*b*	*b*	*b*	*b*	*0·072*	*b*	*b*	*b*	*b*
British Dependencies, etc.—									
British North Borneo	0	0	0	0	0	0	0	0	0
Cyprus	0	0	*U*	*U*	*N*	0	*U*	*U*	*U*
AUSTRALASIA—									
Australia *p*	1·807	—	*U*	*U*	0·017	0·022	*U, N*	*U*	1·802

TABLE 5 (1935–1936)—NOTES

Figures compiled or computed by the Editor are shown in *italics*.

A Approximate.
E Wholly or partly estimated.
N Negligible, less than 500 metric tons.
U Unrecorded.
a Gas coke ; no foundry coke is produced in Austria.
b No statistics were received from the Japanese National Committee ; " the publication of statistical data regarding power is now prohibited in this country, owing to the international conflict in the Far East."
c Excluding gas coke.
d Production at coke ovens only.
e This figure may include some coke used for heating commercial buildings.
f Excludes gas-house coke and breeze (produced in horizontal retorts), no statistics being available.
g Stocks at coke ovens and gas works.
h Stocks at coke ovens only.
i Subject to a margin of error of $\pm$ 10 per cent.
j Gas coke only.
k Producers' stocks only.
l Includes Alaska, Hawaii, Puerto Rico, and the Virgin Islands, although no production and little consumption is reported from these non-contiguous territories.
m Includes beehive and by-product-oven coke and gas-house coke (produced in horizontal retorts) ; also breeze and screenings where reported.
p Year ended 30th June 1937.
q Year ended 30th June 1936.
s Year ended 31st March 1936.
t Compiled from figures relating to the individual producers' financial years.
w Including breeze.
x The sum of Columns 7 and 8 is not in fact equal to (Columns 1+3+5)−(Columns 4+6).
y This figure is not in fact equal to (Columns 1+3+5)−(Columns 4+6).
z Includes production of gas coke (*1·012* million metric tons) in the twelve months ended 31st March 1936.

TABLE 5 (1935–1936)—SOURCES

Where statistics were supplied on the form adopted by the World Power Conference, the source (or if the source was not reported, the name of the organization which transmitted the form) is mentioned in roman type. Where statistics were extracted from published sources, the source is mentioned in *italics*. The National Committees mentioned are National Committees of the World Power Conference ; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Ministerium für Wirtschaft und Arbeit.
Belgium	Administration des Mines.
Bulgaria	*Ministère du Travail—Section des Mines.*
Czechoslovakia	State Office of Statistics.
Danzig	Städtische Werke Danzig ; Statistisches Landesamt.
Denmark	Danish National Committee.
Estonia	Estonian National Committee.
Finland	The three gas supply undertakings in Finland.
France	Comité Central des Houillères de France.
Germany	Statistisches Reichsamt.
Hungary	Ministry of Industry.
Iceland	Statistical Bureau.
Irish Free State	1935 : Irish Committee of the World Power Conference ; 1936 : Department of Industry and Commerce—Statistics Branch.
Latvia	*Statistical Year-Book of Latvia.*
Netherlands	Centraal Bureau voor de Statistiek ; Instituut voor Brandstoffeneconomie.
Norway	Central Statistical Bureau.
Poland	Ministry of Industry and Commerce.
Portugal	Portuguese National Committee.
Roumania	" Petrosani " S.A.R.
Sweden	Swedish National Committee.
Switzerland	Column 1 : Société Suisse de l'Industrie du Gaz et des Eaux ; Column 4 : Direction générale des douanes.
U.S.S.R.	*Mineral Industry 1934–36.**
United Kingdom	Prepared by the National Gas Council of Great Britain and Ireland ; sources :—Columns 1, 5, 6 : *Annual Report of the Secretary for Mines; Columns 2-4, 7, 8: estimated by the National Gas Council.*
Yugoslavia	Association of the Yugoslav Gas and Water Works.
NORTH AMERICA—	
Canada	Dominion Bureau of Statistics.
United States of America	Prepared by the American National Committee from reports of production and stocks from the Bureau of Mines, and of imports and exports from the Bureau of Foreign and Domestic Commerce.
CENTRAL & S. AMERICA—	
Argentine	Argentine National Committee.
AFRICA—	
Southern Rhodesia	Geological Survey.
Union of S. Africa	Office of Census and Statistics.
British Dependencies, etc.—	
Uganda	Chief Secretary to Government.
ASIA—	
India	Column 1 : Geological Survey ; Columns 4, 5 : Department of Commercial Intelligence and Statistics.
Japan	*Mineral Industry 1934–36.**
Formosa	*Mineral Industry 1934–36.**
Korea	*Mineral Industry 1934–36.**
British Dependencies, etc.—	
British Malaya	Municipal Gas Department, Singapore.
British North Borneo	Customs Department.
Cyprus	Customs Department.
AUSTRALASIA—	
Australia	Commonwealth Bureau of Census and Statistics.
New Zealand	The Consulting Engineer to the Government of New Zealand, London.

* The full title of this publication is *The Mineral Industry of the British Empire and Foreign Countries—Statistical Summary (Production, Imports, and Exports)*, and it was issued by the Imperial Institute, London. Statistics have been reproduced from this publication by permission of the Controller of H.M. Stationery Office.

TABLE 6

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In Millions of Metric Tons)

1935

Name of Country	Production		Stocks		Imports	Exports	Domestic Consumption (Cols. 1 + 3 + 5) − (Cols. 4 + 6)		
	Quantity	Estimated Raw Coal Equivalent	At Beginning of Year	At End of Year			For Household Purposes	For other Purposes	Total (Cols. 7 + 8)
0	1	2	3	4	5	6	7	8	9
EUROPE—									
Austria	0·262	0·380	*U*	*U*	0·014	0	*U*	*U*	0·276
Bulgaria	*a*	*a*	*a*	*a*	*a*	*a*	*a*	*a*	*a*
Estonia	0	0	0	0	0	0	0	0	0
Finland	*N*	*N*	*N*	*N*	0	0	*N*	*N*	*N*
France	8·00	7·36	0·26	0·19	0·90	0·12	*U*	*U*	8·21
Germany	39·5	98·3 *b*	1·2	0·8	0·2	2·0	*U, c*	*U, c*	38·1
Hungary	0·401	0·373	*N*	*N*	0	*N*	0·356	0·045	0·401
Latvia	0	0	0	0	0	0	0	0	0
Netherlands	1·12	1·08	*U*	*U*	0·49	0·31	*U*	*U*	1·30
Norway	0	0	0	0	0	0	0	0	0
Poland	0·192	0·180	*N*	*N*	0	0·010	0·011	0·170	0·182
Portugal	*U*	*U*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
Sweden	0	0	*U*	*U*	*N*	0	*N*	*N*	*N*
United Kingdom	0·87	0·82	*U*	*U*	*N*	0·72	*U*	*U*	0·15
NORTH AMERICA—									
United States of America *e*	0·804 *f*	0·664 *g*	*U*	*U*	0·015	0·025	*U, h*	*U*	0·794
AUSTRALASIA—									
Australia *i*	0·363	1·426	*U*	*U*	0	0	0·120	0·243	0·363

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In Millions of Metric Tons)

1936

Name of Country	Production		Stocks		Imports	Exports	Domestic Consumption (Cols. 1+3+5) − (Cols. 4+6)		
	Quantity	Estimated Raw Coal Equivalent	At Beginning of Year	At End of Year			For Household Purposes	For other Purposes	Total (Cols. 7+8)
0	1	2	3	4	5	6	7	8	9
EUROPE—									
Austria	0·258	0·385	*U*	*U*	0·012	0	*U*	*U*	0·270
Bulgaria	0	0	0	0	0	0	0	0	0
Danzig	0	0	*U*	*U*	0·007	0	*U*	*U*	0·007
Denmark	0	0	*U*	*U*	0·07	*N*	*U*	*U*	0·07 *E*
Estonia	0	0	0	0	0	0	0	0	0
Finland	*N*	*N*	*N*	*N*	0	0	*N*	*N*	*N*
France	8·52	7·84	0·19	0·08	1·02	0·11	*U*	*U*	8·86
Germany	42·7	107·0 *b*	0·8	0·6	0·2	1·9	*U, d*	*U, d*	41·2
Hungary	0·381	0·356	*N*	*N*	0	*N*	0·343	0·038	0·381
Iceland	0	0	0	0	0	0	0	0	0
Irish Free State	*N*	*N*	*N*	*N*	*N*	0	*N*	*N*	*N*
Latvia	0	0	0	0	0	0	0	0	0
Netherlands	1·15	1·11	*U*	*U*	0·47	0·34	*U*	*U*	1·28
Norway	0	0	0	0	0	0	0	0	0
Poland	0·167	0·164	*N*	*N*	0·007	0·010	0·015	0·149	0·164
Portugal	*U*	*U*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
Roumania	0·221	0·206	*N*	*N*	*N*	*N*	*U*	*U*	0·221
Sweden	0	0	*U*	*U*	*N*	0	*N*	*N*	*N*
United Kingdom	0·73	0·68	*U*	*U*	*N*	0·52	*U*	*U*	0·21
NORTH AMERICA—									
United States of America *e*	1·081 *f*	0·909 *g*	*U*	*U*	0·018	0·029	*U, h*	*U*	1·070
AUSTRALASIA—									
Australia *j*	0·371	1·438	*U*	*U*	0	0	0·117	0·254	0·371

TABLE 6 (1935–1936)—NOTES

E Wholly or partly estimated.
N Negligible.
a *Nil* in 1936 ; may be assumed to have been *nil* in 1935.
b Includes coal used for firing in brown coal briquette works.
c Of the total domestic consumption of *brown coal* briquettes (33·0 million metric tons), 22·1 million metric tons were consumed for household purposes and 10·9 million metric tons for other purposes.
d Of the total domestic consumption of *brown coal* briquettes (35·9 million metric tons), 22·8 million metric tons were consumed for household purposes and 12·1 million metric tons for other purposes.
e Excluding non-contiguous territories. There is no production, and no consumption (except of a small quantity in Alaska), reported for non-contiguous territories.
f Fuel briquettes including a small quantity of packaged fuel. About one-eighth of the reported production was not coal, but semi-coke, coke, oil-gas residue, or petroleum coke.
g Approximate raw coal used in making manufactured fuel, not including the coke, etc., from which about one-eighth of the reported production was derived.
h Nearly all the consumption is believed to have been for household purposes, although definite figures are not available.
i Twelve months ended 30th June 1936.
j Twelve months ended 30th June 1937.

TABLE 6 (1935–1936)—SOURCES

Where statistics were supplied on the form adopted by the World Power Conference, the source (or if the source was not reported, the name of the organization which transmitted the form) is mentioned in roman type. The National Committees mentioned are National Committees of the World Power Conference ; Ministries, Departments, Bureaux, etc., are Government Departments of the country concerned, unless otherwise indicated.

EUROPE—	
Austria	Ministerium für Wirtschaft und Arbeit.
Bulgaria	Ministère du Travail—Section des Mines.
Danzig	Statistisches Landesamt.
Denmark	Danish National Committee.
Estonia	Estonian National Committee.
Finland	Finnish National Committee.
France	Comité Central des Houillères de France.
Germany	Statistisches Reichsamt.
Hungary	Ministry of Industry.
Iceland	Statistical Bureau.
Irish Free State	Department of Industry and Commerce—Statistics Branch.
Latvia	Latvian National Committee.
Netherlands	Central Bureau voor de Statistiek ; Instituut voor Brandstoffeneconomie.
Norway	Central Statistical Bureau.
Poland	Ministry of Industry and Commerce.
Portugal	Portuguese National Committee.
Roumania	" Petrosani " S.A.R.
Sweden	Swedish National Committee.
United Kingdom	Board of Trade—Mines Department.
NORTH AMERICA—	
United States of America	Prepared by the United States National Committee from reports of production from the Bureau of Mines, and of imports and exports from the Bureau of Foreign and Domestic Commerce.
AUSTRALASIA—	
Australia	Commonwealth Bureau of Census and Statistics.

STATISTICAL YEAR-BOOK

OF THE

WORLD POWER CONFERENCE

No. 3

DATA ON RESOURCES AND ANNUAL STATISTICS FOR 1935 AND 1936

EDITED, WITH AN INTRODUCTION AND EXPLANATORY TEXT

by

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II. SOLID FUELS—A. COALS, BROWN COAL, LIGNITE, PEAT, COKE, AND OTHER MANUFACTURED FUEL

SCOPE AND MEANING OF THE STATISTICS

There are few important changes in the estimates of solid fuel resources as between those which were published in *Statistical Year-book of the World Power Conference*, No. 3, and those which are presented in the present number. The biggest revisions are reductions in three of the estimates for Canada, and the correction of the figure for "probable total reserves" of coals in China, which was magnified ten times by the accidental insertion of an extra "0". In connection with the revision of the Canadian estimates, it appears that the earlier estimates were based on assumptions regarding the continuity of coal seams which have not been substantiated, and included coals which cannot, at least in present economic conditions, be considered as "mineable".

It is stated (*Report of the* [Canadian] *Royal Commission on Coal*, 1946), that "in the past, no coal [only] one foot thick has been mined in Canada below a depth of five hundred feet, and it is extremely unlikely that it will be within the next few decades". On this basis, Definition 13 (*a*) adopted by the World Power Conference (see below), does not apply to the revised estimates of Canadian coal reserves. In short, the present estimates for Canada relate only to coal which, for reasons of quality and extraction costs, is economically "mineable" in Canada to-day, while the estimates for most other countries, being based presumably on Definition 13 (*a*), relate to reserves which, irrespective of whether they are at present economically mineable, are regarded as technically recoverable.

In Canada, Alberta coals, formerly classified as lignite, are now (apparently from 1938) classified as bituminous and sub-bituminous; the comparability as between different years of the statistics for Canada in Tables 3 and 4 is affected accordingly.

CONTINENTAL AND WORLD TOTALS

The figures for total reserves of coals, brown coal and lignite, and peat, presented in Table A, have been obtained by the simple addition of those contained in the corresponding columns of Table 2. The latter are by no means comprehensive, and the estimates for different countries relate to different dates. The significance of the totals in Table A is, therefore, merely the literal one that available estimates of proved or of probable total resources amount, in the aggregate, to so many million metric tons, and that in fact they are at the very least as great as the quantity stated in Table A. The principal reasons for the differences between the totals now presented and those shown in the previous number of the *Year-book*, are mentioned in the preceding paragraphs.

Owing to the war, several European countries were unable to supply statistics of the production of coals, etc., for the whole period 1936-1946. Table B is based upon available data; where these were not comparable, comparable figures have been estimated in compiling this table. It is emphasised that the continental and other totals are not comprehensive. In Europe, production in Poland is omitted because the changes in the boundaries of that country destroy the comparability of the data; and no statistics were received from the U.S.S.R. In North America, production in Canada is omitted because of a break in the comparability of the data. For the rest of the world, the data are far from comprehensive, but many of the most important producing countries are included. Statistics for Japan are shown separately because the development of coal production in that country differed markedly from that in most other countries. The percentages are intended to give only a general indication of the course of coal production in the different areas, and not an exact measurement of the magnitude of changes.

TABLE A: COALS, BROWN COAL AND LIGNITE, AND PEAT—RESOURCES

(in thousands of millions of metric tons)

	Coals		Brown Coal and Lignite		Peat
	Proved reserves	Probable total reserves	Proved reserves	Probable total reserves	Probable total reserves
Column numbers in Table 2:	2	4	6	8	10
Certain countries in:					
Europe	548	1,551	50	287	111
North America	42	2,115	20	951	13
South America	2	1	—	—	—
Africa	9	206	—	—	—
Asia	11	1,097	—	4	—
Australasia	4	14	5	40	—
Totals	616	4,984	75	1,282	124

TABLE B: PRODUCTION OF COALS—1933-1946

	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
Production:														
In millions of metric tons:														
Certain countries in:														
Europe	409	438	443	465	507	494	505	482	473	470	463	404	294	352
North America ..	342	378	386	447	451	358	406	466	519	582	589	619	574	538
Other continents (excluding Japan) ..	45	47	51	51	55	59	61	62	66	68	64	68	69	71
Japan	32	40	38	42	45	49	52	57	56	54	55	49	22	20
Totals ..	828	904	918	1,006	1,058	959	1,024	1,067	1,114	1,174	1,171	1,139	959	981
As% of 1934-38 average:														
Certain countries in:														
Europe	*87*	*93*	*95*	*99*	*108*	*105*	*108*	*103*	*101*	*100*	*99*	*86*	*63*	*75*
North America ..	*85*	*94*	*96*	*111*	*112*	*89*	*100*	*115*	*128*	*144*	*146*	*153*	*142*	*133*
Other continents (excluding Japan) ..	*84*	*90*	*97*	*97*	*105*	*112*	*115*	*117*	*125*	*129*	*121*	*129*	*131*	*134*
Japan	*76*	*94*	*88*	*98*	*106*	*114*	*122*	*134*	*130*	*127*	*130*	*115*	*52*	*48*
Totals ..	*85*	*93*	*95*	*104*	*109*	*99*	*106*	*110*	*115*	*121*	*121*	*118*	*99*	*101*

Considerable increases in coal production occurred during the period 1933-1946; in 1942 and 1943 total production, in all the countries for which series of comparable statistics are available, was nearly 42 per cent. greater than in 1933 (a year of economic depression), and 21 per cent. greater than the average for 1934-38. The average annual rate of increase from 1933 to 1942 was 4 per cent. From 1943 to 1944 total production declined, and in 1945 fell to a level below that of the 1934-1938 average. There was a slight recovery in 1946.

The totals mask different patterns of variation in the different producing countries. In the U.K. and U.S.A. coal production in the 1930's varied in sympathy with general economic conditions: it increased from the depression levels of 1933 until 1937, declined in 1938, and recovered somewhat in 1939. All these fluctuations were large in the U.S.A., and comparatively small in the U.K. After 1939, coal production in the U.K. slowly declined until 1945, when it was 20 per cent. below the average level in 1934-1938 and 12 per cent. less than production in the depression year 1933; in 1946 there was a slight recovery. In the U.S.A. coal production increased continuously and rapidly from 1938 to 1942 at an average annual rate of nearly 13 per cent., and less rapidly from 1942 to 1944, when it was 53 per cent. above the average level in 1934-1938 and 81 per cent. above production in 1933. After 1944, U.S. coal production decreased somewhat, but in 1946 was still 33 per cent. above the average for 1934-1938.

In Germany and Japan coal production increased after 1933 almost continuously, and with little dependence on world economic conditions; then, from 1937 onward, German production remained fairly steady at a high level, and in Japan a period of similar stability began in 1940. In 1944 production in Germany and Japan declined, and in 1945 fell to very low levels (41 and 69 per cent. of 1933 production respectively).

In many of the occupied countries of Europe coal production decreased in 1940 and then remained fairly steady until 1944. In 1944 there was a decline, in 1945 a heavy fall, and in 1946 some recovery.

In the "newer" countries, Australia, New Zealand, South Africa and Southern Rhodesia, there was a fairly steady increase in coal production from 1933 until the middle of the war or later, and then, except in South Africa, a slight decline.

As regards production of brown coal and lignite, discontinuities in the data for many countries prevent the compilation of series of continental totals. However, production in Germany is such a large proportion of the total recorded world output that the statistics for Germany are probably fairly representative of the course of world production. Production in Germany of brown coal and lignite doubled between 1933 and 1943, increasing every year and at an average annual rate of $7\frac{1}{4}$ per cent. German production declined somewhat in 1944, fell heavily in 1945, and recovered somewhat in 1946.

Statistics of the production of peat are far from complete, but sufficient to demonstrate that the use of peat, where available, was increased substantially when coal was in short supply.

Discontinuities in the data prevent the computation of continental totals of coke production. It may, however, be noticed that, whereas in most of the countries for which statistics are available the ratio of coke production to coal production diminished between 1936 and 1945 or 1946, the ratio increased in the U.K., U.S.A., and the British Southern Dominions. These countries were also among the few countries in which coke production in 1945 or 1946 exceeded production in 1936.

Available statistics of the production of solid manufactured fuel other than coke are quite insufficient to permit the establishment of continental totals. Available data suggest that, whereas in some of the countries of continental Europe the production of manufactured fuel declined more than the production of coal, in the U.K. and U.S.A. increased use was made of manufactured fuel. From 1936 to 1946 the production of manufactured fuel in the U.K. increased by 115 per cent. while the production of coal declined by 17 per cent.; in the U.S.A. the production of manufactured fuel increased by 150 per cent. in the same period, while the output of coal increased by only 20 per cent.

TABLES 2, 3, 4, 5, AND 6—DEFINITIONS

The following definitions (including the introductory paragraph), adopted by the World Power Conference were distributed with the forms for the guidance of the organizations which supplied the statistics:

On account of the varying characteristics of coal in the several countries, of the different bases of classification employed, and of the fact that international study of coal classification is already in progress, it has been deemed inadvisable to attempt to segregate the higher ranking coals —anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from lignite and brown coal or which separate the latter from peat. It will, therefore, be the responsibility of each reporting country when submitting its statistics of solid fuels to determine for itself the basis of classification to be used in distinguishing the three groups to be reported: *viz.* coals, brown coal and lignite, and peat.

13 *Proved Reserves—Coals, Lignite and Brown Coal*
"Proved reserves" of coals, of lignite and of brown coal shall mean the total amounts thereof, occurring within the limits hereinafter prescribed, as are of economic value and with respect to which there exist reliable data of actual thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

(*a*) Coals: Seams containing not less than 30 centimetres of merchantable coal and situated not more than 1200 metres below the surface, including workable submarine seams.

(*b*) Lignite and Brown Coal: Seams containing not less than 30 centimetres of merchantable lignite or brown coal and situated not more than 500 metres below the surface.

14 *Probable Reserves—Coals, Lignite and Brown Coal*
"Probable reserves" of coals, of lignite and of brown coal shall mean the aggregate within the reporting country of proved reserves thereof plus such further reserves of economic value within the limits of thickness and depth of seams specified in paragraph 13 hereof, as may, from uncompleted investigations or from relation to proved reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

15 *Peat*
A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent. of organic matter.

16 *Probable Reserves of Peat*
"Probable reserves of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent. moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

17 *Domestic Production—Coals, Lignite and Brown Coal*
"Domestic production" of coals, of lignite and of brown coal shall mean the gross amounts thereof raised to the pit-head, less the amounts of dirt or other waste removed in washeries or cleaning plants, plus any increase in weight between the pit-head and weighing-point due to absorption of water in washeries, but without deduction for other losses beyond point of weighing or for amounts used in operation of mines or collieries.

18 *Coal Stocks*
"Coal stocks" shall include the following:

(*a*) "Mine stocks", or the amounts held or stored at the producing properties, whether in dumps at pit-heads, in cars at colliery sidings, or otherwise, and whether billed to purchasers or not.

(*b*) "Stocks in transit", or amounts held or stored in railway classification yards or at points of trans-shipment from rail to water or water to rail while in process of domestic transit from producers to consumers.

(*c*) "Dealers' and consumers' stocks", or the amounts held in storage by coal dealers and by large industrial users, such as by-product coke ovens, railways, electric-power utilities, steel and rolling mills, etc. This item will, in general, include the stocks of only those dealers and consumers to whom, except in case of transhipment, delivery is made directly from mine or water terminal in car-load lots or in boats or barges.

(*d*) "Import stocks", or amounts of foreign coal held in storage at ports of entry pending shipment in domestic trade.

(*e*) "Export stocks", or amounts in storage at export points pending actual export.

(*f*) "Bunker stocks", or amounts held in storage at ports for fuelling vessels engaged in either foreign or domestic trade.

Statistics of stocks shall be reported in totals and may also be reported by the several classes above defined; but each reporting country in submitting its statistics shall state which of the preceding classes, if any, have been omitted from the total which it reports.

19 *Lignite and Brown Coal Stocks*
In so far as there regularly are within any reporting country stocks of lignite or of brown coal in significant quantities within the several classes as specified for coal in paragraph 18 hereof, data for such classes shall be considered necessary for a complete report on stocks. Each reporting country in which complete data are not available, or are not reported, shall state what classes heve been included in making up its report.

20 *Statistics of Products*
Where coal, brown coal or lignite are imported, exported, shipped as bunker fuel, or carried in stock in the form of coke or briquettes or other manufactured product, such statistics shall be separately reported in Tables 5 and 6. Petroleum coke shall not be reported in Table 5, but shall be reported in Table 10, Column 7.

TABLE 2

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In millions of metric tons)

Name of country	Coals				Brown coal and lignite				Peat	
	Proved reserves		Probable total reserves		Proved reserves		Probable total reserves		Probable total reserves	
	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity
0	1	2	3	4	5	6	7	8	9	10
EUROPE—										
Austria	1930	13	1930	19	1930	611	1930	2,337	1930	80 *a*
Belgium	1913	11,000 *b*	—	—	—	—	—	—	—	—
Bulgaria	1938	0·56	1938	1·4	1938	493	1938	997	—	—
Czechoslovakia	—	—	—	6,450	—	—	—	12,500	—	—
Denmark	—	0	—	0	1937	2·0	1937	7·0	1937	250
Eire	—	*U*	1947	15	—	*N*	—	*N*	1947	3,500
Estonia *c*	—	0	—	0	—	0	—	0	1935	2,030
Finland	—	0	—	0	—	0	—	0	1945	3,500
France	1946	3,770	1946	6,210	1946	230	1946	190	1946	2,000
Germany	1937	80,445	1922	279,516	1937	28,837	1937	56,758	1932	10,000
Greece	1913	*0*	—	*U*	1913	*10*	1913	*30*	—	—
Hungary	1931	210	1931	210	1931	1,500	1931	1,500	1931	120
Iceland	—	0	—	0	—	*U*	—	*U*	—	*U*
Italy	1938	493	1938	563	1938	307	1938	456	—	*U*
Latvia	1938	0	1938	0	1938	0	1938	0	1938	1,665
Lithuania	—	0	—	0	—	0	—	0	1937	259
Netherlands	1930	3,100	—	*U*	1940	13	—	*U*	1946	30
Norway	—	*U*	1939	1,500	—	0	—	0	—	0
Poland	1935	15,000	1940	80,000	—	*U*	1945	18·4	1935	6,000
Portugal	1946	8,410	1946	6,036 *d*	1946	1,294	1946	4,200 *d*	1946	*N*
Roumania	1932	78	—	*U*	1932	2,839	—	*U*	1932	67·6 *e*
Sweden	1936	97 *A*	1936	105 *A*	1936	0	1936	0	1936	9,000 *A, f*
Switzerland	—	*N*	—	*N*	—	*N*	—	*N*	—	*N*
U.S.S.R.	1933	295,900	1933	998,000	1933	12,890	1933	202,000	1933	72,330
United Kingdom	1947	129,900	1947	172,200	1947	*N*	1947	*N*	1947	*U*
Yugoslavia	1936	6·7	1936	39·0	1936	1,123	1936	6,325	1936	*N*
NORTH AMERICA—										
Canada	1946	38,080 *g*	1946	56,620 *g*	1946	18,280 *g*	1946	33,024 *g*	—	—
Newfoundland	1939	0	1939	0	1939	0	1939	0	—	*U*
United States of America *h*	—	*U*	1946	2,028,000 *n*	—	*U*	1946	852,000 *n*	1944	12,543 *i*
Alaska	—	*U*	1946	24,333 *j*	—	*U*	1946	62,963 *j*	*U*	*U, k*

TABLE 2—*continued*

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In millions of metric tons)

Name of country	Coals: Proved reserves: Date to which estimate refers*	Coals: Proved reserves: Quantity	Coals: Probable total reserves: Date to which estimate refers*	Coals: Probable total reserves: Quantity	Brown coal and lignite: Proved reserves: Date to which estimate refers*	Brown coal and lignite: Proved reserves: Quantity	Brown coal and lignite: Probable total reserves: Date to which estimate refers*	Brown coal and lignite: Probable total reserves: Quantity	Peat: Probable total reserves: Date to which estimate refers*	Peat: Probable total reserves: Quantity
0	1	2	3	4	5	6	7	8	9	10
SOUTH AMERICA—										
Argentina	—	*U*	—	*U*	—	*U*	—	*U*	1928	80
Chile	1913	*2,116*	—	—	—	—	—	—	—	—
Honduras	—	—	1913	*1*	—	—	1913	*4*	—	—
Peru	—	—	1913	*1,000*	—	—	—	—	—	—
AFRICA—										
Algeria	1945	10	1945	100	1945	0·2	1945	10	—	—
Belgian Congo	—	—	1913	*100*	—	—	—	—	—	—
Egypt	1936	0	—	*U*	1936	0	—	*U*	1936	0
French Morocco	1937	10 *A*	1937	70 *A*	1937	0	1937	0	1937	0
Madagascar	1937	20 *A*	1937	350 *A*	1937	0	1937	*N*	1937	0
Nigeria	1937	113	1937	300 *A*	1937	13	1937	200 *A*	—	—
Nyasaland	—	*U*	—	*U*	1933	0	1933	0	1933	0
Tanganyika	1934	800	—	*U*	—	—	—	—	—	—
Union of South Africa	1940	7,934	1940	205,395	1947	0	1947	0	1947	0
ASIA—										
China	—	—	1913	*1,011,000 p*	—	—	1913	*600*	—	—
India	1945	4,831	1945	62,143	—	*U*	1945	2,833	—	*U*
Japan Proper	1932	5,895	1932	16,218	1932	66	1932	473	—	—
Korea	—	—	1913	*5,585*	—	—	1913	*27*	—	—
Malaya	1938	0	1938	0	1938	17	1938	67	1938	0
Manchuria	—	—	1913	*1,129*	—	—	—	—	—	—
North Borneo	—	*U*	—	*U*	1938	0	1938	0	1938	0
Palestine	1938	0	1938	0	1938	0	1938	0	—	*U*
Turkey	1946	*U*	1946	500	1946	*U*	1946	255	1946	*U*
AUSTRALASIA—										
Australia	1945	4,480 *l*	1945	13,900 *l*	1945	4,428 *m*	1945	39,200 *m*	1945	*U*
New Caledonia	1937	0	1937	*N*	1937	0	1937	0	1937	0
New Zealand	1946	14	1946	57	1946	291	1946	489	1946	102

TABLE 3

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
EUROPE—								
Austria	1936	0·24	*U*	*U*	2·3	0	0	*2·5*
	1937	0·23	*U*	*U*	2·6	0	0	*2·8*
	1938	0·22	*U*	*U*	2·9	0	*U*	*3·1*
	1939	0·21	*U*	*U*	4·7 *a*	0	*U*	*4·9 a*
	1940	0·22	*U*	*U*	5·6 *a*	0	*U*	*5·8 a*
	1941	0·22	*U*	*U*	5·6 *a*	0	*U*	*5·8 a*
	1942	0·22	*U*	*U*	5·7 *a*	0	*U*	*5·9 a*
	1943	0·21	*U*	*U*	6·0 *a*	0	*U*	*6·2 a*
	1944	0·19	*U*	*U*	5·6 *a*	0	*U*	*5·8 a*
	1945	0·07	*U*	*N*	0·4	0	*U*	0·5
	1946	0·10	*N*	*N*	1·4	0	*U*	1·5
Belgium–Luxembourg	1936	27·9	2·6	1·1	3·9	4·3	0·3 *c*	28·7
	1937	29·9	1·1	0·7	6·2	4·1	0·2 *c*	32·2
	1938	29·6	0·7	2·2	4·5	4·4	0·3 *c*	27·9
	1939	29·8	2·2	1·3	3·5	4·6	0·4 *c*	29·2
	1940	25·5	1·3	1·8	0·8 *b*	2·0	0·1 *c*	23·7
	1941	26·7	1·8	0·4	0·1 *b*	3·3	*N, c*	24·9
	1942	25·1	0·4	0·7	0·2 *b*	2·3	0 *c*	22·7
	1943	23·7	0·7	0·5	0·2 *b*	1·8	0 *c*	22·3
	1944	13·5	0·5	0·5	0·6 *b*	0·2	*N, c*	13·9
	1945	15·8	0·5	0·3	1·5 *b*	*N*	*N, c*	17·5
	1946	22·8	0·3	0·3	2·3	0·2	0·1 *c*	24·8
Bulgaria	1936	0·10	*N*	*N*	*N*	*N*	0	0·10
	1937	0·12	*N*	*N*	*N*	*N*	0	0·12
	1938	0·14	*N*	*N*	*N*	*N*	0	0·14
Czechoslovakia	1936	12·2	0·5	0·4	1·3 *d*	1·8 *d*	0	11·7
	1937	17·0	0·4	*U*	1·2 *d*	2·2 *d*	0	18·0
	1938	15·8	*U*	*U*	*U*	*U*	*U*	*U*
	1939	18·8	*U*	*U*	*U*	*U*	*U*	*U*
	1940	21·0	*U*	*U*	*U*	*U*	*U*	*U*
	1941	21·1	*U*	*U*	*U*	*U*	*U*	*U*
	1942	22·8	*U*	*U*	*U*	*U*	*U*	*U*
	1943	24·6	*U*	*U*	*U*	*U*	*U*	*U*
	1944	23·2	*U*	*U*	*U*	*U*	*U*	*U*
	1945	11·7	*U*	*U*	*U*	*U*	*U*	*U*
	1946	14·2	*U*	*U*	*U*	*U*	*U*	*U*
Denmark	1936	0	*U*	*U*	6·36	—	—	—
	1937	0	*U*	*U*	6·54	—	—	—
	1938	0	0·9	1·0	5·78	—	—	—
	1939	0	—	—	6·36	—	—	—
	1940	0	—	—	3·59	—	—	—
	1941	0	—	—	3·71	—	—	—
	1942	0	—	—	2·97	—	—	—
	1943	0	—	—	3·05	—	—	—

Continued on page 27

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5) +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Denmark—*continued*	1944	0	—	—	3·19	—	—	—
	1945	0	—	—	—	—	—	—
	1946	0	—	—	—	—	—	—
Eire	1936	0·127	*U*	*U*	2·502	0	0·015	2·614
	1937	0·128	*U*	*U*	2·593	0	0·015	2·706
	1945	0·216	*U*	*U*	0·935	0	0·014	*1·137*
	1946	0·210 *P*	*U*	*U*	1·298	0	0·003	*1·505*
Finland	1936	0	*U*	*U*	1·44	0	*U*	*U*
	1937	0	*U*	*U*	1·90	0	*U*	*U*
	1938	0	*U*	*U*	1·530	0	*U*	*U*
	1939	0	*U*	*U*	1·611	0	*U*	*U*
	1940	0	*U*	*U*	0·563	0	*U*	*U*
	1941	0	*U*	*U*	0·946	0	*U*	*U*
	1942	0	*U*	*U*	0·782	0	*U*	*U*
	1943	0	*U*	*U*	1·066	0	*U*	*U*
	1944	0	*U*	*U*	0·737	0	*U*	*U*
	1945	0	*U*	*U*	0·073	0	*U*	*U*
	1946	0	*U*	*U*	0·688	0	*U*	*U*
France *e*	1936	45·23	3·54	1·98	18·66	0·88	*f*	64·57 *g*
	1937	44·35	1·98	1·06	24·63	0·68	*f*	69·22 *g*
	1938	46·50	1·06	1·68	18·68	0·88	*f*	63·68 *g*
	1939	49·15	1·68	1·55	13·94	0·81	*f*	62·41 *g*
	1940 *e*	39·32	1·55	1·38	6·63	0·23	*f*	45·89 *g*
	1941 *e*	41·85	1·38	0·60	1·64	0·86	*f*	43·41 *g*
	1942 *e*	41·87	0·60	0·70	1·61	0·87	*f*	42·51 *g*
	1943 *e*	40·53	0·70	0·99	1·44	0·10	*f*	41·58 *g*
	1944 *e*	25·24	0·99	1·21	1·21	0·07	*f*	26·16 *g*
	1945	33·31	1·21	0·65	4·48	0·05	*f*	38·30 *g*
	1946	47·20	0·65	0·77	8·64	0·27	*f*	55·45 *g*
Germany	1936	158·3	3·8 *h*	2·2 *h*	4·3	28·6	*U*	135·6
	1937	184·5	2·2 *h*	1·7 *h*	4·6	38·6	*U*	151·0
	1938	*156·40*	1·7 *h*	*U*	*U*	*U*	*U*	*U*
	1939	*158·02*	*U*	*U*	*U*	*U*	*U*	*U*
	1940	*154·66*	*U*	*U*	*U*	*U*	*U*	*U*
	1941	*158·86*	*U*	*U*	*U*	*U*	*U*	*U*
	1942	*158·26*	*U*	*U*	*U*	*U*	*U*	*U*
	1943	*158·62*	*U*	*U*	*U*	*U*	*U*	*U*
	1944	*135·34*	*U*	*U*	*U*	*U*	*U*	*U*
	1945	*41·21*	*U*	*U*	*U*	*U*	*U*	*U*
	1946	*65·69*	*U*	*0·16 i*	*U*	*U*	*U*	*U*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Hungary	1936	0·83	0·10	0·07	0·19	0·08	0	0·97
	1937	0·91	0·07	0·02	0·20	0·11	0	1·05
	1938	1·04	0·02	0·04	0·19	0·10	0	1·11
	1939	*1·10*	*U*	*U*	*U*	*U*	*U*	*U*
	1940	*1·21*	*U*	*U*	*U*	*U*	*U*	*U*
	1941	*1·30*	*U*	*U*	*U*	*U*	*U*	*U*
	1942	*1·25*	*U*	*U*	*U*	*U*	*U*	*U*
	1943	*1·37*	*U*	*U*	*U*	*U*	*U*	*U*
	1944	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1945	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1946	*0·72*	*U*	*U*	*U*	*U*	*U*	*U*
Iceland	1936	0	0·03 *E*	0·03 *E*	0·15	0	0·01 *E*	0·14
	1937	0	0·03 *E*	0·01 *E*	0·18	0	0·01	0·19
	1945	0	0·04	0·04	0·12	0	0·01 *A*	0·11
Italy	1936	1·0	—	—	8·7	*N*	—	9·5
	1937	1·3	—	—	12·6	*N*	—	13·6
	1938	1·4	—	—	11·9	*N*	—	13·3
	1939	2·0	—	—	11·2	*N*	—	13·2
	1940	2·3	—	—	12·4	*N*	—	14·7
	1941	2·4	—	—	11·4	*N*	—	13·8
	1942	2·5	—	—	10·4	*N*	—	12·9
	1946	1·2	—	—	5·6	*N*	—	6·8
Netherlands	1936	12·803	*U*	*U*	5·580	5·807	0·375	12·201 *j*
	1937	14·321	*U*	*0·41 h*	6·162	5·828	0·299	14·356 *j*
	1938	13·488	*0·41 h*	*0·50 h*	5·565	6·000	0·243	12·810 *j*
	1939	12·861	*0·50 h*	*0·15 h*	6·605	5·321	0·212	13·933 *j*
	1940	12·145	*0·15 h*	*0·17 h*	2·500	2·521	0·039	12·085 *j*
	1941	13·356	*0·17 h*	*0·08 h*	1·476	2·408	0·021	12·403 *j*
	1942	12·330	*0·08 h*	*0·12 h*	1·081	1·507	0·02	11·881 *j*
	1943	12·497	*0·12 h*	*0·23 h*	1·100	1·675	0·025	11·897 *j*
	1944	8·313	*0·23 h*	*0·30 h*	*U*	*U*	*U*	*U*
	1945	5·080	*0·30 h*	*0·11 h*	*U*	*U*	*U*	*U*
	1946	*8·32*	*0·11 h*	*0·10 h*	*U*	*U*	*U*	*U*
Norway	1936	0·78 *A*	*U*	*U*	2·02 *k*	0·48	*U*	2·32
	1937	0·766	*U*	*U*	2·38 *k*	*N*	*U*	3·14
	1938	0·627	*U*	*U*	2·00 *k*	*N*	*U*	2·63
	1939	0·625	*U*	*U*	2·46 *k*	*N*	*U*	3·08
	1940	0·565	*U*	*U*	1·22 *k*	*N*	*U*	1·79
	1941	0·330	*U*	*U*	1·05 *k*	*N*	*U*	1·38
	1942	0	*U*	0·428	1·18 *k*	*N*	*U*	—
	1943	0	0·428	0·349	1·38 *k*	*N*	*U*	1·46

Continued on page 29

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Norway—*continued*	1944	0	0·349	0·301	1·13 *k*	*N*	*U*	1·18
	1945	*0·01*	0·301	0·391	1·01 *k*	*N*	*U*	*U*
	1946	*0·09*	0·391	0·267	1·45 *k*	*N*	*U*	*U*
Poland	1936	29·75	1·14	0·79	0	8·14	0·68	21·28
	1937	36·22	0·79	0·82	*N*	11·31	*U*	24·80 *E*
	1938	38·10	0·82	1·39	*N*	9·84	1·84	25·85
	1939	65·54 *l*	*U*	*U*	*U*	*U*	*U*	*U*
	1940	77·08 *l*	*U*	*U*	*U*	*U*	*U*	*U*
	1941	76·34 *l*	*U*	*U*	*U*	*U*	*U*	*U*
	1942	83·97 *l*	*U*	*U*	*U*	*U*	*U*	*U*
	1943	91·36 *l*	*U*	*U*	*U*	*U*	*U*	*U*
	1944	87·39 *l*	*U*	*U*	*U*	*U*	*U*	*U*
	1945	27·35 *l*	*U*	1·78	0	6·14 *A*	*N*	5 *A m*
	1946	47·29 *l*	1·78	0·96	0	13·55	*N*	34·23
Portugal	1936	0·217	*U*	*U*	1·051	0	0·023	*1·25*
	1937	0·259	*U*	*U*	1·307	0	0·042	*1·52*
	1938	0·308	*U*	*U*	1·119	0	0·037	*1·39*
	1939	0·313	*U*	0·150	1·145	0	0·036	*1·42*
	1940	0·369	0·150	0·158	0·746	0	0·042	1·065
	1941	0·433	0·158	0·141	0·647	0	0·024	1·073
	1942	0·413	0·141	0·113	0·474	0	0·009	0·906
	1943	0·405	0·113	0·148	0·514	0	0·004	0·880
	1944	0·410	0·148	0·124	0·574	0	0·004	1·004
	1945	0·436	0·124	0·116	0·489	0	*N*	0·933
	1946	0·379	0·116	0·171	0·585	0	0·001	0·908
Roumania	1936	*0·29*	*N*	*N*	0·02	*N*	0	*0·31*
	1937	0·303	0·003	0·003	0·028	*N*	*U*	*0·33*
Sweden	1936	0·456	*U*	*U*	5·616	0·003	*U*	*U*
	1937	0·460	*U*	*U*	6·596	0·003	*U*	*U*
	1938	0·431	*U*	*U*	5·773	0·002	*U*	*U*
	1939	0·444	*U*	*U*	6·342	0·002	*U*	*U*
	1940	0·498	*U*	1·78	3·996	*N*	*U*	*U*
	1941	0·557	1·78	1·98	3·160	0	*U*	*3·5 g*
	1942	0·582	1·98	1·83	2·705	0	*U*	*3·4 g*
	1943	0·558	1·83	2·71	3·561	0	*U*	*3·2 g*
	1944	0·570	2·71	2·43	2·348	0·034	*U*	*3·2 g*
	1945	0·615	2·43	1·24	0·272	0·015	*U*	*2·1 g*
	1946	0·488	1·24	1·68	2·443	0	*U*	*2·5 g*
Switzerland	1936	0	*N*	*N*	1·85	0	0	1·85
	1937	0	*N*	*N*	2·10	0	0	2·10
	1938	0	*N*	*N*	1·92	0	0	1·92
	1939	0	*N*	*N*	2·34	0	0	2·34

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TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5) +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Switzerland—*continued*	1940	0	*N*	*N*	1·62	0	0	1·62
	1941	0·05	*N*	*N*	1·22	0	0	1·27
	1942	0·11	*N*	*N*	1·19	0	0	1·30
	1943	0·10	*N*	*N*	1·15	0	0	1·25
	1944	0·05	*N*	*N*	0·82	0	0	0·87
	1945	0·10	*N*	*N*	0·20	0	0	0·30
	1946	0·01	*N*	*N*	1·10	0	0	1·11
U.S.S.R.	1936	*123·68 x*	—	—	*N*	*1·80*	—	—
United Kingdom	1936	232·10	*U*	*U*	0·03	35·07	12·14	184·92 *E*
	1937	244·25	*U*	*U*	0·02	40·99	11·89	191·39 *E*
	1938	230·64	*U*	*U*	0·01	36·43	10·66	183·56 *E*
	1939	235·05	*U*	*U*	0·01	37·51	9·76	187·79 *E*
	1940	227·90	*U*	22·47	0·02	19·96	7·10	200·86 *E*
	1941	209·66	22·47	22·56	*N*	5·17	4·07	200·33
	1942	208·23	22·56	22·20	*N*	3·63	3·14	201·82
	1943	202·11	22·20	22·60	*N*	3·68	2·55	195·48
	1944	195·84	22·60	21·25	*N*	2·65	1·96	192·58
	1945	185·71	21·25	15·64	*N*	3·38	3·15	184·79
	1946	193·12	15·64	10·40	0·01	4·53	4·76	189·08
NORTH AMERICA—								
Canada	1936	10·06 *n*	*U*	*U*	11·6	0·41	0·32 *o*	*U*
	1937	11·01 *n*	*U*	*U*	14·54	0·36	0·32 *o*	*U*
	1938	12·04 *n*	*U*	*U*	11·44	0·31	0·36 *o*	*U*
	1939	13·37	*U*	*U*	13·24	0·33	0·36 *o*	*U*
	1940	14·94	*U*	*U*	15·46	0·45	0·35 *o*	*U*
	1941	15·33	*U*	*U*	18·17	0·48	0·33 *o*	*U*
	1942	15·93	*U*	*U*	22·25	0·73	0·37 *o*	*U*
	1943	14·69	*U*	*U*	25·13	1·00	0·37 *o*	*U*
	1944	13·60	*U*	*U*	25·55	0·91	0·50 *o*	*U*
	1945	*13·54*	*U*	*U*	—	—	—	*U*
	1946	*14·77*	*U*	*U*	—	—	—	*U*
United States of America *p*	1936	447·30 *q*	44·27 *s*	50·87 *s*	0·80	11·19	1·47	428·84
	1937	450·57 *q*	50·87 *s*	55·66 *s*	0·59	13·66	1·66	431·05
	1938	357·56 *q*	55·66 *s*	48·35 *s*	0·55	11·25	1·23	352·94
	1939	405·56 *q*	48·35 *s*	50·99 *s*	0·59	12·86	1·34	389·30
	1940	465·67 *q*	50·99 *s*	56·08 *s*	0·46	17·36	1·29	442·39
	1941	519·04 *q*	56·08 *s*	67·57 *s*	0·42	21·88	1·49	484·59
	1942	581·87 *q*	67·57 *s*	86·87 *s*	0·57	24·84	1·44	536·87
	1943	588·51 *q*	86·87 *s*	58·75 *s*	0·84	27·19	1·49	588·77
	1944	618·61 *q*	58·75 *s*	59·81 *s*	0·58	27·41	1·42	589·30
	1945	*573·84 r*	59·81 *s*	48·05 *s*	*D*	28·70	1·62	*553 E*
	1946	*539·26 r*	48·05 *s*	*D*	*D*	*D*	*D*	*D*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
SOUTH AMERICA—								
Argentina	1936	0	0·54	0·64	2·81	0	0·04	2·67
	1937	0	0·64	0·93	3·12	0	0·10	2·74
	1938	0	0·93	0·83	2·82	0	0·06	2·86
	1939	0	0·83	1·15	2·97	0	0·07	2·57
	1940	0	1·15	1·17	2·02	0	0·05	1·95
	1941	0	1·17	0·82	1·02	0	0·04	1·33
	1942	0·06	0·82	0·58	0·53	0	0·02	0·80
AFRICA—								
Algeria	1936	0·007	*U*	*U*	1·360	0·016	0·724	0·626
	1937	0·014	*U*	*U*	1·481	0·020	0·809	0·665
	1938	0·013	*U*	*U*	1·240	0·001	0·617	0·635
	1939	0·017	*U*	*U*	1·082	0·001	0·494	0·604
	1940	0·051	*U*	*U*	0·740	0·001	0·173	0·617
	1941	0·081	*U*	*U*	0·510	0·019	0·039	0·532
	1942	0·144	*U*	*U*	0·533	0·020	0·032	0·626
	1943	0·117	*U*	*U*	0·731 *w*	0·008 *w*	0·007 *w*	0·832
	1944	0·120	*U*	*U*	0·909 *w*	0·019 *w*	0·009 *w*	1·001
	1945	0·162	*U*	*U*	0·673 *w*	0·020 *w*	0·005 *w*	0·811
Nigeria	1936	0·32 *X*	—	—	0·03	0·05	—	—
	1937	0·40 *X*	—	—	0·04	0·04	—	—
	1938	0·33 *X*	—	—	0·04	0·05	—	—
	1939	0·30 *X*	—	—	0·02	0·05	—	—
	1940	0·32 *X*	—	—	0·02	—	—	—
	1941	0·41 *X*	—	—	0·03	0·06	—	—
	1942	0·47 *X*	—	—	0·02	0·07	—	—
	1943	0·54 *X*	—	—	0·01	0·08	—	—
	1944	0·68 *X*	—	—	0·01	0·19	—	—
	1945	0·51 *X*	—	—	0·01	0·19	—	—
	1946	0·64 *X*	—	—	*N*	0·19	—	—
Southern Rhodesia	1936	0·70	*U*	*U*	*N*	0·34	0	*U*
	1937	1·03	*U*	*U*	*N*	0·45	0	*U*
	1938	1·04	*U*	*U*	*N*	0·48	0	*U*
	1939	*1·12*	—	—	—	—	—	—
	1940	*1·30*	—	—	—	—	—	—
	1941	*1·42*	—	—	—	—	—	—
	1942	*1·56*	—	—	—	—	—	—
	1943	*1·78*	—	—	—	—	—	—
	1944	*1·81*	—	—	—	—	—	—
	1945	*1·67*	—	—	—	—	—	—
	1946	*1·61*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
AFRICA—*Continued*								
Union of South Africa	1936	14·43	*U*	*U*	0·02	1·35	0·96	12·14
	1937	15·00	*U*	*U*	0·02	1·06	0·89	13·07
	1938	15·69	*U*	*U*	0·02	0·90	1·14	13·67
	1939	16·22	*U*	*U*	0·03	1·06	0·93	14·26
	1940	16·77	*U*	*U*	0·05	0·86	1·35	14·61
	1941	17·95	*U*	*U*	0·04	0·99	1·52	15·48
	1942	19·50	*U*	*U*	0·04	0·41	1·74	17·39
	1943	19·56	*U*	*U*	0·05	2·05	0·80	16·76
	1944	21·96	*U*	*U*	0·05	3·72	0·77	17·52
	1945	22·47	*U*	*U*	0·04	3·82	0·77	17·92
	1946	*t*	*U*	*U*	*U*	*U*	*U*	*U*
ASIA—								
British Malaya	1936	0	0	0	0·66	0·01	0	0·65
	1937	0	0	0	0·81	*N*	0	0·81
	1938	0	0	0	0·53	*N*	0	0·53
British North Borneo	1936–1938	0	*N*	*N*	*N*	0	0	*N*
French Indo-China	1936	*2·19*	—	—	*0·02*	*1·71*	*0·01*	—
India and Pakistan	1936	22·6	*U*	*U*	·01	·02	*U*	*U*
	1937	25·03	*U*	*U*	·01	·02	*U*	*U*
	1938	28·3	*U*	*U*	·01	1·01	*U*	*U*
	1939	27·7	*U*	*U*	*N*	1·3	*U*	*U*
	1940	29·4	*U*	*U*	*N*	2·0	*U*	*U*
	1941	29·5	*U*	*U*	*N*	2·6	*U*	*U*
	1942	29·5	*U*	*U*	*N*	1·5	*U*	*U*
	1943	25·4	*U*	*U*	*N*	0·03	*U*	*U*
	1944	26·0	*U*	*U*	*N*	0·02	*U*	*U*
	1945	29·0	*U*	*U*	*U*	*U*	*U*	*U*
	1946	29·3	*U*	*U*	*U*	*U*	*U*	*U*
Japan Proper	1936	*41·80*	—	—	*4·19*	*1·11*	—	—
	1937	*45·3*	—	—	—	—	—	—
	1938	*48·7*	—	—	—	—	—	—
	1939	*52·4 X*	—	—	—	—	—	—
	1940	*57·3 X*	—	—	—	—	—	—
	1941	*55·6 X*	—	—	—	—	—	—
	1942	*54·2 X*	—	—	—	—	—	—
	1943	*55·5 X*	—	—	—	—	—	—
	1944	*49·3 X*	—	—	—	—	—	—
	1945	*22·4 X*	—	—	—	—	—	—
	1946	*20·4 X*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5) +6)
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Formosa	1936	*1·74*	—	—	—	—	—	—
Korea	1936	*2·28*	—	—	*1·57*	*0·68*	—	—
Sakhalin	1936	*2·08*	—	—	—	—	—	—
Palestine	1938	0	*U*	*U*	0·09	0	0	*U*
Turkey	1936	1·823	—	—	—	—	—	—
	1937	1·573	—	—	—	—	—	—
	1938	1·692	—	—	—	—	—	—
	1939	1·828	—	—	—	—	—	—
	1940	1·998	—	—	—	—	—	—
	1941	2·011	—	—	—	—	—	—
	1942	1·722	—	—	—	—	—	—
	1943	2·094	—	—	—	—	—	—
	1944	2·390	—	—	—	—	—	—
	1945	2·424	—	—	—	—	—	—
	1946	2·441	0·143	0·080	—	0·182	0·034	2·287
AUSTRALASIA—								
Australia	1936	11·552	*U*	*U*	0·040	0·386	0·624	10·582
	1937	12·268	*U*	*U*	0·011	0·346	0·616	11·317
	1938	11·867	*U*	*U*	0·006	0·400	0·628	10·845
	1939	13·752	*U*	*U*	0·090	0·388	0·560	12·894
	1940	11·914	*U*	*U*	0·015	0·270	0·445	11·214
	1941	14·440	*U*	*U*	0·006	0·335	0·336	13·774
	1942	15·140	*U*	*U*	*N*	0·245	0·251	14·644
	1943	14·419	*U*	*U*	0·007	0·258	0·299	13·869
	1944	13·976	*U*	*U*	0·002	0·161	0·215	13·602
	1945	13·060	*U*	*U*	0·005	0·192	0·210	12·663
	1946	*14·11*	—	—	—	—	—	—
New Zealand	1936	0·873	*U*	*U*	0·113	0	0·045	0·941
	1937	0·986	*U*	*U*	0·119	0	0·050	1·055
	1938	0·994	*U*	*U*	0·111	0	0·057	1·048
	1939	1·061	*U*	*U*	0·114	0	0·045	1·130
	1940	1·162	*U*	*U*	0·066	0	0·082	1·146
	1941	1·196	*U*	*U*	0·079	0	0·059	1·216
	1942	1·191	*U*	*U*	0·092	0	0·056	1·227
	1943	1·156	*U*	*U*	0·038	0	0·043	1·151
	1944	1·084	*U*	*U*	0	0	0·038	1·046
	1945	0·979	*U*	*U*	0	0	0·022	0·957

TABLE 4

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) – (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
EUROPE—								
Austria	1936	2·8	*U*	*U*	0·15 *a*	0	*U*	0·05 *A*
	1937	3·2	*U*	0·03 *a*	0·18 *a*	0	*U*	0·05 *A*
	1938	3·3	0·03 *a*	0·01 *a*	0·26 *a*	0	3·6	0·05 *A*
	1939	3·5	0·01 *a*	0·02 *a*	1·10 *a*	0	4·6	0·05 *A*
	1940	3·6	0·02 *a*	0·02 *a*	1·22 *a*	0	4·8	0·05 *A*
	1941	3·5	0·02 *a*	0·03 *a*	1·95 *a*	0	5·4	0·05 *A*
	1942	3·5	0·03 *a*	0·03 *a*	2·11 *a*	0	5·6	0·05 *A*
	1943	3·6	0·03 *a*	0·02 *a*	2·62 *a*	0	6·2	0·05 *A*
	1944	3·6	0·02 *a*	0·04 *a*	2·60 *a*	0	6·2	0·05 *A*
	1945	2·0	0·04 *a*	0·15 *a*	0·08 *a*	0	2·0	0·05 *A*
	1946	2·4	0·15 *a*	0·12 *a*	0·70 *a*	0	3·1	0·05 *A*
Belgium–Luxembourg	1936–1939 *i*	0	0	0	0·2	0	0·2	0
	1940–1942 *i*	0	0	0	0·1	0	0·1	0
	1943	0	0	0	0·2	0	0·2	0
	1944	0	0	0	0·1	0	0·1	0
	1945	0	0	0	0·2	0	0·2	0
	1946	0	0	0	0·4	0	0·4	0
Bulgaria	1936	1·57	*N*	*N*	0	*N*	1·57	0
	1937	1·73	*N*	*N*	0	*N*	1·73	0
	1938	1·94	*N*	*N*	0	*N*	1·94	0
	1939	*2·14*	—	—	—	—	—	—
	1940	*2·54*	—	—	—	—	—	—
	1941	*2·78*	—	—	—	—	—	—
	1942	*3·44*	—	—	—	—	—	—
	1943	*3·82*	—	—	—	—	—	—
	1944	*2·89*	—	—	—	—	—	—
	1945	*3·43*	—	—	—	—	—	—
	1946	*3·42*	—	—	—	—	—	—
Czechoslovakia	1936	15·95	0·58	0·51	0·09	1·77	14·34	—
	1937	18·0	—	—	0·08	1·9	16·2	—
	1938	16·0	—	—	—	—	—	—
	1939	19·4	—	—	—	—	—	—
	1940	22·3	—	—	—	—	—	—
	1941	22·4	—	—	—	—	—	—
	1942	24·1	—	—	—	—	—	—
	1943	27·6	—	—	—	—	—	—
	1944	26·8	—	—	—	—	—	—
	1945	15·4	—	—	—	—	—	—
	1946	19·5	—	—	—	—	—	—

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS
(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) − (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Denmark	1936	—	—	—	0·07	—	—	—
	1937	—	—	—	0·13	—	—	—
	1938	—	—	—	0·15	—	—	—
	1939	—	—	—	0·24	—	—	—
	1940	0·2	—	—	0·90	—	—	2·5
	1941	1·0	—	—	0·41	—	—	4·7
	1942	1·8	—	—	0·30	—	—	4·8
	1943	2·6	—	—	0·73	—	—	6·0
	1944	2·2	—	—	0·76	—	—	5·8
	1945	2·3 *P*	—	—	0·07 *P*	—	—	5·7
Eire	1936	0	0	0	0	0	0	3·7
	1937	0	0	0	0	0	0	3·6
	1945	0	0	0	0	0	0	5·161
	1946	0	0	0	0	0	0	4·81 *P*
Estonia	1936	0	0	0	0	0	0	0·163
	1937	0	0	0	0	0	0	0·214
Finland	1936	0	0	0	0	0	0	0·02 *E*
	1937	0	0	0	0	0	0	0·02 *E*
	1938	0	0	0	*N*	0	0	0·030
	1939	0	0	0	*N*	0	0	0·029
	1940	0	0	0	*N*	0	0	0·033
	1941	0	0	0	*N*	0	0	0·020
	1942	0	0	0	*N*	0	0	0·045
	1943	0	0	0	*N*	0	0	0·07
	1944	0	0	0	*N*	0	0	0·10
	1945	0	0	0	*N*	0	0	0·16
	1946	0	0	0	*N*	0	0	0·23
France	1936	0·94	0·04	0·02	0·40 *b*	—	1·36	0·017 *c*
	1937	1·02	0·02	0·02	0·38 *b*	—	1·40	0·021 *c*
	1938	1·06	0·02	0·03	0·25 *b*	—	1·30	0·270 *c*
	1939	1·10	0·03	0·04	—	—	1·09	0·015 *c*
	F 1940	1·66	0·04	0·01	—	—	1·69	0·024 *c*
	F 1941	2·01	0·01	0·005	—	—	2·02	0·084 *c*
	F 1942	1·96	0·005	0·01	0·02 *b*	0·01	1·96	0·210 *c*
	F 1943	1·89	0·01	0·03	0·19 *b*	—	2·06	0·190 *c*
	F 1944	1·34	0·03	0·02	0·06 *b*	—	1·41	0·113 *c*
	1945	1·70	0·02	0·01	0·21 *b*	—	1·92	0·096 *c*
	1946	2·09	0·01	0·01	0·62 *b*	—	2·71	*D*

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Brown coal and lignite: Stocks: At beginning of year	Brown coal and lignite: Stocks: At end of year	Brown coal and lignite: Imports	Brown coal and lignite: Exports	Brown coal and lignite: Total consumption (cols. 1+2+4) – (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Germany	1936	161·4	*U*	*U*	4·9	*N*	166·3	0·5 *E*
	1937	184·7	*U*	*U*	5·5	*N*	190·2	0·5 *E*
	1938	*196·3*	—	—	—	—	—	—
	1939	*212·7*	—	—	—	—	—	—
	1940	*225·7*	—	—	—	—	—	—
	1941	*237·4*	—	—	—	—	—	—
	1942	*247·2*	—	—	—	—	—	—
	1943	*254·6*	—	—	—	—	—	—
	1944	*230·8*	—	—	—	—	—	—
	1945	*107·8*	—	—	—	—	—	—
	1946	*159·9*	—	—	—	—	—	—
Greece	1936	0·106	—	—	—	—	—	—
	1937	0·131	—	—	—	—	—	—
	1938	0·108	—	—	—	—	—	—
	1939	0·139	—	—	—	—	—	—
	1940	0·25	—	—	—	—	—	—
	1941	0·18	—	—	—	—	—	—
	1942	0·365	—	—	—	—	—	—
	1943	0·37	—	—	—	—	—	—
	1944	0·19	—	—	—	—	—	—
	1945	0·07	—	—	—	—	—	—
	1946	0·125	—	—	—	—	—	—
Hungary	1936	7·10	0·27	0·25	*N*	0·18	6·94	*N*
	1937	8·05	0·25	0·27	*N*	0·21	7·82	*N*
	1938	8·31	0·27	0·23	*N*	0·25	8·10	*N*
	1939	*9·41*	—	—	—	—	—	—
	1940	*10·16*	—	—	—	—	—	—
	1941	*10·96*	—	—	—	—	—	—
	1942	*11·23*	—	—	—	—	—	—
	1943	*10·79*	—	—	—	—	—	—
	1944	—	—	—	—	—	—	—
	1945	*4·12*	—	—	—	—	—	—
	1946	*5·63*	—	—	—	—	—	—
Iceland	1936	0	0	0	0	0	0	0·015
	1937	0	0	0	0	0	0	0·014
	1945	0	0	0	0	0	0	0·010
Italy	1936	0·6	—	—	*N*	—	0·8	—
	1937	0·8	—	—	*N*	—	1·1	—
	1938	0·9	—	—	*N*	—	0·9	—
	1939	1·1	—	—	*N*	—	1·1	—

Continued on page 37

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) – (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Italy—*continued*	1940	2·1	—	—	*N*	—	2·1	—
	1941	2·1	—	—	*N*	—	2·1	—
	1942	2·3	—	—	*N*	—	2·3	—
	1946	1·5	—	—	*N*	—	1·5	—
Latvia	1936	0	0	0	0	0	0	0·04
	1937	0	0	0	0	0	0	0·05
	1938	0	0	0	0	0	0	0·085
Lithuania	1936	0	0	0	0	0	0	0·41 *A*
	1937	0	0	0	0	0	0	0·466
	1938	0	0	0	0	0	0	0·848
Netherlands	1936	0·089	*U*	*U*	0·134	0·004	0·219	0·690
	1937	0·143	*U*	*U*	0·132	0·022	0·253	0·721
	1938	0·171	*U*	*U*	0·133	0·023	0·281	0·810
	1939	0·197	*U*	*U*	0·158	0·025	0·330	0·850
	1940	0·199	*U*	*U*	0·110	0·006	0·303	0·823
	1941	0·199	*U*	*U*	0·151	0	0·350	0·842
	1942	0·281	*U*	*U*	0·153	0	0·434	0·997
	1943	0·383	*U*	*U*	0·146	0	0·529	1·112
	1944	0·228	*U*	*U*	—	0	—	0·723
	1945	*U*	*U*	*U*	—	*U*	—	0·665
Norway	1936–1946	0	*U*	*U*	*d*	*d*	*d*	*U*
Poland	1936	0·014	0·002	0·002	0	0	0·014	2·0 *E*
	1946	1·45	*N*	*N*	0	1·19	0·25	*U*
Portugal	1936	0·020	*U*	*U*	0	0	*U*	0
	1937	0·023	*U*	*U*	0	0	*U*	0
	1938	0·018	*U*	*U*	0	0	*U*	0
	1939	0·034	*U*	*N*	0	0	*U*	0
	1940	0·063	*N*	*N*	0	0	0·063	0
	1941	0·081	*N*	*N*	0	0	0·081	0
	1942	0·102	*N*	*N*	0	0	0·102	0
	1943	0·101	*N*	*N*	0	0	0·101	0
	1944	0·125	*N*	*N*	0	0	0·125	0·001
	1945	0·162	*N*	*N*	0	0	0·162	0·002
	1946	0·120	*N*	*N*	0	0	0·120	0·003
Roumania	1936	0·562	*N*	0·094	*N*	*N*	0·562	*N*
	1937	1·190	0·094	0·091	*N*	*N*	1·192	*U*

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Brown coal and lignite: Stocks: At beginning of year	Brown coal and lignite: Stocks: At end of year	Brown coal and lignite: Imports	Brown coal and lignite: Exports	Brown coal and lignite: Total consumption (cols. 1+2+4) – (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Spain	1937	*0·20*	—	—	—	—	—	—
	1938	*0·17*	—	—	—	—	—	—
	1939	*0·19*	—	—	—	—	—	—
	1940	*0·56*	—	—	—	—	—	—
	1941	*0·79*	—	—	—	—	—	—
	1942	*1·10*	—	—	—	—	—	—
	1943	*1·12*	—	—	—	—	—	—
	1944	*1·20*	—	—	—	—	—	—
	1945	*1·36*	—	—	—	—	—	—
	1946	*1·33*	—	—	—	—	—	—
Sweden	1936	0	*U*	*U*	*N*	*N*	*N*	0·031
	1937	0	*U*	*U*	*N*	*N*	*N*	0·034
	1938	0	*U*	*U*	*N*	*N*	*N*	0·026
	1939	0	*U*	*U*	*N*	*N*	*N*	0·023
	1940	0	*U*	*U*	*N*	*N*	*N*	0·076
	1941	0	*U*	*U*	*N*	*N*	*N*	0·248
	1942	0	*U*	*U*	*N*	*N*	*N*	0·638
	1943	0	*U*	*U*	*N*	*N*	*N*	0·978
	1944	0	*U*	*U*	*N*	*N*	*N*	0·775
	1945	0	*U*	*U*	*N*	*N*	*N*	1·049
	1946	0	*U*	*U*	*N*	*N*	*N*	0·811
Switzerland	1936–1939	0	—	—	0	0	0	0
	1940	0·01	*N*	*N*	0·05	0	0·06	0
	1941	0·04	*N*	*N*	0·12	0	0·16	0·04
	1942	0·10	*N*	*N*	0·07	0	0·17	0·21
	1943	0·13	*N*	*N*	0·15	0	0·28	0·44
	1944	0·09	*N*	*N*	0·03	0	0·12	0·31
	1945	0·21	*N*	*N*	0·02	0	0·23	0·50
	1946	0·10	*N*	*N*	0·02	0	0·12	0·10
United Kingdom	1936–1946	*N*	*N*	*N*	0	0	*N*	*U*
NORTH AMERICA—								
Canada	1936	3·48 *f*	*U*	*U*	0·004	0·009 *f,e*	*U*	0·001
	1937	3·352 *f*	*U*	*U*	0·001	0·009 *f*	*U*	*N*
	1938	3·148 *f*	*U*	*U*	0·003	0·009 *f*	*U*	0·001
	1938	0·927	*U*	*U*	0·003	0·009	*U*	
	1939	0·871	*U*	*U*	0·003	0·007	*U*	*N*
	1940	0·996	*U*	*U*	0·002	0·006	*U*	*N*
	1941	1·200	*U*	*U*	0·001	0·006	*U*	*N*
	1942	1·180	*U*	*U*	*N*	0·009	*U*	*N*
	1943	1·511	*U*	*U*	*N*	0·008	*U*	0·001

Continued on page 39

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Brown coal and lignite						Peat
	Production	Stocks		Imports	Exports	Total consumption (cols. 1+2+4) – (cols. 3+5)	Production
		At beginning of year	At end of year				
0	1	2	3	4	5	6	7
NORTH AMERICA—*Continued*							
Canada—*continued* 1944	1·846	*U*	*U*	*N*	0·010	*U*	0·001
Newfoundland 1938	0	0	0	0	0	0	*U*
United States of America *jj* 1936	2·821	*U, N*	*U, N*	0·006	0	2·827	0·042 *g*
1937	2·920	*U, N*	*U, N*	0·004	0	2·924	0·046 *g*
1938	2·720	*U, N*	*U, N*	0·002	0	2·722	0·042 *g*
1939	2·760	*U, N*	*U, N*	0·002	0	2·762	0·050 *g*
1940	2·666	*U, N*	*U, N*	0·004	0	2·670	0·064 *g*
1941	2·518	*U, N*	*U, N*	0·003	0	2·521	0·078 *g*
1942	2·659	*U, N*	*U, N*	0·006	0	2·665	0·065 *g*
1943	2·494	*U, N*	*U, N*	0·002	0	2·496	0·054 *g*
1944	2·317	*U, N*	*U, N*	0·001	0	2·318	0·053 *g*
1945	*D*	*U, N*	*U, N*	*D*	*D*	*D*	0·071 *g*
SOUTH AMERICA—							
Argentina 1936–1939	*N*	*N*	*N*	0	0	*N*	0
1940–1942	0	0	0	0	0	0	0
AFRICA—							
Algeria 1936	0	*U*	*U*	0	0	0	0
1937	—	*U*	*U*	—	—	—	—
1938	—	*U*	*U*	—	—	—	—
1939	—	*U*	*U*	—	—	—	—
1940	—	*U*	*U*	—	—	—	—
1941	0·001	*U*	*U*	0·005	—	0·006	—
1942	0·007	*U*	*U*	0·007	—	0·014	—
1943	0·001	*U*	*U*	—	—	0·001	—
1944	0·001	*U*	*U*	0·002 *h*	—	0·002	—
1945	—	*U*	*U*	*N*	—	*N*	—
Nigeria 1936–1938	0	0	0	0	0	0	0
Southern Rhodesia 1936–1938	0	0	0	0	0	0	0
Union of South Africa 1936–1946	0	0	0	0	0	0	0

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite						Peat
		Production	Stocks		Imports	Exports	Total consumption (cols. 1+2+4) – (cols. 3+5)	Production
			At beginning of year	At end of year				
0		1	2	3	4	5	6	7
ASIA—								
India	1936–1946	C	C	C	—	—	—	—
Japan	1937	*0·12*	—	—	—	—	—	—
	1938	*0·14*	—	—	—	—	—	—
	1939	*0·19*	—	—	—	—	—	—
	1940	*0·28*	—	—	—	—	—	—
	1941	*0·41*	—	—	—	—	—	—
	1942	*1·61*	—	—	—	—	—	—
	1943	*2·88*	—	—	—	—	—	—
	1944	*2·30*	—	—	—	—	—	—
	1945	*1·64*	—	—	—	—	—	—
	1946	*2·35*	—	—	—	—	—	—
Turkey	1946	0·604	0·075	0·091	—	—	0·588	N
AUSTRALASIA—								
Australia	1936	3·094	U	U	0	0	3·094	0
	1937	3·448	U	U	0	0	3·448	0
	1938	3·825	U	U	0	0	3·825	0
	1939	3·709	U	U	0	0	3·709	0
	1940	4·346	U	U	0	0	4·346	0
	1941	4·639	U	U	0	0	4·639	0
	1942	5·013	U	U	0	0	5·013	0
	1943	5·174	U	U	0	0	5·174	0
	1944	5·096	U	U	0	0	5·096	0
	1945	5·532	U	U	0	0	5·532	0
New Zealand	1936	1·299	U	U	0	0	1·299	U, N
	1937	1·328	U	U	0	0	1·328	U, N
	1938	1·263	U	U	0	0	1·263	U, N
	1939	1·317	U	U	0	0	1·317	U, N
	1940	1·391	U	U	0	0	1·391	U, N
	1941	1·482	U	U	0	0	1·482	U, N
	1942	1·529	U	U	0	0	1·529	U, N
	1943	1·723	U	U	0	0	1·723	U, N
	1944	1·764	U	U	0	0	1·764	U, N
	1945	1·897	U	U	0	0	1·897	U, N

TABLE 5

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—										
Austria	1936	0·546 *a*	0·702	*U*	*U*	0·396	0	0·146	0·799	0·945
	1937	0·60	*U*	0·1	0·1	0·55	0	*U*	*U*	1·15*e*
	1938	0·55	*U*	*U*	*U*	0·67	0	*U*	*U*	1·22*A,e*
	1939	0·61	*U*	*U*	*U*	1·10	0	*U*	*U*	1·71*A,e*
	1940 *X*	0·71	*U*	*U*	*U*	1·34	0	*U*	*U*	2·05*A,e*
	1941 *X*	0·75	*U*	*U*	*U*	1·26	0	*U*	*U*	2·01*A,e*
	1942 *X*	0·87 *c*	*U*	*U*	*U*	1·12	0	*U*	*U*	1·99*A,c,e*
	1943 *X*	0·88 *c*	*U*	*U*	*U*	0·99	0	*U*	*U*	1·87*A,c,e*
	1944	0·78 *c*	*U*	*U*	*U*	0·88	0	*U*	*U*	1·66*A,c,e*
	1945	0·16 *c*	*U*	*U*	*U*	0·05	0	*U*	*U*	0·21*A,c,e*
	1946	0·44 *d*	*U*	*U*	*U*	0·16	0	*U*	*U*	0·60*A,e*
Belgium–Luxembourg *B*	1936	5·5	7·1	*U*	*U*	2·6	1·3	0·5	6·3	6·8
	1937	6·3	8·2	*U*	0·2	3·2	1·3	0·6	7·6	8·2
	1938	5·1	6·7	0·2	0·4	1·9	1·2	0·6	5·0	5·6
	1939	5·6	7·4	0·4	*N*	2·0	1·6	0·4	6·0	6·4
	1940	3·9	5·2	*N*	0·1	0·4 *B*	0·5	0·3	3·4	3·7
	1941	4·4	5·8	0·1	*N*	*N, B*	0·2	0·2	4·1	4·3
	1942	4·4	5·8	*N*	*N*	*N, B*	0·2	0·2	4·0	4·2
	1943	4·4	5·8	*N*	*N*	0·1 *B*	0·4	0·1	4·0	4·1
	1944	2·0	2·7	*N*	*N*	0·1 *B*	0·1	0·1	1·9	2·0
	1945	2·1	2·7	*N*	*N*	0·3 *B*	0·2	0·2	2·0	2·2
	1946	3·9	5·1	*N*	*N*	0·2	0·5	0·3	4·3	4·6
Bulgaria	1936	0·003	0·004	*N*	*N*	0·002	0	0·001	0·004	0·005
	1937	0·004	0·006	*N*	*N*	0·002	0	0·001	0·005	0·006
	1938	0·004	0·006	*N*	*N*	0·003	0	0·002	0·005	0·007
Czechoslovakia	1936	2·0	2·7	0·2	0·2	0·2	0·4	*U*	*U*	1·8
	1937	3·280 *p*	4·4	0·2	0·2	0·2	0·9	*U*	*U*	2·6
	1938	2·766 *p*	*D*	*D*	*D*	*D*	*D*	*D*	*D*	*D*
	1939	3·221 *p*	*D*	*D*	*D*	*D*	*D*	*D*	*D*	*D*
	1940	3·733 *p*	*D*	*D*	*D*	*D*	*D*	*D*	*D*	*D*
	1941	3·696 *p*	*D*	*D*	*D*	*D*	*D*	*D*	*D*	*D*
	1942	3·889 *p*	*D*	*D*	*D*	*D*	*D*	*D*	*D*	*D*
	1943	4·281 *p*	*D*	*D*	*D*	*D*	*D*	*D*	*D*	*D*
	1944	4·528 *p*	*D*	*D*	*D*	*D*	*D*	*D*	*D*	*D*
	1945	1·901 *p*	*D*	*D*	*D*	*D*	*D*	*D*	*D*	*D*
	1946	2·250 *p*	*D*	*D*	*D*	*D*	*D*	*D*	*D*	*D*
Denmark	1936	0·315	0·630	*U*	*U*	1·659	0·037	*U*	*U*	1·937 *E*
	1937	—	—	—	—	—	—	—	—	—
	1938	0·3	0·6	0·3	0·3	1·4	*N*	*U*	*U*	1·7

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Eire	1936	0·133	0·284	*U*	*U*	0·023	0·013	0·084	0·059	0·143
	1937	0·138	0·288	*U*	*U*	0·019	0·003	0·091 *E*	0·063 *E*	0·154
	1945	0·097	*U*	*U*	*U*	0·076	0	*U*	*U*	*U*
	1946	0·106 *P*	*U*	*U*	*U*	0·076	0	*U*	*U*	*U*
Estonia	1936	0·002	*U*	*U*	*U*	0·003	0	*U*	*U*	*U*
	1937	0·003	*U*	*U*	*U*	0·004	0	*U*	*U*	*U*
Finland	1936	0·060	*U*	0·015	0·011	0·279	0	*U*	*U*	0·343
	1937	0·068	*U*	0·011	0·008	0·329	0	*U*	*U*	0·400
	1938	0·068	0·085	*U*	*U*	0·248	0	*U*	*U*	*U*
	1939	0·067	0·083	*U*	*U*	0·260	0	*U*	*U*	*U*
	1940	0·073	0·093	*U*	*U*	0·127	0	*U*	*U*	*U*
	1941	0·090	0·108	*U*	*U*	0·119	0	*U*	*U*	*U*
	1942	0·091	0·106	*U*	*U*	0·120	0	*U*	*U*	*U*
	1943	0·090	0·111	*U*	*U*	0·242	0	*U*	*U*	*U*
	1944	0·077	0·092	*U*	*U*	0·168	0	*U*	*U*	*U*
	1945	0·064	0·066	*U*	*U*	0·038	0	*U*	*U*	*U*
	1946	0·056	0·064	*U*	*U*	0·241	0	*U*	*U*	*U*
France	1936	7·10	9·23	0·31	0·14	2·56	0·26	—	—	9·57
	1937	7·90	10·27	0·14	0·07	3·86	0·23	—	—	11·60
	1938	7·64	9·32	0·07	0·14	2·36	0·21	—	—	9·72
	1939	8·15	10·60	0·14	0·07	2·79	0·21	—	—	10·80
	1940 *F*	5·16	6·71	0·07	0·12	0·86	0·04	—	—	5·93
	1941 *F*	4·89	6·36	0·12	0·02	0·07	0·01	—	—	5·05
	1942 *F*	5·01	6·51	0·02	0·05	0·16	0·02	—	—	5·12
	1943 *F*	4·96	6·45	0·05	0·06	0·43	0·01	—	—	5·37
	1944 *F*	2·91	3·78	0·06	0·24	0·35	0·01	—	—	3·07
	1945	2·50	3·25	0·24	0·03	0·39	0	—	—	3·10
	1946	4·96	6·45	0·03	0·04	1·14	0·05	—	—	6·04
Germany	1936	40·7	54·9	3·9	2·8	0·7	7·2	10·4	24·9	35·3
	1937	46·3	62·1	2·8	1·6	0·5	8·8	12·1	27·0	39·1
Hungary	1936	0·212	0·283	0·025	0·022	0·273	0·009	0·161	0·319	0·480
	1937	0·227	0·304	0·022	0·026	0·370	0·009	0·181	0·403	0·584
	1938	0·244	0·326	0·026	0·030	0·327	0·007	0·175	0·385	0·560
	1942	—	—	—	—	0·61	—	—	—	—
	1946	—	—	—	—	0·23	—	—	—	—
Iceland	1936	0·003	*U*	*O*	*O*	0·006	0	0·009	0	0·009
	1937	0·003	*U*	*N*	*N*	0·001	0	0·004	0	0·004
	1945	0·002	0·003	*N*	*N*	*N*	0	0·001	*N*	0·002

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Italy	1936	1·8	—	—	—	0·5	*N*	—	—	2·3
	1937	2·3	—	—	—	0·3	*N*	—	—	2·6
	1938	2·4	—	—	—	0·2	*N*	—	—	2·6
	1939	2·7	—	—	—	0·1	*N*	—	—	2·8
	1940	2·6	—	—	—	0·1	*N*	—	—	2·7
	1941	2·5	—	—	—	0·2	*N*	—	—	2·7
	1942	2·5	—	—	—	0·3	*N*	—	—	2·8
	1946	0·9	—	—	—	0·2	*N*	—	—	1·1
Latvia	1936	0·014	0·017	*U*	*U*	0·067	0	*U*	*U*	0·081
	1937	0·015	0·019	*U*	*U*	0·071	0	*U*	*U*	0·086
	1938	0·018	0·022	*U*	*U*	0·071	0	*U*	*U*	0·089
Lithuania	1936	*N*	*N*	*U*	*U*	0·017	0	*U*	*U*	*U*
	1937	*N*	*N*	*U*	*U*	0·020	0	*U*	*U*	*U*
	1938	*N*	*N*	*U*	*U*	0·018	0	*U*	*U*	*U*
Netherlands	1936	3·637	3·08	*U*	*U*	0·374	2·305	0·583	1·122	1·705
	1937	3·965	3·37	*U*	*U*	0·426	2·438	0·600	1·354	1·954
	1938	3·745	3·18	*U*	*U*	0·331	2·170	0·603	1·302	1·905
	1939	3·636	3·08	*U*	*U*	0·370	2·300	0·607	1·099	1·706
	1940	3·038	2·58	*U*	*U*	0·149	1·148	0·670	1·369	2·039
	1941	2·930	2·49	0·120 *q*	0·235	0·018	0·973	0·674	1·186	1·860
	1942	2·789	2·37	0·235	0·245	0·001	0·695	0·741	1·344	2·085
	1943	2·937	2·49	0·245	0·210	0·001	1·091	0·774	1·108	1·882
Norway	1936	0·072	*U*	*U*	*U*	0·749	0·006	0·623	0·192	0·815
	1937	0·077	*U*	*U*	*U*	0·813	0	*U*	*U*	0·890
	1938	0·075	*U*	*U*	*U*	0·659	0	*U*	*U*	0·734
	1939	0·074	*U*	*U*	*U*	0·825	0	*U*	*U*	0·899
	1940	0·067	*U*	*U*	*U*	0·388	0	*U*	*U*	*U*
	1941	0·056	*U*	*U*	*U*	0·285	0	*U*	*U*	*U*
	1942	0·047	*U*	*U*	0·090	0·241	0	*U*	*U*	*U*
	1943	0·049	*U*	0·090	0·122	0·329	0	*U*	*U*	0·346
	1944	*U*	*U*	0·122	0·095	0·288	0	*U*	*U*	*U*
	1945	*U*	*U*	0·095	0·082	0·117	0	*U*	*U*	*U*
	1946	*U*	*U*	0·082	0·116	0·321	0	*U*	*U*	*U*
Poland	1936 *G*	1·62	2·15 *f*	0·21	0·08	*N*	0·40	0·22	1·12	1·34
	1937 *G*	2·13	2·83 *f*	0·08	0·04	0·08	0·42	0·23	1·59	1·82
	1938 *G*	2·29	3·05 *f*	0·04	*U*	*U*	0·27	*U*	*U*	1·87
	1939 *H*	3·56	4·73 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1940 *H*	4·06	5·40 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1941 *H*	4·36	5·80 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1942 *H*	4·48	5·96 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1943 *H*	4·63	6·16 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*

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TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)-(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Poland—*continued*	1944*H*	4·54	6·04*f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1945*H*	*U*	*U*	*U*	0·78	0	*U*	*U*	*U*	*U*
	1946*H*	3·55	4·46*f*	0·78	0·21	0	1·46	0·29	2·21	2·50
Portugal	1936	0·032	—	*U*	*U*	0·036	0	0·068	0	0·068
	1937	0·029	—	*U*	*U*	0·040	0	0·069	0	0·069
	1938	0·030	—	*U*	*U*	0·029	0	0·059	0	0·059
	1939	0·027	—	*U*	*U*	0·029	0	0·056	0	0·056
	1940	0·027	—	*U*	*U*	0·012	0	0·039	0	0·039
	1941	0·024	—	*U*	*U*	0·022	0	0·046	0	0·046
	1942	0·018	—	*U*	*U*	0·014	0	0·032	0	0·032
	1943	0·026	—	*U*	*U*	0·022	0	0·048	0	0·048
	1944	0·024	—	*U*	*U*	0·007	0	0·031	0	0·031
	1945	0·015	—	*U*	*U*	0·005	0	0·020	0	0·020
	1946	0·016	—	*U*	*U*	*U*	0	0·016	0	0·016
Roumania	1936	0·063	0·094	*N*	*N*	0·039	0	*U*	*U*	0·102
	1937	0·078	*U*	*U*	*U*	0·048	*N*	*U*	*U*	*U*
Sweden	1936	0·533	*U*	*U*	*U*	2·078	0·010	*U*	*U*	*U*
	1937	0·576	*U*	*U*	*U*	2·331	0·013	*U*	*U*	*U*
	1938	0·579	*U*	*U*	*U*	1·940	0·007	*U*	*U*	*U*
	1939	0·591	*U*	*U*	*U*	2·339	0·005	*U*	*U*	*U*
	1940	0·562	*U*	*U*	*U*	1·725	0·007	*U*	*U*	*U*
	1941	0·537	*U*	*U*	1·030	1·643	0	*U*	*U*	*U*
	1942	0·615	*U*	1·030	1·090	1·186	0	0·966	0·775	1·741
	1943	0·624	*U*	1·090	1·130	1·242	0	0·965	0·861	1·826
	1944	0·599	*U*	1·130	1·270	1·214	0·015	0·825	0·833	1·618
	1945	0·318	*U*	1·270	0·520	0·089	0·010	0·572	0·575	1·147
	1946	0·291	*U*	0·520	0·640	1·011	0	0·599	0·583	1·182
Switzerland	1936	0·35	—	*N*	*N*	0·85	0	*U*	*U*	1·20
	1937	0·37	—	*N*	*N*	0·95	0	*U*	*U*	1·32
	1938	0·38	—	*N*	*N*	0·89	0	*U*	*U*	1·27
	1939	0·38	—	*N*	*N*	1·00	0	*U*	*U*	1·38
	1940	0·32	—	*N*	*N*	0·68	0	*U*	*U*	1·00
	1941	0·25	—	*N*	*N*	0·54	0	*U*	*U*	0·79
	1942	0·21	—	*N*	*N*	0·36	0	*U*	*U*	0·57
	1943	0·17	—	*N*	*N*	0·31	0	*U*	*U*	0·48
	1944	0·17	—	*N*	*N*	0·32	0	*U*	*U*	0·49
	1945	0·02	—	*N*	*N*	0·02	0	*U*	*U*	0·04
	1946	0·05	—	*N*	*N*	0·29	0	*U*	*U*	0·34
U.S.S.R.	1936	*19·89*	—	—	—	*N*	—	—	—	—

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country	Year	Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)-(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
United Kingdom	1936	26·91	39·56	*U*	*U*	0·10	2·35	*U*	*U*	24·66 *E*
	1937	28·32	41·94	*U*	*U*	0·06	2·49	*U*	*U*	25·89 *E*
	1938	26·08	38·81	*U*	*U*	*N*	2·02	*U*	*U*	24·06 *E*
	1939	24·62	40·34	*U*	3·00	*N*	2·43	*U*	*U*	22·19 *E*
	1940	25·57	40·95	3·00	2·77	*N*	0·88	*U*	*U*	24·92
	1941	25·48	41·05	2·77	2·53	*N*	0·45	*U*	*U*	25·24
	1942	26·48	42·88	2·56	2·46	0	0·26	3·31	23·01	26·32
	1943	26·23	42·27	2·46	2·83	*N*	0·33	3·23	22·30	25·53
	1944	25·95	41·35	2·83	2·18	0	0·14	3·36	23·10	26·46
	1945	26·00	41·76	2·18	2·16	*N*	0·13	3·34	22·55	25·89
	1946	26·84	42·39	2·16	2·31	*N*	0·18	3·80	22·71	26·51
NORTH AMERICA—										
Canada	1936	2·182	3·047 *g*	0·325 *h*	0·254 *h*	0·556	0·017	*U*	*U*	2·792
	1937	2·332	3·246 *g*	0·254 *h*	0·223 *h*	0·379	0·034	*U*	*U*	2·708
	1938	2·137	2·928 *g*	0·223 *h*	0·344 *h*	0·376	0·028	*U*	*U*	2·364
	1939	2·186	2·970 *g*	0·344 *h*	0·282 *h*	0·395	0·044	*U*	*U*	2·599
	1940	2·736	3·739 *g*	0·282 *h*	0·216 *h*	0·607	0·032	*U*	*U*	3·377
	1941	2·854	3·921 *g*	0·216 *h*	0·195 *h*	0·599	0·036	*U*	*U*	3·417
	1942	2·963	4·056 *g*	0·195 *h*	0·177 *h*	0·704	0·041	*U*	*U*	3·644
	1943	3·222	4·34 *g*	0·177 *h*	0·198 *h*	0·836	0·044	*U*	*U*	3·993
	1944	3·645	4·823 *g*	0·198 *h*	0·270 *h*	0·738	0·039	*U*	*U*	4·272
United States of America *L*	1936	46·264 *i*	61·585 *g*	2·812 *j*	1·834 *j*	0·299	0·608	9·757 *A,k*	37·176 *A*	46·933
	1937	51·983 *i*	69·111 *g*	1·834 *j*	2·613 *j*	0·260	0·478	7·933 *A,k*	43·053 *A*	50·986
	1938	31·929 *i*	42·299 *g*	2·613 *j*	3·585 *j*	0·123	0·441	6·675 *A,k,l*	23·964 *A*	30·639
	1939	43·302 *i*	57·619 *g*	3·585 *j*	2·121 *j*	0·129	0·535	7·058 *A,k,l*	37·302 *A*	44·360
	1940	55·554 *i*	73·832 *g*	2·121 *j*	2·161 *j*	0·102	0·729	7·569 *A,k,l*	47·318 *A*	54·887
	1941	63·158 *i*	84·494 *g*	2·161 *j*	1·997 *j*	0·243	0·643	6·306 *A,k,l*	56·616 *A*	62·922
	1942	69·459 *i*	91·055 *g*	1·997 *j*	1·950 *j*	0·099	0·762	6·005 *A,k*	62·838 *A*	68·843
	1943	70·400 *i*	94·253 *g*	1·950 *j*	1·946 *j*	0·089	0·902	4·992 *A,k*	64·599 *A*	69·591
	1944	72·699 *i*	96·835 *g*	1·946 *j*	2·380 *j*	0·057	0·786	6·536 *A,k*	65·000 *A*	71·536
	1945	66·213 *i*	88·067 *g*	2·380 *j*	1·773 *j*	0·047	1·341	6·585 *A,k*	58·941 *A*	65·526
SOUTH AMERICA—										
Argentina	1936	0·076	0·22	*U*	*U*	0·037	0	*U*	*U*	*U*
	1937	0·137	0·40	*U*	*U*	0·047	0·483	*U*	*U*	*U*
	1938	0·133	0·39	*U*	0·081	0·037	0·107	*U*	*U*	*U*
	1939	0·127 *m*	—	0·081	0·012	0·038	*N*	*U*	*U*	0·234
	1940	0·104 *m*	—	0·012	0·034	0·030	0·002	*U*	*U*	0·110
	1941	0·109 *m*	—	0·034	0·037	0·040	*N*	*U*	*U*	0·146
	1942	0·088 *m*	—	0·037	0·039	0·030	*N*	*U*	*U*	0·116

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country	Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
	Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0	1	2	3	4	5	6	7	8	9
AFRICA—									
Algeria 1936	0·073	*U*	*U*	*U*	0·001	0	*U*	*U*	0·074
1937	0·072	*U*	*U*	*U*	0·002	0	*U*	*U*	0·074
1938	0·077	*U*	*U*	*U*	0·002	0	*U*	*U*	0·079
1939	0·071	*U*	*U*	*U*	0·002	0	*U*	*U*	0·073
1940	0·060	*U*	*U*	*U*	0·002	0	*U*	*U*	0·062
1941	0·057	*U*	*U*	*U*	0·005	0	*U*	*U*	0·062
1942	0·069	*U*	*U*	*U*	0·005	0	*U*	*U*	0·074
1943	0·077	*U*	*U*	*U*	0·003	0	*U*	*U*	0·080
1944	0·088	*U*	*U*	*U*	0·004	0	*U*	*U*	0·092
1945	0·093	*U*	*U*	*U*	0·002	0	*U*	*U*	0·095
Nigeria 1936–1938	0	—	0	0	0	0	0	0	0
Southern Rhodesia 1936	0·020	0·029	*U*	*U*	*N*	0·016	*U*	*U*	*U*
1937	0·056	0·082	*U*	*U*	*N*	0·045	*U*	*U*	*U*
1938	—	0·077	*U*	*U*	*N*	0·046	*U*	*U*	*U*
Uganda 1936	0	—	0	0	0	0	0	0	0
Union of South Africa 1936	0·26 *n*	0·41	*U*	*U*	*N*	0·02	*U, o*	*U*	0·24
1937	0·32 *n*	0·49	*U*	*U*	*N*	0·02	*U, o*	*U*	0·30
1938	0·37	0·60	*U*	*U*	*N*	0·02	*U*	*U*	0·35
1939	0·41	0·67	*U*	*U*	*N*	0·01	*U*	*U*	0·40
1940	0·44	0·72	*U*	*U*	*N*	0·01	*U*	*U*	0·42
1941	0·44	0·73	*U*	*U*	*N*	0·01	*U*	*U*	0·44
1942	0·37	0·91	*U*	*U*	*N*	0·03	*U*	*U*	0·54
1943	0·65	1·00	*U*	*U*	*N*	0·03	*U*	*U*	0·63
1944	0·66	1·03	*U*	*U*	*N*	0·03	*U*	*U*	0·64
1945	0·70	1·09	*U*	*U*	*N*	0·06	*U*	*U*	0·63
ASIA—									
British Malaya— Singapore 1936	0·009	*U*	*N*	*N*	*N*	*N*	0	0·003	0·003
1937	0·010	*U*	*N*	*N*	*N*	*N*	0	0·003	0·003
1938	0·010	*U*	*N*	*N*	*N*	*N*	0	0·003	0·003
British North Borneo 1936–1938	0	0	0	0	0	0	0	0	0
Cyprus 1936–1938	0	0	*U*	*U*	*N*	0	*U*	*U*	*U*

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)-(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
ASIA—*Continued*										
India *I*	1936	0·098	0·131	0·004	0·004	0·002	*N*	—	—	0·100
	1937	0·096	0·129	0·004	0·004	0·002	*N*	—	—	0·098
	1938	0·105	0·140	0·004	0·009	*N*	0·002	—	—	0·098
	1939	0·112	0·149	0·009	0·015	*N*	0·002	—	—	0·104
	1940	0·113	0·151	0·015	0·015	*N*	0·002	—	—	0·111
	1941	0·131	0·174	0·015	0·013	*N*	0·003	—	—	0·130
	1942	0·108	0·144	0·013	—	*N*	0·004	—	—	—
	1943	0·073	0·098	—	—	*N*	*N*	—	—	—
	1944	0·026	0·031	—	0·012	*N*	*N*	—	—	—
	1945	0·063	0·084	0·012	0·008	*D*	*D*	—	—	—
	1946	0·079	0·103	0·008	0·008	*D*	*D*	—	—	—
Palestine	1937, 1938 *r*	0	0	*U*	*U*	0·001	0	*U*	*U*	0·001
Turkey	1946	0·357	0·510	*N*	0·012	0	0	0·215	0·130	0·345
AUSTRALASIA—										
Australia	1936 *Y*	1·535	2·353	*U*	*U*	0·002	0·016	*U*	*U*	1·521
	1937 *Y*	1·806	2·656	*U*	*U*	0·016	0·022	*U*	*U*	1·800
	1938 *Y*	1·963	2·895	*U*	*U*	0·016	0·037	*U*	*U*	1·942
	1939 *Y*	2·069	3·033	*U*	*U*	0·010	0·031	*U*	*U*	2·048
	1940 *Y*	2·191	3·180	*U*	*U*	*N*	0·041	*U*	*U*	2·150
	1941 *Y*	2·633	3·784	*U*	*U*	*N*	0·008	*U*	*U*	2·635
	1942 *Y*	2·810	4·121	*U*	*U*	0	0·030	*U*	*U*	2·780
	1943 *Y*	2·743	4·004	*U*	*U*	*N*	0·021	*U*	*U*	2·722
	1944 *Y*	2·696	3·923	*U*	*U*	*N*	0·032	*U*	*U*	2·664
	1945 *Y*	2·448	3·553	*U*	*U*	0	0·025	*U*	*U*	2·423
New Zealand	1936	0·122 *E*	*U*	*U*	*U*	0·001	0	*U*	*U*	0·123 *E*
	1937	0·129 *E*	*U*	*U*	*U*	0·001	0	*U*	*U*	0·130 *E*
	1938	0·140 *E*	*U*	*U*	*U*	0·001	0	*U*	*U*	0·141 *E*
	1939	0·145 *E*	*U*	*U*	*U*	0·001	0	*U*	*U*	0·146 *E*
	1940	0·156 *E*	*U*	*U*	*U*	0·001	0	*U*	*U*	0·157 *E*
	1941	0·165 *E*	*U*	*U*	*U*	0·001	0	*U*	*U*	0·166 *E*
	1942	0·162 *E*	*U*	*U*	*U*	0·001	0	*U*	*U*	0·163 *E*
	1943	0·176 *E*	*U*	*U*	0·003	0·001	0	*U*	*U*	0·177 *E*
	1944	0·177	0·303	0·003	0·002	0·003	0	*U*	*U*	0·181
	1945	0·178	0·309	0·002	0·003	0·003	0	*U*	*U*	0·180

TABLE 6

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(in millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—										
Austria	1963–1940	0	0	*U*	*U*	*U*	*U*	*U*	*U*	*U*
Belgium–Luxembourg *B*	1936	1·6	1·4	*N*	*N*	0·1	0·5	0·2	1·0	1·2
	1937	1·8	1·7	*N*	*N*	0·2	0·6	0·2	1·2	1·4
	1938	1·7	1·6	*N*	*N*	0·1	0·6	0·2	1·0	1·2
	1939	1·6	1·4	*N*	*N*	0·1	0·5	0·2	1·0	1·2
	1940	1·8	1·6	*N*	*N*	*N*	0·3	0·5	1·0	1·5
	1941	1·5	1·4	*N*	*N*	*N*	0·1	0·4	1·0	1·4
	1942	1·1	1·0	*N*	*N*	*N*	*N*	0·3	0·8	1·1
	1943	1·0	0·9	*N*	*N*	*N*	0·1	0·1	0·8	0·9
	1944	0·5	0·4	*N*	*N*	*N*	*N*	0·1	0·4	0·5
	1945	0·8	0·7	*N*	*N*	*N*	*N*	0·2	0·6	0·8
	1946	1·1	1·0	*N*	*N*	0·1	*N*	0·5	0·7	1·2
Bulgaria	1936	0	0	0	0	0	0	0	0	0
Czechoslovakia	1936	0·6 *r*	*U*	*U*	*U*	*N*	0·1 *q*	*U*	*U*	0·5
	1937	0·8 *s*	*U*	*U*	*U*	*N*	0·1 *q*	*U*	*U*	0·7
Denmark	1936	0	0	*U*	*U*	0·07	*N*	*U*	*U*	0·07 *E*
	1937	—	—	—	—	—	—	—	—	—
	1938	—	—	*U*	*U*	0·15	0	—	—	—
Eire	1936, 1937	*N*	*N*	*N*	*N*	*N*	0	*N*	*N*	*N*
	1945	0·108	*U*	*N*	*N*	0	0	0	0·108	0·108
Estonia	1936, 1937	0	0	0	0	0	0	0	0	0
Finland	1936–1938	*N*	*N*	*N*	*N*	*N*	0	*N*	*N*	*N*
	1946	0	0	0	0	*N*	0	*U*	*U*	*N*
France	1936	8·52	7·84 *c*	0·19	0·08	0·61	0·11	—	—	9·13
	1937	8·32	7·65	0·08	0·07	0·96	0·06	—	—	9·23
	1938	7·81	7·18	0·07	0·29	0·80	0·06	—	—	8·33
	1939	8·36	7·69	0·29	0·22	0·34	0·11	—	—	8·66
	F 1940	6·75	6·21	0·22	0·10	0·29	0·03	—	—	7·13
	F 1941	4·44	4·08	0·10	0·04	0·06	0·03	—	—	4·53
	F 1942	3·42	3·15	0·04	0·05	—	0·02	—	—	3·39
	F 1943	3·22	2·96	0·05	0·05	0·07	0·01	—	—	3·28
	F 1944	1·66	1·53	0·05	0·07	—	—	—	—	1·64
	1945	3·53	3·25	0·07	0·01	0·09	—	—	—	3·68
	1946	5·25	4·83	0·01	0·01	—	0·08	—	—	5·17

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(in millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Germany	*d* 1936	42·7	107·0 *b*	0·8	0·6	0·2	1·9	*U*	*U*	41·2
	e 1937	49·3	122·9 *b*	0·6	0·8	0·2	2·1	*U*	*U*	47·2
Hungary	1936	0·381	0·356	*N*	*N*	0	*N*	0·343	0·038	0·381
	1937	0·454	0·422	*N*	*N*	0	0	0·400	0·054	0·454
	1938	0·456	0·425	*N*	*N*	0	0	0·410	0·046	0·456
Iceland	1936	0	0	0	0	0	0	0	0	0
	1946	0	0	0	0	0	0	0	0	0
Italy	1936	0·05	—	—	—	0·08	*N*	—	—	*U*
	1937	0·06	—	—	—	0·02	*N*	—	—	*U*
	1938	0·05	—	—	—	*N*	*N*	—	—	*U*
	1939	0·08	—	—	—	*N*	*N*	—	—	*U*
	1940	0·13	—	—	—	*N*	*N*	—	—	*U*
	1941	0·12	—	—	—	*N*	*N*	—	—	*U*
	1942	0·12	—	—	—	*N*	*N*	—	—	*U*
Latvia	1936–1938	0	0	0	0	0	0	0	0	0
Lithuania	1936–1938	0	0	0	0	0	0	0	0	0
Netherlands	1936	1·153	1·11	*U*	*U*	0·469	0·341	*U*	*U*	1·28
	1937	1·327	1·34	*U*	*U*	0·458	0·449	1·03 *E*	0·31	1·34
	1938	1·325	*U*	*U*	*U*	0·453	0·436	*U*	*U*	1·342
	1939	1·338	*U*	*U*	*U*	0·510	0·338	*U*	*U*	1·510
	1940	1·285	*U*	*U*	*U*	0·242	0·123	*U*	*U*	1·404
	1941	1·200	*U*	*U*	*U*	0·160	0·062	*U*	*U*	1·298
	1942	1·025	*U*	*U*	*U*	0·154	0	*U*	*U*	1·179
	1943	0·951	*U*	*U*	*U*	0·147	0	*U*	*U*	1·098
	1944	0·631	*U*	*U*	*U*	*U*	0	*U*	*U*	*U*
Norway	1936–1946	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Poland	*G* 1936	0·17	0·15 *f*	*N*	*N*	0	0·01 *g*	0·01	0·15	0·16
	G 1937	0·21	0·19 *f*	*N*	*N*	0	0·01 *g*	0·01	0·19	0·20
	G 1938	0·22	0·20 *f*	*N*	*N*	0	*N*, *g*	*N*	0·22	0·22
	H 1939	0·46	0·41 *f*	*U*	*U*	*U*	*U*	*N*	*U*	*U*
	H 1940	0·76	0·68 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	H 1941	0·76	0·68 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	H 1942	0·75	0·67 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	H 1943	0·81	0·73 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	H 1944	0·76	0·68 *f*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	H 1945	0·11	0·10 *f*	*N*	*N*	0	*N*, *g*	*U*	*U*	*U*
	H 1946	0·53	0·48 *f*	*N*	*N*	0	*N*, *g*	0·01	0·51	0·52

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(in millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)-(cols. 4+6): For household purposes	Domestic consumption: For other purposes	Domestic consumption: Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Portugal	1936	*U*	*U*	*U*	*U*	*N*	0	*U*	*U*	*U*
	1937	*U*	*U*	*U*	*U*	*N*	0	*U*	*U*	*U*
	1938	0·093 *E, h*	—	*U*	*U*	*N*	0	*U*	*U*	*U*
	1939	0·090 *E, h*	—	*U*	*N*	*N*	0	*U*	*U*	*U*
	1940	0·093 *E, h*	—	*N*	*N*	*N*	0	*U*	*U*	*U*
	1941	0·092 *E, h*	—	*N*	*N*	*N*	0	*U*	*U*	*U*
	1942	0·069 *E, h*	—	*N*	*N*	*N*	0	*U*	*U*	*U*
	1943	0·081 *E, h*	—	*N*	*N*	*N*	0	*U*	*U*	*U*
	1944	0·072 *E, h*	—	*N*	*N*	*N*	0	*U*	*U*	*U*
	1945	0·050 *E, h*	—	*N*	*N*	*N*	0	*U*	*U*	*U*
	1946	0·060 *E, h*	—	*N*	*N*	*N*	0	*U*	*U*	*U*
Roumania	1936	0·221	0·206	*N*	*N*	*N*	*N*	*U*	*U*	0·221
	1937	0·262	*U*	*U*	*U*	0	0	*U*	*U*	*U*
Sweden	1936	*U*	*U*	*U*	*U*	0·018 *i*	0·005 *j*	*U*	*U, k*	*U*
	1937	*U*	*U*	*U*	*U*	0·037 *i*	0·007 *j*	*U*	*U, k*	*U*
	1938	*U*	*U*	*U*	*U*	0·035 *i*	0·005 *j*	*U*	*U, k*	*U*
	1939	*U*	*U*	*U*	*U*	0·036 *i*	0·005 *j*	*U*	*U, k*	*U*
	1940	*U*	*U*	*U*	*U*	0·035 *i*	0 *j*	*U*	*U, k*	*U*
	1941	*U*	*U*	*U*	*U*	0·094 *i*	0·001 *j*	*U*	*U, k*	*U*
	1942	*U*	*U*	*U*	*U*	0·095 *i*	0 *j*	*U*	*U, k*	*U*
	1943	*U*	*U*	*U*	*U*	0·097 *i*	0 *j*	*U*	*U, k*	*U*
	1944	*U*	*U*	*U*	*U*	0·044 *i*	0·001 *j*	*U*	*U, k*	*U*
	1945	*U*	*U*	*U*	*U*	0·001 *i*	0 *j*	*U*	*U, k*	*U*
	1946	*U*	*U*	*U*	*U*	*D*	*D*	*U*	*U*	*U*
Switzerland	1936	0	—	*N*	*N*	0·48	0	*U*	*U*	0·48
	1937	0	—	*N*	*N*	0·44	0	*U*	*U*	0·44
	1938	0	—	*N*	*N*	0·53	0	*U*	*U*	0·53
	1939	0	—	*N*	*N*	0·63	0	*U*	*U*	0·63
	1940	0	—	*N*	*N*	0·33	0	*U*	*U*	0·33
	1941	0	—	*N*	*N*	0·34	0	*U*	*U*	0·34
	1942	0	—	*N*	*N*	0·29	0	*U*	*U*	0·29
	1943	0	—	*N*	*N*	0·34	0	*U*	*U*	0·34
	1944	0	—	*N*	*N*	0·20	0	*U*	*U*	0·20
	1945	0	—	*N*	*N*	0·01	0	*U*	*U*	0·01
	1946	0	—	*N*	*N*	0·13	0	*U*	*U*	0·13
United Kingdom	1936	0·73	0·68	*U*	*U*	*N*	0·52	*U*	*U*	0·21
	1937	0·83	0·78	*U*	*U*	*N*	0·69	*U*	*U*	0·14
	1938	0·51	0·48	*U*	*U*	*N*	0·34	*U*	*U*	0·17
	1939	0·81	0·76	*U*	*U*	*N*	0·60	*U*	*U*	0·21
	1940	*U*	*U*	*U*	*U*	*N*	0·42	*U*	*U*	*U*
	1941	*U*	*U*	*U*	*U*	*N*	0·07	*U*	*U*	*U*
	1942	*U*	*U*	*U*	*U*	0	0·07	*U*	*U*	*U*
	1943	0·75	0·68	*U*	*U*	*N*	0·12	*U*	*U*	0·63

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TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS
(in millions of metric tons)

Name of country and year	Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
	Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0	1	2	3	4	5	6	7	8	9
EUROPE—*Continued*									
United Kingdom—*Continued* 1944	0·88	0·82	*U*	*U*	0	0·02	*U*	*U*	0·86
1945	1·00	0·94	*U*	*U*	*N*	0·02	*U*	*U*	0·98
1946	1·57	1·45	*U*	*U*	*N*	0·02	*U*	*U*	1·55
NORTH AMERICA—									
Newfoundland 1938	0	0	0	0	*N*	0	*N*	*N*	*N*
United States of America *J* 1936	1·081 *l*	0·912 *m*	*U, n*	*U, n*	0·018	0·029	*U, o*	*U, n*	1·070
1937	1·036 *l*	0·872 *m*	*U, n*	*U, n*	0·006	0·023	*U, o*	*U, n*	1·019
1938	0·936 *l*	*U*	*U, n*	*U, n*	0·013	0·015	*U, o*	*U, n*	0·934
1939	1·005 *l*	0·818 *m*	*U, n*	*U, n*	0·001	0·011	*U, o*	*U, n*	0·995
1940	1·211 *l*	1·007 *m*	*U, n*	*U, n*	*N*	0·021	*U, o*	*U, n*	1·190
1941	1·423 *l*	1·154 *m*	*U, n*	*U, n*	*N*	0·037	*U, o*	*U, n*	1·386
1942	1·816 *l*	1·517 *m*	*U, n*	*U, n*	*N*	0·094	*U, o*	*U, n*	1·722
1943	2·159 *l*	1·947 *m*	*U, n*	*U, n*	*N*	0·159	*U, o*	*U, n*	2·000
1944	2·596 *l*	2·137 *m*	*U, n*	*U, n*	0·001	0·148	*U, o*	*U, n*	2·449
1945	2·695 *l*	2·375 *m*	*U, n*	*U, n*	0·001	0·158	*U, o*	*U, n*	2·538
CENTRAL & SOUTH AMERICA—									
Argentina 1936–1938	*U*	*U*	*U*	*U*	0	0	*U*	*U*	*U*
1939	0	—	0	0	0	0	0	0	0
1940	0	—	0	0	0	0	0	0	0
1941	*N*	—	—	—	—	—	—	—	—
1942	*N*	*N*	*N*	*N*	0	0	*N*	*N*	*N*
Curaçao 1937	*U*	*U*	*U*	*U*	0	0	*U*	*U*	*U*
Surinam 1937	*U*	*U*	*U*	*U*	0	0	*U*	*U*	*U*
AFRICA—									
Algeria 1936	0·061	*U*	*U*	*U*	0·122	0·005	*U*	*U*	0·178
1937	0·069	*U*	*U*	*U*	0·098	0·009	*U*	*U*	0·158
1938	0·090	*U*	*U*	*U*	0·086	0·001	*U*	*U*	0·175
1939	0·103	*U*	*U*	*U*	0·078	0·005	*U*	*U*	0·177
1940	0·095	*U*	*U*	*U*	0·045	0·013	*U*	*U*	0·127
1941	0·049	*U*	*U*	*U*	0·005	0·003	*U*	*U*	0·051
1942	0·049	*U*	*U*	*U*	0·004	0·005	*U*	*U*	0·048
1943	0·051	*U*	*U*	*U*	0·057	0·001	*U*	*U*	0·107
1944	0·088	*U*	*U*	*U*	0·055	*N*	*U*	*U*	0·143
1945	0·102	*U*	*U*	*U*	0·010	*N*	*U*	*U*	0·111
Nigeria 1936–1938	0	0	0	0	0	0	0	0	0

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(in millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—*Continued*										
Southern Rhodesia	1936, 1937	0	0	0	0	0	0	0	0	0
	1938	0	0	0	0	*N*	0	*U*	*U*	*N*
ASIA—										
British North Borneo	1936–1938	0	0	0	0	0	0	0	0	0
Cyprus	1937, 1938	0·001 *p*	0·001	*U*	*U*	0	0	*U*	*U*	*U*
India *I*	1936	0·932	1·296	0·013	0·012	*D*	*D*	*D*	*D*	*D*
	1937	0·850	1·157	0·012	0·014	*D*	*D*	*D*	*D*	*D*
	1938	0·914	1·295	0·014	0·020	*D*	*D*	*D*	*D*	*D*
	1939	0·909	1·291	0·020	0·020	*D*	*D*	*D*	*D*	*D*
	1940	0·981	1·389	0·020	0·018	*D*	*D*	*D*	*D*	*D*
	1941	0·953	1·336	0·018	0·023	*D*	*D*	*D*	*D*	*D*
	1942	0·512	0·824	0·023	—	*D*	*D*	*D*	*D*	*D*
	1943	0·423	0·699	—	—	*D*	*D*	*D*	*D*	*D*
	1944	0·499	0·748	—	—	*D*	*D*	*D*	*D*	*D*
	1945	0·675	1·003	—	0·060	*D*	*D*	*D*	*D*	*D*
	1946	0·704	1·056	0·060	0·063	*D*	*D*	*D*	*D*	*D*
Palestine	1937	0	0	*U*	*U*	0·004	0	*U*	*U*	*U*
	1938	0	0	*U*	*U*	0·005	0	*U*	*U*	*U*
Turkey	1946	*N*	—	0	0	0	0	*N*	*N*	*N*
AUSTRALASIA—										
Australia	*Y* 1936	0·363 *q*	0·951	*U*	*U*	0	0	0·120	0·243	0·363
	Y 1937	0·371 *q*	0·955	*U*	*U*	0	0	0·116	0·255	0·371
	Y 1938	0·423 *q*	1·086	*U*	*U*	0	0	0·126	0·297	0·423
	Y 1939	0·406 *q*	1·048	*U*	*U*	0	0	0·109	0·297	0·406
	Y 1940	0·435 *q*	1·104	*U*	*U*	0	0	0·088	0·347	0·435
	Y 1941	0·441 *q*	1·128	*U*	*U*	0	0	0·048	0·393	0·441
	Y 1942	0·420 *q*	1·088	*U*	*U*	0	0	0·005	0·415	0·420
	Y 1943	0·422 *q*	1·107	*U*	*U*	0	0	*N*	0·422	0·422
	Y 1944	0·423 *q*	1·093	*U*	*U*	0	0	*N*	0·423	0·433
	Y 1945	0·438 *q*	1·166	*U*	*U*	0	0	0·002	0·436	0·438
New Zealand	1936–1946	*N, C*	*N, C*	*N, C*	*N, C*	0	0	*U*	*U*	*N, C*

STATISTICAL YEAR-BOOK

OF THE

WORLD POWER CONFERENCE

No. 4

Data on Resources and Annual Statistics for 1936-1946

EDITED, WITH INTRODUCTORY AND EXPLANATORY TEXTS

by

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II. SOLID FUELS—A. COALS, BROWN COAL, LIGNITE, PEAT, COKE, AND OTHER MANUFACTURED FUEL

SCOPE OF THE STATISTICS

In Table 2 are presented some revisions of the estimates of resources which were published in *Statistical Year-book of the World Power Conference*, No. 4. These revisions, based on new data, or on revised definitions, or on allowances for extraction since the dates of the earlier estimates, make little difference to the totals presented in Table A on page 21 of *Year-book* No. 4. Consequently, Table A is omitted from the present number of the *Year-book*.

Statistics of production of coals, presented in this number of the *Year-book*, cover a considerably larger number of countries than those published in the previous number. This is due in part to the reproduction of a substantial number of statistics extracted from the *Statistical Year-book* of the United Nations. The statistics of brown coal and lignite and of coke are also, on balance, more comprehensive. The continental and world totals, with comparisons between different years, which are presented in Table B and in the text of this section, are based on series of comparable statistics; and while these totals do not cover all the countries of the world, they include the most important producing countries of Africa, North America, Western Europe, Oceania, and some others.

CONTINENTAL AND WORLD TOTALS

Production of COALS in continental areas and in total, in so far as it is covered by available and comparable statistics, is summarised in Table B, where also are shown percentage changes since the immediate pre-war quinquennium and from 1946. The figures are not wholly in agreement with those presented in Table B of *Statistical Year-book of the World Power Conference*, No. 4, being based on a somewhat different, and on balance more comprehensive, list of countries. Production in the U.S.S.R. and China is not included, suitable data not being available; or production in Germany, for which post-war statistics include only the American-British Bizone; or production in Poland, where comparability is destroyed by important territorial changes. In Table B in this number of this *Year-book* are shown, in addition, statistics of total coal production as presented in the United Nations *Statistical Year-book*. The latter figures exclude the Soviet zone of Germany in the post-war period, and the U.S.S.R. throughout, and so probably underestimate the increase in total world production since the pre-war period.

It is probably safe to say that, in that part of the world which falls within the economic nexus of the West, coal production increased during the first part of World War II by about one-fifth or one-quarter to a maximum in 1942 and 1943; declined at the end of the war to a level less than 10 per cent. above that of the pre-war quinquennium; and increased again (by from 10 to 15 per cent.) to a level 15 to 20 per cent. above that of the pre-war period.

In the period from 1946 to 1948, coal production increased considerably in all continental areas and in most individual countries. France was an important exception, production in 1948 being 6 per cent. below the level of the pre-war quinquennium and 8 per cent. below that of 1946. In most of the territories where coal production had decreased greatly during or immediately after the war, there was a marked recovery from 1946 to 1948. In most of the countries which, deprived by the war of imported coal, had expanded their domestic production, that production further increased from 1946 to 1948, most rapidly in those countries whose coal resources had been comparatively less fully exploited before. In the U.S.A., coal production in 1947 reached the highest level for many years (622 million metric tons, or 54 per cent. above that of the pre-war quinquennium), but declined slightly in 1948.

TABLE B: PRODUCTION OF COALS

	Millions of metric tons				% of 1934–38 average*			% of 1946*	
	1934–38 av.	1946	1947	1948	1946	1947	1948	1947	1948
Certain countries in:									
Africa	1	3	3	3	*165*	*163*	*175*	*99*	*107*
America, North ..	416	554	636	610	*133*	*153*	*147*	*115*	*110*
America, South ..	3	4	4	4	‡	‡	‡	‡	‡
Asia	73	54	61	68	*74*	*84*	*94*	*115*	*127*
Europe	352	307	322	338	*87*	*91*	*96*	*105*	*110*
Oceania	12	15	16	16	*123*	*131*	*131*	*106*	*106*
Totals ..	857	936	1,042	1,040	*109*	*122*	*121*	*111*	*111*
United Nations Year-book Total† ..	1,094	1,090	1,230	1,250	*99½*	*112½*	*114*	*113*	*115*

* The percentages have been calculated from more exact statistics of quantities than those shown in this table.

† Includes Poland whose area changed considerably between 1934–38 and 1946, and includes the whole of Germany before the war but only the American-British Bizone in 1946–48. U.S.S.R. not included.

‡ The statistics are not sufficiently comprehensive to warrant the presentation of percentage changes.

On the basis of information relating to thirty-three countries, total production of BROWN COAL AND LIGNITE amounted in 1946 to about 219 million metric tons, and in 1947 to about 233 million metric tons—increases of 6 per cent. and 12½ per cent. respectively above the annual average for 1934–38 (207 million metric tons). These total figures are dominated by the statistics for Germany, which produced 79 per cent. of the total in 1934–38; but in that country brown coal and lignite production fell sharply at the end of the war and subsequently recovered less than in some other producing countries, so that in 1947 Germany, with a diminished territory, accounted for only 69 per cent. of the total figure.

Total production of brown coal and lignite had increased continuously at an average rate of nearly 6½ per cent. per annum from a minimum of 163 million metric tons in 1932 to a maximum of almost exactly double that quantity in 1943, after which there had been a sharp but short-lived decline. Between 1946 and 1947 the earlier rate of increase was almost restored, being nearly 6¼ per cent. A comparable total for 1948 cannot be computed, since data for Germany as a whole, and for most of the countries within the Soviet sphere of influence, are not available; the total for 26 other countries shows an increase from 1947 to 1948 of only 0½ per cent. It may be noted that in Czechoslovakia production increased by 14½ per cent. from 1946 to 1947, and by 5½ per cent. from 1947 to 1948; and it may be that world production, though still increasing at a rate of more than 0½ per cent., had, like the production of anthracite and bituminous coals, lost its momentum between 1946 and 1948.

Total production of COKE, based on data relating to twenty countries, was about 129 million metric tons in 1946 and 11 per cent. more (about 143 million metric tons) in 1947. (Production in the French and Soviet zones of Germany, and in the U.S.S.R., is not included.) More than three-quarters of these totals were produced in the U.S.A., the U.K., and the American-British Bizone of Germany; but while production increased by 25 per cent. in the U.S.A., it was barely stationary in the U.K., and declined sharply in the Bizone. Data for 1948 cover fewer countries, and it can only be said that the rate of increase in the U.S.A. was much reduced, while production increased in Canada and several Western European countries, including the U.K.

Such statistics of MANUFACTURED FUEL (other than coke) as are available suggest that total production in 1946 was something like 10 per cent. below the level of 1936, and that in 1947 and 1948 about one-half of this decline had been reversed. Production in the principal producing country, France, remained much below the pre-war level, while the production of the moderately large producers, the U.K. and the U.S.A., was increasing until 1947 anddeclined somewhat in 1948.

TABLES 2, 3, 4, 5, AND 6—DEFINITIONS

The following definitions (including the introductory paragraph), adopted by the World Power Conference, were distributed with the forms for the guidance of the organizations which supplied the statistics:

On account of the varying characteristics of coal in the several countries, of the different bases of classification employed, and of the fact that international study of coal classification is already in progress, it has been deemed inadvisable to attempt to segregate the higher ranking coals —anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from lignite and brown coal or which separate the latter from peat. It will, therefore, be the responsibility of each reporting country when submitting its statistics of solid fuels to determine for itself the basis of classification to be used in distinguishing the three groups to be reported: *viz.* coals, brown coal and lignite, and peat.

13 *Proved Reserves—Coals, Lignite and Brown Coal*

"Proved reserves" of coals, of lignite and of brown coal shall mean the total amounts thereof, occurring within the limits hereinafter prescribed, as are of economic value and with respect to which there exist reliable data of actual thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

(*a*) Coals: Seams containing not less than 30 centimetres of merchantable coal and situated not more than 1200 metres below the surface, including workable submarine seams.

(*b*) Lignite and Brown Coal: Seams containing not less than 30 centimetres of merchantable lignite or brown coal and situated not more than 500 metres below the surface.

14 *Probable Reserves—Coals, Lignite and Brown Coal*

"Probable reserves" of coals, of lignite and of brown coal shall mean the aggregate within the reporting country of proved reserves thereof plus such further reserves of economic value within the limits of thickness and depth of seams specified in paragraph 13 hereof, as may, from uncompleted investigations or from relation to proved reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

15 *Peat*

A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent. of organic matter.

16 *Probable Reserves of Peat*

"Probable reserves of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent. moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

17 *Domestic Production—Coals, Lignite and Brown Coal*

"Domestic production" of coals, of lignite and of brown coal shall mean the gross amounts thereof raised to the pit-head, less the amounts of dirt or other waste removed in washeries or cleaning plants, plus any increase in weight between the pit-head and weighing-point due to absorption of water in washeries, but without deduction for other losses beyond point of weighing or for amounts used in operation of mines or collieries.

18 *Coal Stocks*

"Coal stocks" shall include the following:

(*a*) "Mine stocks", or the amounts held or stored at the producing properties, whether in dumps at pit-heads, in cars at colliery sidings, or otherwise, and whether billed to purchasers or not.

(*b*) "Stocks in transit", or amounts held or stored in railway classification yards or at points of trans-shipment from rail to water or water to rail while in process of domestic transit from producers to consumers.

(*c*) "Dealers' and consumers' stocks", or the amounts held in storage by coal dealers and by large industrial users, such as by-product coke ovens, railways, electric-power utilities, steel and rolling mills, etc. This item will, in general, include the stocks of only those dealers and consumers to whom, except in case of transhipment, delivery is made directly from mine or water terminal in car-load lots or in boats or barges.

(*d*) "Import stocks", or amounts of foreign coal held in storage at ports of entry pending shipment in domestic trade.

(*e*) "Export stocks", or amounts in storage at export points pending actual export.

(*f*) "Bunker stocks", or amounts held in storage at ports for fuelling vessels engaged in either foreign or domestic trade.

Statistics of stocks shall be reported in totals and may also be reported by the several classes above defined; but each reporting country in submitting its statistics shall state which of the preceding classes, if any, have been omitted from the total which it reports.

19 *Lignite and Brown Coal Stocks*

In so far as there regularly are within any reporting country stocks of lignite or of brown coal in significant quantities within the several classes as specified for coal in paragraph 18 hereof, data for such classes shall be considered necessary for a complete report on stocks. Each reporting country in which complete data are not available, or are not reported, shall state what classes have been included in making up its report.

20 *Statistics of Products*

Where coal, brown coal or lignite are imported, exported, shipped as bunker fuel, or carried in stock in the form of coke or briquettes or other manufactured product, such statistics shall be separately reported in Tables 5 and 6. Petroleum coke shall not be reported in Table 5, but shall be reported in Table 10, Column 7.

TABLE 2

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES
(In millions of metric tons)

Name of country	Coals				Brown coal and lignite				Peat	
	Proved reserves		Probable total reserves		Proved reserves		Probable total reserves		Probable total reserves	
	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity
0	1	2	3	4	5	6	7	8	9	10
AFRICA—										
Union of South Africa	1948	21,534	1948	68,014	—	0	—	0	—	0
NON-SELF-GOVERNING TERRITORIES—										
BRITISH—										
Nigeria	1937	113	1937	300 *A*	1937	13	1937	200 *A*	1937	0
Tanganyika	1934	800	1934	*U*	1934	*U*	1934	*U*	1934	*U*
AMERICA, NORTH—										
Canada	1946	43,806	1946	65,053	1946	12,554	1946	24,592	*U*	*U*
United States of America *h*	*U*	*U*	1949	1,958,000 *n*	*U*	*U*	1949	852,000 *n*	1949	12,542 *i*
Alaska	*U*	*U*	1949	87,300 *j*	*U*	*U*	—	*j*	*U*, *k*	*U*, *k*
ASIA—										
Ceylon	—	0	—	0	—	0	—	0	—	0
NON-SELF-GOVERNING TERRITORY—										
BRITISH—										
Federation of Malaya	1938	0	1938	0	1938	17	1938	67	1938	0
EUROPE—										
Austria	1947	4	1947	8	1947	90	1947	152	—	*U*
Finland	—	0	—	0	—	0	—	0	1949	600 *E*, *a*
France	1947	2,891	1947	11,224	1947	50	1947	125	1944	46
Greece	—	0	—	0	1948	350	1948	2,000	—	0
Norway	—	*U*	1939	1,500	—	0	—	0	—	*U*

TABLE 3

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
AFRICA—								
Southern Rhodesia	1946	*1·613*	—	—	—	—	—	—
	1947	*1·508*	—	—	—	—	—	—
	P 1948	*1·696*	—	—	—	—	—	—
Union of South Africa	1946	22·51	*U*	*U*	0·07	3·20	0·72	18·66
	1947	22·33	*U*	*U*	*D*	*D*	*D*	*D*
NON-SELF-GOVERNING TERRITORIES—								
BELGIAN—								
Belgian Congo	1946	*0·102*	—	—	—	—	—	—
	1947	*0·102*	—	—	—	—	—	—
	P 1948	*0·117*	—	—	—	—	—	—
BRITISH—								
Nigeria	1946	0·617 *k, R*	0	0	0·002	0·180	0·011	0·428
	1947	0·589 *k*	0	0	*N*	0·138	0·021	0·430
	1948	0·618 *k*	0	0	0·001	0·099	0·029	0·491
FRENCH—								
Algeria	1946	0·215	—	0·015	0·604	0·16	*D*	—
	1947	0·206	0·015	0·026	0·519	*D*	*D*	—
	1948	0·226	0·028	0·038	0·416	*D*	*D*	0·683
French Equatorial Africa	1946	—	—	—	0·008	—	—	—
	1947	—	—	—	0·011	—	—	—
	1948	—	—	—	0·025	—	—	—
Morocco	1946	0·222	*0·014*	0·026	0·155	0·089	—	—
	1947	0·268	0·026	0·025	0·212	0·122	—	—
	1948	0·290	0·025	0·034	0·182	0·137	—	—
Tunisia	1946	—	—	—	0·268	—	—	—
	1947	—	—	—	0·286	—	—	—
	1948	—	—	—	0·231	—	—	—
PORTUGUESE—								
Mozambique	1946	*0·016*	—	—	—	—	—	—
	1947	*0·016*	—	—	—	—	—	—
AMERICA, NORTH—								
Canada *a*	1945	13·58	*U*	7·32	22·74	0·75	*U*	*U*
	1946	14·78	7·32	7·78	24·33	0·77	*U*	*U*
	1947	12·97	7·78	8·72	27·73	0·64	*U*	*U*
	1948	15·30	8·72	10·09	28·17	1·15	*U*	*U*
Mexico	1946	*0·983*	—	—	—	—	—	—
	1947	*1·040*	—	—	—	—	—	—
	P 1948	*1·059*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5) +6)
0	1	2	3	4	5	6	7
NORTH AMERICA—*Continued*							
United States of America *p* 1945	572·115 *q*	59·810 *s*	48·048 *s*	0·412	28·701	1·619	553·969
1946	537·831 *q*	48·047 *s*	50·063 *s*	0·396	43·269	1·252	491·690
1947	622·302 *q*	50·063 *s*	55·457 *s, r*	0·271	70·014	1·533	545·632
P 1948	594·080 *q*	55·457 *s, r*	73·106 *s, r*	0·264	47·720	0·960	528·015
AMERICA, SOUTH—							
Brazil 1946	*1·897 k*	—	—	—	—	—	—
1947	*1·999 k*	—	—	—	—	—	—
P 1948	*2·015 k*	—	—	—	—	—	—
Chile 1946	*1·966*	*0·124*	*0·045*	—	—	—	—
1947	*2·079*	*0·045*	*0·025*	—	—	—	—
P 1948	*2·234*	*0·025*	*0·116*	—	—	—	—
Colombia 1946	*0·551 n*	—	—	—	—	—	—
1947	*0·505 n*	—	—	—	—	—	—
Peru 1946	*0·230*	—	—	—	—	—	—
1947	*0·215*	—	—	—	—	—	—
Venezuela 1946	*0·004*	—	—	—	—	—	—
ASIA—							
Ceylon 1946	0	*U*	*U*	0·348	0	0·140	*U*
1947	0	*U*	*U*	0·325	0	0·099	*U*
1948	0	*U*	*U*	0·353	0	0·177	*U*
China *u* 1946	*18·408*	—	—	—	—	—	—
1947	*19·487*	—	—	—	—	—	—
India *v* 1946	*30·187 v*	—	—	—	—	—	—
1947	*30·556 v*	—	—	—	—	—	—
P 1948	*30·301 v*	—	—	—	—	—	—
Indonesia 1946	*0·157*	—	—	—	—	—	—
1947	*0·299*	—	—	—	—	—	—
P 1948	*0·538*	—	—	—	—	—	—
Japan 1946	*20·368*	—	*0·850 m*	—	—	—	—
1947	*27·237*	*0·850 l*	*1·001 m*	—	—	—	—
P 1948	*33·725*	*1·001 l*	*1·768 m*	—	—	—	—
Korea, South 1946	*0·250*	—	—	—	—	—	—
1947	*0·433*	—	—	—	—	—	—
P 1948	*0·799*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Pakistan	1947	0·364	*U*	0·027	*U*	0·004	0·033	*U*
	1948	0·245	0·027	0·018	1·816	0·006	0·078	1·986
	1949	0·337	0·018	0·027	1·926	0·007	0·064	2·184
Philippines	1947	*0·045*	—	—	—	—	—	—
Turkey	*R* 1946	2·441	0·143	0·080	0	0·182	0·017	2·305
	1947	2·504	0·080	0·049	0	0·078	0·015	2·442
	1948	2·573	0·049	0·085	0	*N*	0·007	2·530
NON-SELF-GOVERNING TERRITORIES—								
BRITISH—								
Hong Kong	1948	—	*0·083 x*	*0·080 x*	—	—	—	—
Malaya	1946	0·228	0	0	0·058	0·002	*U*	0·284
	1947	0·230	0	0	0·214	0·002	0·122	0·320
	1948	0·381	0	0	0·128	*N*	0·073	0·436
FRENCH—								
Indo-China	1946	0·262	—	—	—	—	—	—
	1947	0·247	—	*0·054 h*	—	0·039	—	—
	1948	0·359	*0·054 h*	*0·057 h*	—	0·069	—	—
EUROPE—								
Austria	1946	0·108	0	0	0·46	0	0	1·57
	1947	0·178	0	0	2·35	0	0	2·53
	1948	0·180	0	0	3·97	0	0	4·15
Belgium-Luxembourg	1946	22·9 *R*	0·3 *h*	0·3 *h*	2·9 *R*	0·2	0·1 *c*	25·5 *R*
	1947	24·4	0·3 *h*	0·4 *h*	5·8	1·0	0·2 *c*	28·9
	P 1948	26·7	0·4 *h*	0·8 *h*	3·1	0·6	0·2 *c*	28·6
Bulgaria	1946	*0·093*	—	—	—	—	—	—
	P 1947	*0·120*	—	—	—	—	—	—
Czechoslovakia	1946	*14·130*	*0·524 h*	*0·290 h*	—	—	—	—
	1947	*16·216*	*0·290 h*	*0·336 h*	—	—	—	—
	P 1948	*17·746*	*0·336 h*	*0·311 h*	—	—	—	—
Denmark	1945	0	0	0	1·118	0	0	0
	1946	0	0	0	2·563	0	0	0
	1947	0	0	0	3·430	0	0	0
	1948	0	0	0	2·728	0	0	0
Eire	1946	0·215	*0·035*	*0·024*	1·298	0	0·003	1·521
	1947	0·221	*0·024*	*0·498*	1·528	0	0·004	1·271
	1948	0·178 *P*	*0·498 P*	*0·451*	1·723	0	0·010	1·938

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Finland	1946	0	*U*	*U*	0·688	0	*U*	*U*
	1947	0	*U*	*U*	1·299	0	*U*	*U*
	1948	0	*U*	*U*	2·000	0	*U*	*U*
France	1946	47·15	0·65 *e*	0·77 *e*	8·64	0·27	*f*	55·40 *g*
	1947	45·22	0·77 *e*	0·74 *e*	14·23	0·30	*f*	59·18 *g*
	1948	43·29 *P*	0·74 *e*	0·77 *e*	15·14 *b*	0·27	*f*	58·13 *g*
Germany *bb*	1946	*55·260 cc*	—	*0·102 h*	—	—	—	—
	1947	*74·534 cc*	*0·102 h*	*0·942 h*	—	—	—	—
	1948	*88·594 cc*	*0·942 h*	*0·212 h*	—	—	—	—
Greece	1946	0	*U*	*U*	0·306	0	0	0·306
	1947	0	*U*	*U*	0·227	0	0	0·227
	1948	0	*U*	*U*	0·292	0	0	0·292
Hungary	1946	*0·722*	—	—	—	—	—	—
	1947	*1·060*	—	—	—	—	—	—
	1948	*1·250 E*	—	—	—	—	—	—
Iceland	1946	0	0·037	0·031	0·095	0	*U*	*U*
	1947	0	0·031	*U*	0·167	0	*U*	*U*
	1948	0	*U*	*U*	0·128	0	*U*	*U*
Italy	1946	*1·178*	—	—	—	—	—	—
	1947	*1·358*	—	—	—	—	—	—
	P 1948	*0·974*	—	—	—	—	—	—
Netherlands	1936	12·803	*U*	*U*	5·381 *R*	3·164 *R*	0·885 *o*, *R*	14·135 *j*, *R*
	1937	14·321	*U*	*0·41 h*	6·054 *R*	3·963 *R*	0·943 *o*, *R*	15·469 *j*, *R*
	1938	13·488	*0·41 h*	*0·50 h*	5·613 *R*	3·417 *R*	0·934 *o*, R	14·750 *j*, *R*
	1939	12·861	*0·50 h*	*0·15 h*	6·432 *R*	2·738 *R*	0·763 *o*, *R*	15·792 *j*, *R*
	1940	12·145	*0·15 h*	*0·17 h*	2·437 *R*	1·266 *R*	0·257 *o*, *R*	13·059 *j*, *R*
	1941	13·356	*0·17 h*	*0·08 h*	1·464 *R*	1·373 *R*	0·037 *o*, *R*	13·410 *j*, *R*
	1942	12·330	*0·08 h*	*0·12 h*	1·090 *R*	0·812 *R*	0·035 *o*, *R*	12·573 *j*, *R*
	1943	12·497	*0·12 h*	*0·23 h*	1·111 *R*	0·584 *R*	0·037 *o*, *R*	12·987 *j*, *R*
	1944	8·313	*0·23 h*	*0·30 h*	*U*	*U*	*U*	*U*
	1945	5·080	*0·30 h*	0·11 *h*	*U*	*U*	*U*	*U*
	1946	8·314	0·11 *h*	0·10 *h*	2·836	*N*	0·076	11·074 *j*, *R*
	1947	10·104	0·10 *h*	0·10 *h*	3·661	*N*	0·134	13·632 *j*, *R*
	1948	11·032	0·10 *h*	0·15 *h*	3·486	0·036	0·124	14·357 *j*, *R*
Norway	1946	0·096 *d*	0·391	0·227 *R*	1·455 *t*	*N*	*U*	*U*
	1947	0·336 *d*	0·227	0·555	1·802 *t*	*N*	*U*	*U*
	1948	0·437 *d*	0·555	0·460	1·110 *t*	*N*	*U*	*U*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5) +6)
0	1	2	3	4	5	6	7
EUROPE—*Continued*							
Poland 1946	*47·3*	*1·782 h*	*0·956 h*	—	—	—	—
1947	*59·13*	*0·956 h*	*0·925 h*	—	—	—	—
P 1948	*70·262*	*0·925 h*	*0·779 h*	—	—	—	—
Portugal 1946	0·379	0·116	0·171	0·585	0	*N*	0·908
1947	0·370	0·189	0·305	0·949	0	*N*	1·203
1948	0·386	0·305	0·211	0·766	0	*N*	1·246
Roumania 1946	*0·167*	—	—	—	—	—	—
1947	*0·163*	—	—	—	—	—	—
Saar 1946	*7·885*	—	—	—	—	—	—
1947	*10·484*	—	—	—	—	—	—
P 1948	*12·488*	—	—	—	—	—	—
Spain 1946	*10·759*	—	—	—	—	—	—
1947	*10·606*	—	—	—	—	—	—
P 1948	*10·409*	—	—	—	—	—	—
Sweden 1946	0·488	1·24	1·68	2·443	0	*U*	*U*
1947	0·416	*C*	*C*	4·160	*N*	*U*	*U*
1948	0·374	*C*	*C*	5·142	*N*	*U*	*U*
Switzerland 1946	0·01	*N*	*N*	1·1	0	0	1·1
1947	0	*N*	*N*	1·9	0	0	1·9
1948	0	*N*	*N*	1·8	0	0	1·8
United Kingdom *aa* 1946	193·13	15·50	10·18	0·01	4·53	4·80	189·13
1947	200·63	10·18	18·01	0·71	1·07	4·47	187·97
1948	212·68	18·01	17·14	0·08	10·67	5·52	197·44
OCEANIA—							
Australia 1946	14·110	*U*	*U*	0·001	0·077	0·233	13·801
1947	15·075	*U*	0·037	0·001	0·045	0·361	14·670
1948	15·059	0·037	0·037	0·004	0·068	0·288	14·707
New Zealand *X* 1945	0·974	*U*	*U*	0·028	0	0·029	0·973
X 1946	0·951	*U*	*U*	0·095	0	0·028	1·018
X 1947	0·968	*U*	*U*	0·055	0	0·019	1·004

TABLE 4

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite						Peat
		Production	Stocks		Imports	Exports	Total consumption (cols. 1+2+4) – (cols. 3+5)	Production
			At beginning of year	At end of year				
0		1	2	3	4	5	6	7
AFRICA—								
Union of South Africa	1946–1947	0	0	0	0	0	0	0
NON-SELF-GOVERNING TERRITORIES—								
FRENCH—								
Madagascar	1946	0·0004	—	—	—	—	0·0004	—
Tunisia	1946	0·095	*N*	*N*	—	—	0·095	—
	1947	0·075	*N*	*N*	—	—	0·075	—
	1948	0·069	*N*	*N*	—	—	0·069	—
AMERICA, NORTH—								
Canada	1945	1·391	*U*	*N*	*N*	0·01	*U*	*U*
	1946	1·382	*N*	*N*	*N*	0·01	*U*	*N*
	1947	1·425	*N*	*N*	*N*	0·01	*U*	*N*
	1948	1·442	*N*	*N*	*N*	0·01	*U*	*N*
United States of America *JJ*	1945	2·421	*U, N*	*U, N*	0·012	0	2·433	0·097 *g, R, E*
	1946	2·420	*U, N*	*U, N*	0·007	0	2·427	0·128 *g*
	1947	2·607	*U, N*	*U, N*	0·002	0	2·609	0·124 *g*
	1948	2·527	*U, N*	*U, N*	0·001	0	2·528	0·118 *g*
ASIA—								
Japan	1946	*2·357*	—	—	—	—	—	—
	1947	*2·821*	—	—	—	—	—	—
	1948	*2·552*	—	—	—	—	—	—
Turkey	*R* 1946	0·604	0·143	0·136	0	0	0·611	0
	1947	0·676	0·136	0·155	0	0	0·657	0
	1948	0·789	0·155	0·113	0	0	0·831	0
EUROPE—								
Austria	1946	2·4	0	0	0·72	0	3·1	*U*
	1947	2·8	0	0	1·28	0	4·1	*U*
	1948	3·3	0	0	1·59	0	4·9	*U*
Belgium-Luxembourg	1946	0	0	0	0·4 *b*	0	0·4 *b*	0
	1947	0	0	0	0·3 *b*	0	0·3 *b*	0
	1948	0	0	0	0·2 *b*	0	0·2 *b*	0
Czechoslovakia	1946	*19·512*	—	—	—	—	—	—
	1947	*22·362*	—	—	—	—	—	—
	1948	*23·591*	—	—	—	—	—	—
Denmark	1945	2·3	0	0	0·073 *R*	0	—	5·7
	1946	2·3	0	0	0·063	0	—	3·705
	1947	2·8	0	0	0·254	0	—	5·2
	1948	2·3	0	0	0·003	0	—	3·617

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite						Peat
		Production	Stocks		Imports	Exports	Total consumption (cols. 1+2+4) − (cols. 3+5)	Production
			At beginning of year	At end of year				
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Eire	1946	0	0	0	0	0	0	4·825
	1947	0	0	0	0	0	0	4·810
	1948	0	0	0	0	0	0	3·864
Finland	1946	0	0	0	*N*	0	0	0·208
	1947	0	0	0	*N*	0	0	0·206
	1948	0	0	0	*N*	0	0	0·238
	1949	0	0	0	*N*	0	0	0·208
France	1946	2·13	0·13 *e*	0·14 *e*	—	—	2·12	0·08
	1947	2·09	0·14 *e*	0·13 *e*	—	—	2·10	0·06
	1948	1·84 *P*	0·13 *e*	0·07 *e*	—	—	1·90	—
Germany— Bizone *c*	1946	*51·596*	—	—	—	—	—	—
	1947	*58·725*	—	—	—	—	—	—
	P 1948	*64·856*	—	—	—	—	—	—
Four occupation zones	1946	*159·924*	—	—	—	—	—	—
	1947	*160·596*	—	—	—	—	—	—
Greece	1946	0·125	0·002	*U*	0	0	0	0
	1947	*0·133*	—	—	—	—	—	—
Hungary	1946	*5·631*	—	—	—	—	—	—
	1947	*7·749*	—	—	—	—	—	—
	P 1948	*9·253*	—	—	—	—	—	—
Iceland	1946	0	0	0	0	0	0	0·009
	1947	0	0	0	0	0	0	0·003
	1948	0	0	0	0	0	0	*D*
Italy	1946	*1·521*	—	—	—	—	—	—
	1947	*1·851*	—	—	—	—	—	—
	P 1948	*0·901*	—	—	—	—	—	—
Netherlands	1936	0·089	*U*	*U*	*N, R*	0 *R*	0·089 *R*	0·639 *R, j*
	1937	0·143	*U*	*U*	*N, R*	0 *R*	0·143 *R*	0·718 *R, j*
	1938	0·171	*U*	*U*	*N, R*	0 *R*	0·171 *R*	0·760 *R, j*
	1939	0·197	*U*	*U*	*N, R*	0 *R*	0·197 *R*	0·699 *R, j*
	1940	0·199	*U*	*U*	0·001 *R*	0 *R*	0·200 *R*	0·725 *R, j*
	1941	0·199	*U*	*U*	0·002 *R*	0 *R*	0·201 *R*	0·906 *R, j*
	1942	0·281	*U*	*U*	0·001 *R*	0 *R*	0·282 *R*	1·012 *R, j*
	1943	0·383	*U*	*U*	0·001 *R*	0 *R*	0·384 *R*	0·859 *R, j*
	1944	0·228	*U*	*U*	—	0	—	0·670 *R, j*
	1945	0·130	*U*	*U*	*U*	*U*	*U*	0·634 *R, j*
	1946	0·483	*U*	*U*	0	0	0·483	0·628 *j*
	1947	0·474	*U*	*U*	0	0·047	0·427	0·635 *j*
	1948	0·279	*U*	*U*	*N*	0·036	0·243	0·855 *j*

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) − (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Norway	1946	0	*U*	*U*	*U*	*U*	*U*	0·40
	1947	0	*U*	*U*	*U*	*U*	*U*	0·38
	1948	0	*U*	*U*	*U*	*U*	*U*	0·34
Poland	*a* 1946	*1·366 a*	—	—	—	—	—	—
	1947	*4·766*	—	—	—	—	—	—
	P 1948	*5·040*	—	—	—	—	—	—
Portugal	1946	0·120	0·006	0·003	0	0	0·123	0·003
	1947	0·102	0·003	0·007	0	0	0·098	0·002
	1948	0·103	0·007	0·009	0	0	0·101	0·001
Roumania	1946	*1·845*	—	—	—	—	—	—
	1947	*2·105*	—	—	—	—	—	—
Spain	1946	*1·336*	—	—	—	—	—	—
	1947	*1·263*	—	—	—	—	—	—
	P 1948	*1·391*	—	—	—	—	—	—
Sweden	1946	0	*U*	*U*	*N*	*N*	*U*	0·770
	1947	0	*U*	*U*	*N*	*N*	*U*	0·436
	1948	0	*U*	*U*	*N*	*N*	*U*	*D*
Switzerland	1946	0·10	*N*	*N*	0·02	0	0·12	0·10
	1947	*N*	*N*	*N*	0·07	0	0·07	*N*
	1948	*N*	*N*	*N*	*N*	0	*N*	*N*
United Kingdom	1946–1948	*N*	*N*	*N*	0	0	*N*	*U*
Yugoslavia	1946	*6·047*	—	—	—	—	—	—
	1947	*8·229*	—	—	—	—	—	—
OCEANIA—								
Australia	1946	5·801	*U*	*U*	0	0	5·801	0
	1947	6·241	*U*	*U*	0	0	6·241	0
	1948	6·802	*U*	*U*	0	0	6·802	0
New Zealand	*X* 1945	1·865	*U*	*U*	0	0	1·865	*N*
	X 1946	1·845	*U*	*U*	0	0	1·845	*N*
	X 1947	1·852	*U*	*U*	0	0	1·852	*N*

TABLE 5

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)-(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—										
Southern Rhodesia	1946	*0·086 o*	—	—	—	—	—	—	—	—
	1947	*0·064 o*	—	—	—	—	—	—	—	—
Union of South Africa	1946	0·66	1·09	*U*	*U*	*N*	0·05	*U*	*U*	0·61
	1947	0·71	1·16	*U*	*U*	*D*	*D*	*U*	*U*	*D*
NON-SELF-GOVERNING TERRITORIES—										
BRITISH—										
Nigeria	1946	0	0	0	0	*N*	0	*U*	*U*	*N*
	1947	0	0	0	0	0·001	0	*U*	*U*	0·001
	1948	0	0	0	0	0	0	0	0	0
FRENCH—										
Algeria	1946	*0·094 t*	—	—	—	0·004	—	—	—	—
	1947	*0·082 t*	—	—	—	—	—	—	—	—
Tunisia	1946	0·019	—	*U*	*U*	0·007	*U*	—	—	0·025
	1947	0·020	—	*U*	*U*	0·003	*U*	—	—	0·023
	1948	0·019	—	*U*	*U*	0·009	*U*	—	—	0·028
AMERICA, NORTH—										
Canada	1945	3·549	*U*	0·270 *h*	*U*	1·129	0·035	*U*	*U*	*U*
	1946	3·051	*U*	*U*	0·496 *h*	0·825	0·043	*U*	*U*	*U*
	1947	3·188	4·180 *g*	0·496 *h*	0·375 *h*	0·511	0·097	*U*	*U*	*U*
	1948	3·580	5·469 *g*	0·375 *h*	0·382 *h*	0·510	0·152	*U*	*U*	*U*
United States of America *a*	*R* 1945	66·412	88·364 *g*	2·506	1·943	0·047	1·341	6·284 *b*	59·397 *b*	65·681
	1946	57·880	77·109 *g*	1·943	1·581	0·047	1·117	4·838 *b*	52·334 *b*	57·172
	1947	72·540	96·529 *g*	1·581	2·124	0·094	0·758	3·854 *b*	67·479 *b*	71·333
	1948	73·930	98·600 *g*	2·124	2·884	0·146	0·641	3·434 *b*	69·241 *b*	72·675
AMERICA, SOUTH—										
Chile	1946	*0·109 t*	—	—	—	—	—	—	—	—
	1947	*0·109 t*	—	—	—	—	—	—	—	—
ASIA—										
Ceylon	1946	*0·012 t*	—	—	—	—	—	—	—	—
	1947	*0·011 t*	—	—	—	—	—	—	—	—
Japan	1946	*1·363 u*	—	—	—	—	—	—	—	—
	1947	*1·841 u*	—	—	—	—	—	—	—	—
Korea, South	1946	*0·04 o*	—	—	—	—	—	—	—	—
	1947	*0·02 o*	—	—	—	—	—	—	—	—
Pakistan		0	0	*N*	0·008	0·022	0	0	0·014	0·014

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)-(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
ASIA—*Continued*										
Turkey	*R* 1946	0·360	0·507	0·002	0·004	0	0	0·226	0·132	0·358
	1947	0·375	0·531	0·004	0·001	0	0	0·207	0·171	0·378
	1948	0·394	0·553	0·001	0·003	0	0	0·223	0·169	0·392
NON-SELF-GOVERNING TERRITORY—										
BRITISH—										
Singapore	1946	*U*	*U*	*U*	*U*	*N*	0·002	*U*	*U*	*U*
	1947	*U*	*U*	*U*	*U*	0·002	*N*	*U*	*U*	*U*
	1948	*U*	*U*	*U*	*U*	0·007	*N*	*U*	*U*	*U*
EUROPE—										
Austria	1946	0·44	*U*	*U*	*U*	0·16	0	*U*	*U*	0·60 *e*
	1947	0·63	0·78	*U*	*U*	0·19	0	*U*	*U*	*U*
	1948	1·15	—	*U*	*U*	0·30	0	*U*	*U*	*U*
Belgium–Luxembourg	1946	3·9	5·1	*N, h*	*N, h*	1·2	0·5	0·3	4·3	4·6
	1947	4·7	6·3	*N, h*	*N, h*	1·4	0·7	0·2	5·2	5·4
	P 1948	5·6	7·5	*N, h*	0·2 *h*	2·5	0·7	0·2	7·0	7·2
Czechoslovakia	1946	*2·627 c, u*	—	—	—	—	—	—	—	—
	1947	*3·757 c, u*	—	—	—	—	—	—	—	—
Denmark	1945	0·342 *i*	—	—	—	0·309	—	—	—	—
	1946	0·489 *j*	—	—	—	1·210	—	—	—	—
	1947	0·514 *k*	—	—	—	0·677	—	—	—	—
	1948	—	—	—	—	0·921	—	—	—	—
Eire	1946	0·081 *p*	*U*	*U*	*U*	0·076	0	*U*	*U*	*U*
	1947	0·047 *p*	*U*	*U*	*U*	0·032	0	*U*	*U*	*U*
	1948	*D*	*D*	*D*	*D*	0·024	0·001	*U*	*U*	*U*
Finland	1946	0·056	0·064	0·010	0·022	0·241	0	—	—	—
	1947	0·057	0·069	0·022	0·023	0·199	0	—	—	—
	1948	0·064	0·079	0·023	—	0·413	0	—	—	—
France *d*	1946	6·28	8·16	0·03 *f*	0·04 *f*	1·12	0·05	0·84 *n*	6·50	7·34
	1947	7·16	9·31	0·04 *f*	0·08 *f*	1·95	0·05	0·71 *n*	8·31	9·02
	1948	7·52 *P*	9·78 *P*	0·08 *f*	0·04 *f*	4·27 *m*	0·08	1·16 *n*	10·59	11·75
Germany (Bizone)	1946	*19·041 o*	—	—	—	—	—	—	—	—
	1947	*13·238 o*	—	—	—	—	—	—	—	—
Gibraltar	1946	0·001	0·002	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1947	0·001	0·002	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1948	0·002	0·002	*U*	*U*	*U*	*U*	*U*	*U*	*U*
Greece	1946	0·22	*U*	*U*	*U*	0·004	0	*U*	*U*	*U*
	1947	0·028	*U*	*U*	*U*	0·009	0	*U*	*U*	*U*
	1948	0·028	*U*	*U*	*U*	0·01	0	*U*	*U*	*U*

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Hungary	1946	—	—	—	—	0·23	—	—	—	—
Iceland	1946	0·002	0·002	*N*	*N*	*N*	0	0·001	0·001	0·002
	1947	0·002	0·002	*N*	*N*	*N*	0	0·001	0·001	0·002
	1948	0·001	0·001	*N*	*N*	0·001	0	0·001	0·001	0·002
Italy	1946	*0·963 u*	—	—	—	—	—	—	—	—
	1947	*1·746 u*	—	—	—	—	—	—	—	—
Netherlands	1946	2·080	*U*	*U*	*U*	0·009	0·443	*U*	*U*	1·646
	1947	2·632	*U*	*U*	*U*	0·001	0·533	*U*	*U*	2·100
	1948	3·088	*U*	*U*	*U*	*N*	0·896	*U*	*U*	2·192
Norway	1946	0·052	*U*	—	—	—	—	—	—	—
	1947	0·056	*U*	—	—	—	—	—	—	—
	1948	0·060	*U*	—	—	—	—	—	—	—
Poland	1946	3·55	4·46	0·78	0·21	0	1·46	0·29	2·21	2·50
	1947	*4·469 r*	—	—	—	—	—	—	—	—
Portugal	1946	0·018	0·036	0·001	0·008	0·030	0	0·014	0·042	0·056
	1947	0·022	0·053	0·008	0·005	0·015	0	0·017	0·019	0·036
	1948	0·020	0·045	0·005	0·014	0·042	0	0·016	0·046	0·062
Spain	1946	*0·943 u*	—	—	—	—	—	—	—	—
	1947	*0·970 u*	—	—	—	—	—	—	—	—
Sweden	1945	0·433 *R*	—	—	—	0·089	0·010	—	—	—
	1946	0·414 *R*	—	—	—	1·011	0	—	—	—
	1947	0·641	*U*	*C*	*C*	0·904	*N*	*U*	*U*	*U*
	1948	0·696	*U*	*C*	*C*	1·608	*D*	*U*	*U*	*U*
Switzerland	1946	0·05	*U*	*N*	*N*	0·29	0	*U*	*U*	0·34
	1947	0·32	*U*	*N*	*N*	0·40	0	*U*	*U*	0·72
	1948	0·40	*U*	*N*	*N*	0·65	0	*U*	*U*	1·05
United Kingdom *s*	1946	24·47	43·49	2·21	1·96	*N*	0·49	3·82	20·41	24·23
	1947	24·17	43·18	1·96	1·90	*N*	0·03	3·43	20·77	24·20
	1948	26·04 *P*	47·45	1·90	2·56	*N*	0·78	3·34	21·26 *P*	24·60 *P*
OCEANIA—										
Australia	*Y* 1946	2·181	3·037	*U*	*U*	0	0·006	*U*	*U*	2·175
	Y 1947	2·460	3·459	*U*	*U*	0	0·008	*U*	*U*	2·452
	Y 1948	2·771	3·921	*U*	*U*	0·001	0·010	*U*	*U*	2·762
New Zealand	*X* 1946	*0·090 w*	—	—	—	—	—	—	—	—

TABLE 6

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(in millions of metric tons)

Name of country and year	Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0	1	2	3	4	5	6	7	8	9
AMERICA, NORTH—									
Canada 1945–1948	*N*	—	—	—	—	—	—	—	—
United States of America *WW* 1945	2·695 *b*	2·547 *c*	*U, N*	*U, N*	0·001	0·158	*U, e*	*U, N*	2·538 *f*
1946	2·898 *b*	2·736 *c*	*U, N*	*U, N*	0·001	0·148	*U, e*	*U, N*	2·751 *f*
1947	3·043 *b*	2·863 *c*	*U, N*	*U, N*	*N*	0·226	*U, e*	*U, N*	2·817 *f*
1948	2·981 *b*	2·816 *c*	*U, N*	*U, N*	*N*	0·189	*U, e*	*U, N*	2·792 *f*
ASIA—									
India *I* 1946	0·704	1·056	0·060	0·063	—	—	—	—	—
Pakistan 1947	0·002	0·002	*U*	0	0	0	0	0·002	0·002
1948	0·005	0·004	0	0	0	0	0	0·005	0·005
1949	0·009	0·008	0	0	0	0	0	0·009	0·009
Turkey *R* 1946	0·013	—	0·002	*N*	0	0	0	0·015	0·015
1947	0·015	—	*N*	0	0	0	0	0·015	0·015
1948	0·007	—	0	0	0	0	0	0·007	0·007
EUROPE—									
Austria 1948	0	0	*U*	*U*	*U*	*U*	*U*	*U*	*U*
Belgium-Luxembourg 1946	1·1	1·0	*N, g*	*N, g*	0·1	*N*	0·5	0·7	1·2
1947	1·3	1·2	*N, g*	*N, g*	*N*	0·1	0·5	0·7	1·2
P 1948	1·0	0·9	*N, g*	*N, g*	*N*	*N*	0·2	0·8	1·0
Eire 1946	0·086	*U*	*N*	*N*	0	0	0	0·086	0·086
1947	0·067	*U*	*N*	*N*	0	0	0	0·067	0·067
1948	*D*	*U*	*N*	*N*	0	0	0	*D*	*D*
Finland 1946, 1947	0	—	0	0	*N*	0	0	0	0
France 1946	5·16	4·64	0·01 *k*	0·01 *k*	0·64 *h*	0·08	4·15	1·57	5·72
1947	5·01	4·51	0·01 *k*	0·02 *k*	0·22 *i*	0·10	3·86	1·26	5·12
1948	5·92 *P*	5·33 *P*	0·02 *k*	0·01 *k*	0·25 *j*	0·01	4·51	1·66	6·17
Iceland 1946–1948	0	—	0	0	0	0	0	0	0
Netherlands *q* 1945	0·429	*U*	*U*	*U*	*U*	*U*	*U*	*U*	*U*
1946	0·770	*U*	*U*	*U*	0·339	*N*	*U*	*U*	1·109
1947	0·952	*U*	*U*	*U*	0·205	*N*	*U*	*U*	1·157
1948	0·999	*U*	*U*	*U*	0·275	0·005	*U*	*U*	1·269

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(in millions of metric tons)

Name of country and year	Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
	Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0	1	2	3	4	5	6	7	8	9
EUROPE—*Continued*									
Norway 1946–1948	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Poland 1946	0·53	0·48 *m*	*N*	*N*	0	*N*, *n*	0·01	0·51	0·52
Portugal 1946	0·060 *o*, *E*	—	*N*	*N*	*N*	0	*U*	*U*	*U*
Sweden 1946	0·026	*U*	*U*	*U*	0·059	0	*U*	*U*	*U*
1947	0·087	*U*	*U*	*U*	0·646	0	*U*	*U*	*U*
Switzerland 1946	0	—	*N*	*N*	0·13	0	*U*	*U*	0·13
1947	0	—	*N*	*N*	0·14	0	*U*	*U*	0·14
1948	0	—	*N*	*N*	0·16	0	*U*	*U*	0·16
United Kingdom 1946	1·57	1·46	*U*	*U*	*N*	0·02	*U*	*U*	1·55
1947	1·87	1·74	*U*	*U*	*N*	0	*U*	*U*	1·87
1948	1·49	1·42	*U*	*U*	*N*	0·20	*U*	*U*	1·29
OCEANIA—									
Australia *Y* 1946	0·501 *p*	1·303	*U*	*U*	0	0	0	0·501 *p*	0·501 *p*
Y 1947	0·498 *p*	1·325	*U*	*U*	0	0	0	0·498 *p*	0·498 *p*
Y 1948	0·554 *p*	1·512	*U*	*U*	0	0	0	0·554 *p*	0·554 *p*
New Zealand 1946–1948	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*

STATISTICAL YEAR-BOOK

OF THE

WORLD POWER CONFERENCE

No. 5

Annual Statistics for 1946-1948
and Some Additional and Revised Data on Resources

EDITED, WITH INTRODUCTORY AND EXPLANATORY TEXTS

by

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II. SOLID FUELS—A. COALS, BROWN COAL, LIGNITE, PEAT, COKE, AND OTHER MANUFACTURED FUEL

Some revised and additional estimates of *resources* of coals, brown coal and lignite, and peat, are shown in Table 2, and supplement the estimates presented in *Statistical Year-book of the World Power Conference*, Nos. 4 and 5.

The statistics relating to coals, which are shown in Table 3, include, in addition to those reported to the World Power Conference by its National Committees and conforming with the definitions adopted by that organization, other statistics (printed in italics) which do not necessarily conform to those definitions and which have been extracted from publications of the United Nations Statistical Office and Economic Commission for Europe. It is believed that in the statistics of coal production (Table 3, Column 1) no country with important coal production (except the U.S.S.R. and China) has been omitted.

Continental and world totals of coal production in 1948, 1949, and 1950 are shown in Table A1 (below), together with such totals for 1951 as are available.

TABLE A1: PRODUCTION OF COALS

	Millions of metric tons				% of 1948*		
	1948	1949	1950	1951	1949	1950	1951
Principal countries in:							
Africa	25	26	27	*D*	*103*	*108*	*D*
America, North	612	452	525	539 *E*	*74*	*86*	*88 E*
America, South	5	5	5	*D*	*100*	*100*	*D*
Asia †	70	76	77	*D*	*109*	*111*	*D*
Europe †	495	533	547	572	*107½*	*110½*	*115½*
Oceania	16	15	18	*D*	*95*	*110½*	*D*
Total † ..	1,223	1,107	1,199	*D*	*90½*	*98*	*D*

* The percentages have been calculated from more exact statistics than those shown in this table, which have been rounded.
† No statistics for the U.S.S.R. or China are included in this table.
D Data not yet available.
E Estimated, wholly or in part.

Discontinuities in some of the data have prevented the computation of comparable totals for 1946 and 1947, but percentages based on statistics for the more important coal-producing countries, and showing the course of production since 1946 compared with pre-war averages, are presented in Table A2. No adjustments have been made for changes in national boundaries, but the figures, though in one sense not comparable, have a certain significance.

TABLE A2: COAL PRODUCTION IN CERTAIN AREAS, 1946–1951, AS PERCENTAGE OF PRE-WAR PRODUCTION, AND AS PERCENTAGE OF WORLD PRODUCTION

	Production as % of 1934–38 average						Production of area as % of total production†	
	1946	1947	1948	1949	1950	1951	In 1934–38	In 1950
Principal countries in:								
Africa	*168*	*168*	*171*	*182*	*191*	*D*	*1·5*	*2·5*
America, North	*133*	*153*	*147*	*108*	*125*	*D*	*39·5*	*43·4*
America, South	*149*	*154*	*151*	*157*	*154*	*D*	*0·3*	*0·4*
Asia †	*76*	*86*	*96*	*105*	*106*	*D*	*6·9*	*6·4*
Europe †	*77*	*85*	*93*	*100*	*103*	*D*	*50·6*	*45·8*
Oceania	*123*	*131*	*131*	*125*	*145*	*D*	*1·2*	*1·5*
Total† ..	*101*	*114*	*116*	*105*	*113½*	*D*	*100·0*	*100·0*
United States of America ..	*134*	*155*	*148*	*108*	*125*	*129*	*38·2*	*42·0*
India	*123*	*124*	*124*	*131*	*133*	*142*	*2·3*	*2·7*
Japan	*49*	*65*	*81*	*91*	*92*	*103*	*4·0*	*3·2*
France	*102*	*98½*	*94*	*111*	*111*	*115*	*4·4*	*4·3*
Saar	*64*	*86*	*102*	*116*	*123*	*132*	*1·2*	*1·3*
Germany *a*	*36*	*47½*	*58*	*69*	*74*	*79½*	*14·2*	*9·3*
Poland *b*	*146*	*183*	*217*	*229*	*244*	*253*	*3·0*	*6·5*
United Kingdom	*83*	*87*	*93*	*94*	*95*	*98*	*22·0*	*18·4*

† The statistics on which the percentages in this table are based do not include the U.S.S.R. and China.
a Germany in 1934–38; Western Germany in 1946–51.
b As constituted at the various dates.
D Data not yet available.

Continental totals of the *production of brown coal and lignite* are shown in Table A3. Total reported production in 1948 was 258 million metric tons, of which nearly 70 per cent. was in East and West Germany.

TABLE A3: PRODUCTION OF BROWN COAL AND LIGNITE, 1946–1951

	Millions of metric tons					
	1946	1947	1948	1949	1950	1951
Africa	0·1	0·1	0·1	*N*	*N*	*D*
America, North	3·8	4·0	4·2	4·5	5·1	*D*
Asia	3·3	4·0	3·7	3·5	2·7	*D*
"Western Europe"	69·2	79·9	86·2	94·4	98·5	107·1
Oceania	7·6	8·1	8·6	9·3	9·2	9·8
Total	84·0	96·1	102·8	111·7	115·5	*D*
Other Europe *a*	*U*	*U*	155·4	*U*	*U*	*U*
"World" *b*	*U*	*U*	258·2	*U*	*U*	*U*

a Bulgaria, Czechoslovakia, Eastern Germany, Hungary, Poland, and Roumania.
b Excluding the U.S.S.R.
D Data not yet available.
N Less than 0·05 million metric tons.
U Data not available.

Continental totals of the *production of coke* are shown in Table A4.

TABLE A4: PRODUCTION OF COKE, 1946–1950

	Millions of metric tons					% of 1946*			
	1946	1947	1948	1949	1950	1947	1948	1949	1950
Africa	0·8	0·9	1·0	1·0	1·0	*b*	*b*	*b*	*b*
America, North	60·9	75·7	77·4	66·2	74·5	*124*	*127*	*109*	*122*
America, South	0·3	0·4	0·4	0·4	0·5	*b*	*b*	*b*	*b*
Asia *c*	4·1	4·9	6·2	7·3	8·2	*120*	*153*	*180*	*201*
"Western Europe"	62·2	61·3	75·1	82·5	85·4	*99*	*121*	*133*	*137*
Oceania	2·3	2·6	2·9	2·6	2·5	*b*	*b*	*b*	*b*
"Western World"	130·6	145·7	163·0	160·0	172·0	*112*	*125*	*123*	*132*
"Eastern Europe" *a*	*U*	*U*	11·3	14·5	*U*	*U*	*U*	*U*	*U*

* Based on more exact statistics than those shown in this table.
a Czechoslovakia, Eastern Germany, Poland, and Roumania; excluding the U.S.S.R.
b The statistics are not sufficiently exact to justify the computation of percentages.
c Excluding the U.S.S.R.

TABLES 2, 3, 4, 5, AND 6—DEFINITIONS

The following definitions (including the introductory paragraph), adopted by the World Power Conference, were distributed with the forms for the guidance of the organizations which supplied the statistics:

On account of the varying characteristics of coal in the several countries, of the different bases of classification employed, and of the fact that international study of coal classification is already in progress, it has been deemed inadvisable to attempt to segregate the higher ranking coals —anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from lignite and brown coal or which separate the latter from peat. It will, therefore, be the responsibility of each reporting country when submitting its statistics of solid fuels to determine for itself the basis of classification to be used in distinguishing the three groups to be reported: *viz.* coals, brown coal and lignite, and peat.

13 *Proved Reserves—Coals, Lignite and Brown Coal* "Proved reserves" of coals, of lignite and of brown coal shall mean the total amounts thereof, occurring within the limits hereinafter prescribed, as are of economic value and with respect to which there exist reliable data of actual thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

(*a*) Coals: Seams containing not less than 30 centimetres of merchantable coal and situated not more than 1200 metres below the surface, including workable submarine seams.

(*b*) Lignite and Brown Coal: Seams containing not less than 30 centimetres of merchantable lignite or brown coal and situated not more than 500 metres below the surface.

14 *Probable Reserves—Coals, Lignite and Brown Coal* "Probable reserves" of coals, of lignite and of brown coal shall mean the aggregate within the reporting country of proved reserves thereof plus such further reserves of economic value within the limits of thickness and depth of seams specified in paragraph 13 hereof, as may, from uncompleted investigations or from relation to proved reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

15 *Peat*

A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent. of organic matter.

16 *Probable Reserves of Peat*

"Probable reserves of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent. moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

17 *Domestic Production—Coals, Lignite and Brown Coal*

"Domestic production" of coals, of lignite and of brown coal shall mean the gross amounts thereof raised to the pit-head, less the amounts of dirt or other waste removed in washeries or cleaning plants, plus any increase in weight between the pit-head and weighing-point due to absorption of water in washeries, but without deduction for other losses beyond point of weighing or for amounts used in operation of mines or collieries.

18 *Coal Stocks*

"Coal stocks" shall include the following:

(*a*) "Mine stocks", or the amounts held or stored at the producing properties, whether in dumps at pit-heads, in cars at colliery sidings, or otherwise, and whether billed to purchasers or not.

(*b*) "Stocks in transit", or amounts held or stored in railway classification yards or at points of transhipment from rail to water or water to rail while in process of domestic transit from producers to consumers.

(*c*) "Dealers' and consumers' stocks", or the amounts held in storage by coal dealers and by large industrial users, such as by-product coke ovens, railways, electric-power utilities, steel and rolling mills, etc. This item will, in general, include the stocks of only those dealers and consumers to whom, except in case of transhipment, delivery is made directly from mine or water terminal in car-load lots or in boats or barges.

(*d*) "Import stocks", or amounts of foreign coal held in storage at ports of entry pending shipment in domestic trade.

(*e*) "Export stocks", or amounts in storage at export points pending actual export.

(*f*) "Bunker stocks", or amounts held in storage at ports for fuelling vessels engaged in either foreign or domestic trade.

Statistics of stocks shall be reported in totals and may also be reported by the several classes above defined; but each reporting country in submitting its statistics shall state which of the preceding classes, if any, have been omitted from the total which it reports.

19 *Lignite and Brown Coal Stocks*

In so far as there regularly are within any reporting country stocks of lignite or of brown coal in significant quantities within the several classes as specified for coal in paragraph 18 hereof, data for such classes shall be considered necessary for a complete report on stocks. Each reporting country in which complete data are not available, or are not reported, shall state what classes have been included in making up its report.

20 *Statistics of Products*

Where coal, brown coal or lignite are imported, exported, shipped as bunker fuel, or carried in stock in the form of coke or briquettes or other manufactured product, such statistics shall be separately reported in Tables 5 and 6. Petroleum coke shall not be reported in Table 5, but shall be reported in Table 10, Column 7.

TABLE 2

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In millions of metric tons)

Name of country	Coals				Brown coal and lignite				Peat	
	Proved reserves		Probable total reserves		Proved reserves		Probable total reserves		Probable total reserves	
	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity
0	1	2	3	4	5	6	7	8	9	10
AMERICA, SOUTH—										
Argentina	—	—	—	—	1950	250	—	—	—	—
Chile	1949	61·5	1949	698·5	—	*U*	—	*U*	1949	*N*
ASIA—										
India	1946	4,559	1946	62,636	1946	508 *b*	—	*U*	—	0
Japan	1932	5,891	1932	9,803	1932	66	1932	198	—	*U*
Pakistan	—	0	—	0	—	*U*	1949	168 *c*	—	0
Turkey	1950	319	1950	1,500	1950	212	1950	278	—	*U*
EUROPE—										
Austria	1950	4	1950	8	1950	100	1950	160	—	*U*
Belgium	1947	2,451	1947	2,720	—	*N*	—	*N*	—	*N*
France	1949	2,748	—	12,288	1949	100	1949	430	—	*U*
Germany, Western	1942	67,200	—	—	1950	27,057 *a*	—	*U*	—	*U*
Iceland	1951	0	1951	0	1951	*N*	—	*U*	1951	1,000 *d*
Ireland, Republic of	—	*U*	—	*U*	—	*U*	—	*U*	1950	3,490
Portugal	1948	11·6	1948	18·2	1948	5·0	1948	14·5	—	*U*
Sweden	1936	97 *A*	1936	105 *A*	1936	0	1936	0	1950	6,000 *A*
United Kingdom	1951	129,100	1951	171,400	1951	*N*	1951	*N*	1951	*U*
Yugoslavia	1950	19	—	—	1950	752·5	1950	10,693	—	0
OCEANIA—										
Australia	1950	5,400	1950	13,600	1950	6,000	1950	40,000	—	—
New Zealand	1950	28	1950	79	1950	65	1950	840	1946	100

TABLE 3

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
AFRICA—								
Algeria	1948	0·226	0·163	0·138	0·417	0·027	0	0·641
	1949	0·265	0·138	0·173	0·350	0·043	0	0·537
	1950	0·258	0·173	0·151	0·343	0·049	0	0·574
Belgian Congo	1948	*0·117*	—	—	—	—	—	—
	1949	*0·152*	—	—	—	—	—	—
	1950	*0·160 P*	—	—	—	—	—	—
Egypt	1948	0	—	—	0·256	—	0·071	—
	1949	0	—	—	0·261	—	0·054	—
	1950	0	—	—	0·146	—	0·038	—
Morocco, French	1948	0·290	0·025	0·034	0·182	0·137	0	0·326
	1949	0·341	0·034	0·048	0·145	0·162	0	0·340 *jj*
	1950	0·368	0·048	0·091	0·122	0·149	0	0·398 *jj*
	1951	*0·377*	*0·091*	*0·046*	—	—	—	—
Mozambique	1948	*0·009*	—	—	—	—	—	—
	1949	*0·013*	—	—	—	—	—	—
	1950	*0·056 P*	—	—	—	—	—	—
Nigeria	1948	0·618 *k*	0	0	0·001	0·099	0·029	0·491
	1949	0·55	0	*U*	*N*	0·06	0	*U*
	1950	0·59	*U*	*U*	0·06	0·002	0	*U*
Southern Rhodesia	1948	*1·696*	—	—	—	—	—	—
	1949	*1·918*	—	—	—	—	—	—
	1950	*2·128*	—	—	—	—	—	—
	1951	*2·299*	—	—	—	—	—	—
Tunisia	1948	—	—	—	0·231	—	—	—
	1949	—	—	—	0·224	—	—	—
	1950	—	—	—	0·196	—	—	—
Union of South Africa	1948	22·33	*U*	*U*	0·07	2·64	0·61	19·15 *j*
	1949	22·79	*U*	*U*	0·06	1·72	0·57	20·56 *j*
	1950	23·69	*U*	*U*	0·07	1·85	0·59	21·32 *j*
AMERICA, NORTH—								
Canada	1948	15·30 *a*	8·72 *a*	10·09 *a*	28·17 *a*	1·15 *a*	*U*	*U*
	1949	17·345	10·095	8·801	18·035	0·392	*U*	37·066 *jj*
	1950	17·363	8·801	10·625	24·549	0·358	*U*	39·729
Mexico	1948	*1·057 R*	—	—	—	—	—	—
	1949	*1·075*	—	—	—	—	—	—
	1950	*0·912 P*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
AMERICA, NORTH—*Continued*								
United States of America *p*	1948	594·085 *q*	55·457 *r*	73·106 *r*	0·264	47·723	0·959	528·018
	1949	433·900 *q*	75·106 *r*	48·916 *r*	0·284	29·742	0·793	427·839
	1950	506·702 *q*	48·916 *r*	77·124 *r*	0·329	26·635	0·651	451·537
	1951	*520 A*	—	—	—	—	—	—
AMERICA, SOUTH—								
Argentina	1947	0·014	—	—	1·214	—	—	—
	1948	0·017	—	—	2·177	—	—	—
	1949	0·018	—	—	1·340	—	—	—
	1950	0·026	—	—	1·447	—	—	—
Brazil	1948	*2·025 R*	—	—	—	—	—	—
	1949	*2·129*	—	—	—	—	—	—
	1950	*1·959 P*	—	—	—	—	—	—
Chile	1947	2·04	*0·045*	*0·025*	0·03	0·01	*N*	*2·08*
	1948	2·16	*0·025*	*0·116*	0·09	0·03	*N*	*2·13*
	1949	2·05	*0·116*	*0·207*	0	0·07	*N*	*1·89*
	1950	2·21	*0·207*	*0·210*	0·08	0·07	*N*	*2·22*
Colombia	1948	*0·514 n*	—	—	—	—	—	—
	1949	*0·521 n*	—	—	—	—	—	—
	1950	*0·491 n*	—	—	—	—	—	—
Peru	1948	*0·189*	—	—	—	—	—	—
	1949	*0·142*	—	—	—	—	—	—
Venezuela	1947	*0·003*	—	—	—	—	—	—
	1948	*0·003*	—	—	—	—	—	—
	1949	*0·002*	—	—	—	—	—	—
	1950	*0·001 P*	—	—	—	—	—	—
ASIA—								
Ceylon	1948	0	*U*	*U*	0·353	0	0·177	0·176 *j*
	1949	0	*U*	*U*	0·373	0	0·109	0·264 *j*
	1950	0	*U*	*U*	0·334	0	0·086	0·248 *j*
	1951	0	*U*	*U*	0·286	0	0·072	0·214 *j*
China (excluding Formosa and Manchuria)	1947	*19·487*	—	—	—	—	—	—
	1948	*13·8 P*	—	—	—	—	—	—
Formosa	1947	*1·307*	—	—	—	—	—	—
	1948	*1·629*	—	—	—	—	—	—
	1949	*1·649*	—	—	—	—	—	—
	1950	*1·402 P*	—	—	—	—	—	—
Manchuria	1949	*11 k*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5+6)
0	1	2	3	4	5	6	7
ASIA—*Continued*							
India 1948	30·6 R	2·5	2·4	N	0·9	U	—
1949	32·2	2·4	1·5	N	1·2	U	—
1950	*32·825*	1·5	*2·040*	—	—	—	—
1951	*34·858*	*2·040*	*2·688*	—	—	—	—
Indochina 1948	0·359	0·048	0·062	0	0·069	0	0·276
1949	0·379	0·062	0·044	0	0·073	0	0·324
1950	0·502	0·044	0·067	0	0·059	0	0·420
1951	*0·625*	—	—	—	—	—	—
Indonesia 1948	*0·540* R	—	—	—	—	—	—
1949	*0·662*	—	—	—	—	—	—
1950	*0·799*	—	—	—	—	—	—
1951	*0·862*	—	—	—	—	—	—
Iran 1947	*0·188*	—	—	—	—	—	—
Japan X 1938	49·284	0·930 w	1·202 w	6·239	1·827 g	U, i	53·424
X 1939	52·409	1·202 w	1·473 w	7·975	1·758 g	U, i	58·355
X 1940	57·318	1·473 w	1·704 w	9·897	1·569 g	U, i	65·415
X 1941	55·602	1·704 w	3·304 w	9·577	1·680 g	U, i	61·899
X 1942	54·179	3·304 w	2·883 w	8·730	1·596 g	U, i	61·734
X 1943	55·539	2·883 w	3·796 w	6·218	0·829 g	U, i	60·015
X 1944	49·335	3·796 w	4·031 w	3·250	0·714 g	U, i	51·636
X 1945	22·335	4·031 w	1·424 w	0·297	0·371 g	U, i	24·868
X 1946	22·523	1·424 w	0·877 w	0	0·758 g	U, i	22·312
X 1947	29·335	0·877 w	1·396 v	0·087	0·890 g	U, i	28·013
X 1948	34·793	1·396 v	1·860 v	1·475	1·232 g	U, i	34·572
X 1949	37·296	1·860 v	3·432 v	1·217	0·606 g	U, i	36·335
X 1950	39·330	3·432 v	1·462 v	0·996	0·467 g	U, i	41·829
K 1948	33·726	1·462 v	1·369 v	1·047	1·126 g	U, i	33·740
K 1949	37·973	1·369 v	4·729 v	1·612	0·787 g	U, i	35·438
K 1950	38·459	4·729 v	2·990 v	0·830	0·477 g	U, i	40·551
K 1951	*43·295*	—	—	—	—	—	—
Korea, South 1948	*0·799*	—	—	—	—	—	—
1949	*1·066*	—	—	—	—	—	—
1950	*x*	—	—	—	—	—	—
Malaya, Federation of 1948	0·381	0	0	0·128	N	0·073	0·436
1949	0·39	U	U	0·13	N	0·06	*0·46* j
1950	0·42	U	U	0·09	N	0·04	*0·47* j
1951	*0·389*	—	—	—	—	—	—
Pakistan 1948	0 y	U	0·197 y	1·817 y	0 y	0·047 y	1·770 j,y
1949	0 y	0·197 y	0·168 y	1·968 y	0 y	0·053 y	1·944 y
1950	0 y	0·168 y	0·109 y	1·039 y	0 y	0·024 y	1·074 y

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Philippines	1946	*0·047*	—	—	—	—	—	—
	1947	*0·074 R*	—	—	—	—	—	—
	1948	*0·088*	—	—	—	—	—	—
	1949	*0·123*	—	—	—	—	—	—
	1950	*0·159 P*	—	—	—	—	—	—
Turkey	1948	2·573	0·049	0·085	0	*N*	0·007	2·530
	1949	2·685	0·085	0·026	0	0	0·007	2·737
	1950	2·813	0·026	0·036	0	0	0·007	2·796
EUROPE—								
Austria	1948	0·181 *R*	0	0	3·97	0	0	4·15
	1949	0·183	0	0	4·41	0	0	4·59
	1950	0·183	0	0	4·28	0	0	4·46
	1951	*0·196*	—	—	—	—	—	—
Belgium	1948	26·691	0·439	0·840	3·103	0·616	0·167	28·610
	1949	27·854	0·840	1·805	1·177	1·283	0·082	26·702
	P 1950	27·298	1·805	1·031	0·899	2·735	0·033	26·203
	1951	*29·64*	1·031	*0·227*	—	—	—	—
Bulgaria	1948	*0·3 E, B*	—	—	*N, B*	*N, B*	—	*0·3 j, E*
Czechoslovakia	1948	*17·746*	*0·336 h*	*0·311 h*	—	—	—	—
	1949	*17·003*	—	—	*3·532 E,B*	*0·777 E,B*	—	—
	1950	*18·456 P*	—	—	*3·720 E,B*	*0·720 E,B*	—	—
Denmark	1948	—	*0·718 c*	*0·693 c*	2·728	—	—	*2·753 g*
	1949	—	*0·693 c*	*0·614 c*	3·101	—	—	*3·180 g*
	1950	—	*0·614 c*	*0·700 c*	4·005	—	—	*3·919 g*
	1951	—	*0·700 c*	*1·383 c*	*4·65 B*	—	—	*3·97 g*
Finland	1948	0	*U*	*U*	2·000	0	*U*	*U*
	1949	0	*U*	*U*	0·949	0	*U*	*U*
	1950	0	*U*	*U*	1·460	0	*U*	*U*
France *CC*	1947	45·22	0·77 *e*	0·74 *e*	14·43 *R*	0·30 *z*	*f*	59·38 *g*, *R*
	1948	43·29	0·74 *e*	0·78 *e*, *R*	15·19 *b*, *R*	0·27 *z*	*f*	58·17 *g*, *R*
	1949	51·20	0·78 *e*	1·51 *e*	15·73 *b*	1·05 *z*	*f*	65·15 *g*
	1950	50·84 *P*	1·51 *e*	2·73 *e*	9·81 *b*	2·14 *z*	*f*	57·29 *g*
	1951	*52·97*	*2·73 e*	*1·56 e*	*13·76 b, B*	*1·87 B*	*f*	*66·03 g*
Germany, Eastern	1948	*2·9 E, B*	—	—	*2·465 m,B*	*l*	—	*5·4 j, A*
	1949	*3·0 E, B*	—	—	*2·686 m,B*	*l*	—	*5·9 j, A*
Germany, Western *CC*	1946	53·946 *cc*	6·288 *dd*	2·644	3·188	13·048 *ee*	0·345	47·385
	1947	71·124 *cc*	2·664	4·816	4·545	12·613 *ee*	0·180	60·686
	1948	87·033 *cc*	4·816	3·911	4·788	18·833 *gg*	0·194	73·699
	1949	103·238 *cc*	3·911	4·594	4·802	22·391 *gg*	0·331	84·635
	1950	110·755 *cc*	4·594	2·680	4·269	25·355 *gg*	0·352	91·231
	1951	*118·92*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Hungary	1948	*1·2*	—	—	*0·112 m,B*	*l*	—	*1·3 j*
	1949	*1·2 E, B*	—	—	*0·1 m,B*	*l*	—	*1·3 j, E*
Iceland	1948	0	*U*	*U*	0·128	0	*U*	*U*
	1949	0	*U*	*U*	0·098	0	*U*	*U*
	1950	0	*U*	*U*	0·095	0	*U*	*U*
Ireland, Republic of	1948	*0·172 R*	*0·498*	*0·451 R*	1·723	0	0·010	*1·932*
	1949	0·129	*0·451 R*	*0·371*	1·7	0	0·007	*1·9*
	1950	0·172 *P*	*0·371*	*0·239*	1·9	0	0·003	*2·2*
	1951	*0·184*	*0·239*	*0·225*	—	—	—	—
Italy	1947	1·357	0·439	1·741	9·260	0·001	0·004	9·310
	1948	0·973	1·741	1·329	8·075	*N*	0·007	9·453
	1949	1·104	1·329	1·057	9·038	0·004	0·004	10·406
	1950	1·030	1·057	0·723	8·532	0·012	*U*	9·884 *g*
	1951	*1·167 P*	—	—	—	—	—	—
Netherlands	1948	11·032	0·104 *h*	0·149 *h*	3·486	0·036	0·124	14·358 *j*
	1949	11·705	0·149 *h*	0·144 *h*	4·094	0·018	0·143	15·638 *j*
	1950	12·247	0·144 *h*	0·151 *h*	4·517	0·023	0·114	16·627 *j*
	1951	*12·422*	0·151 *h*	*0·140 h*	—	—	—	—
Norway	1947	0·336 *d*	0·255 *A,hh*	0·627 *A,hh*	1·802 *t*	*N*	0·334 *A, ii*	1·432
	1948	0·436 *d, R*	0·627 *A,hh*	0·565 *A,hh*	1·110 *t*	0·005	0·332 *A, ii*	1·281
	1949	0·457 *d*	0·565 *A,hh*	0·632 *A,hh*	0·999 *t*	0	0·270 *A, ii*	1·119
	1950	0·374 *d*	0·632 *A,hh*	*0·6 A,hh*	0·975 *t*	0·011 *A*	0·237 *A, ii*	*1·1 A*
	1951	*0·470 d*	—	—	—	—	—	—
Poland	1948	*70·262*	*0·925 h*	*0·779 h*	—	—	—	—
	1949	*74·081*	*0·779 h*	*0·555 h,B*	*N, B*	*26·992 E,B*	*0·054 B*	*47·259*
	1950	*78·001 P*	*0·555 h,B*	—	*N, B*	*26·511 E,B*	*0·070 B*	*51·4 j, A*
	1951	*81·992 B*	—	—	—	—	—	—
Portugal	1948	0·386	0·305	0·211	0·766	0	*N*	1·246
	1949	0·443	0·211	0·211	0·877	0	*N*	1·320
	1950	0·419	0·211	0·180	0·718	0	*N*	1·168
Roumania	1948	*0·163 B*	—	—	*0·166 m,B*	*l*	—	*0·3 j*
	1949	*0·2 E, B*	—	—	*0·2 m,B*	*l*	—	*0·4 j, E*
Saar	1947	*10·541*	—	*0·063*	—	—	0	—
	1948	*12·566*	*0·063*	*0·067*	—	—	0	—
	1949	*14·268*	*0·067*	*0·233*	*0·909 B*	*6·983 B*	0	*8·03*
	1950	*15·091*	*0·233*	*0·201*	*0·969 B*	*8·112 B*	0	*7·98*
	1951	*16·27*	*0·201*	*0·07 B*	*1·050 B*	*8·420 B*	0	*9·0*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Spain	1947	*10·488 R*	—	—	—	—	—	—
	1948	*10·423 R*	—	—	—	—	—	—
	1949	*10·642*	—	—	—	—	—	—
	1950	*11·044 P*	—	—	—	—	—	—
	1951	*11·333 P*	—	—	—	—	—	—
Sweden	1948	0·374	*C*	*C*	5·401 *R*	0	*U*	*U*
	1949	0·317	*0·838 c*	*0·725 c*	3·965	0	*U*	*4·395 g*
	1950	0·309 *P*	*0·725 c*	*1·146 c*	4·853	*N*	*U*	*4·741 g*
	1951	*0·26*	*1·146 c*	*1·270 c*	*5·23 B*	*N*	—	*5·37 g*
Switzerland	1948	0	*N*	*N*	1·8	0	0	1·8
	1949	0	*N*	*N*	1·4	0	0	1·4
	1950	0	*N*	*N*	1·8	0	0	1·8
	1951	—	—	—	*2·5 B*	—	—	—
United Kingdom	1948	212·81 *R*	18·01	17·14	0·08	10·67	5·52	197·57 *R*
	1949	218·62	17·14	17·39	*N*	14·14	5·12	199·11
	1950	219·78	17·39	14·16	*N*	13·77	4·08	205·16
	1951	226·42	14·16	17·78	1·25	7·93	3·78	212·34
Yugoslavia	1947	1·062	*U*	*U*	0·100	0·101	*U*	*U*
	1948	0·972	*U*	*U*	0·087	0·108	*U*	*U*
	1949	1·275	*U*	*U*	0·027	0·204	*U*	*U*
	1950	1·154	*U*	*U*	0·041	0·106	*U*	*U*
	1951	0·992	*U*	*U*	0·041	0·061	*U*	*U*
OCEANIA—								
Australia	1948	15·018 *R*	0·037	0·037	0·038 *R*	0·051 *R*	0·279 *R*	14·726 *R*
	1949	14·332	0·037	0·093	0·449	0·049	0·251	14·425
	1950	16·794 *P*	0·093	0·154	0·622	0·068	0·086	17·201
	1951	*17·89*	—	—	—	—	—	—
New Zealand	*X* 1948	1·0	*U*	*U*	*N*	*N*	*N*	1·0 *j*
	X 1949	0·9	*U*	*U*	*N*	*N*	*N*	0·9 *j*
	X 1950	*0·9*	—	—	—	—	—	—

TABLE 4
BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS
(In millions of metric tons)

Name of country and year		Brown coal and lignite						Peat
		Production	Stocks		Imports	Exports	Total consumption (cols. 1+2+4) − (cols. 3+5)	Production
			At beginning of year	At end of year				
0		1	2	3	4	5	6	7
AFRICA—								
Algeria	1948–1950	0	0	0	0	0	0	0
Egypt	1948–1950	0	0	0	0	0	0	0
Tunisia	1948	0·069	—	—	0	—	0·070	0
	1949	0·047	—	—	0	—	0·047	0
	1950	0·041	—	—	0	—	0·040	0
Union of South Africa	1947–1949	0	0	0	0	0	0	0
AMERICA, NORTH—								
Canada	1948	1·442	*N, f*	*N, f*	*N*	0·01	*U*	*N*
	1949	1·697	*N, f*	0·002 *f*	—	0·006	1·689	*N*
	1950	1·999	0·002 *f*	0·009 *f*	—	0·013	1·979	*N*
	1951	*2·011*	—	—	—	—	—	—
United States of America *jj*	1948	2·799 *R*	*U, N*	*U, N*	0·001	0	2·800	0·118 *g*
	1949	2·805	*U, N*	*U, N*	0·001	0	2·806	0·117 *g*
	1950	3·057	*U, N*	*U, N*	0·002	0	3·059	0·119 *g*
AMERICA, SOUTH—								
Chile	1948–1950	*N*	*N*	*N*	—	—	*U*	*N*
ASIA—								
Japan	1936	0·109	*U*	*U*	0	0	*U*	0
	1937	0·121	*U*	*U*	0	0	*U*	0
	1938	0·142	*U*	*U*	0	0	*U*	0
	1939	0·195	*U*	*U*	0	0	*U*	0
	1940	0·275	*U*	*U*	0	0	*U*	0
	1941	0·334	*U*	*U*	0	0	*U*	0
	1942	1·607	*U*	*U*	0	0	*U*	0
	1943	2·876	*U*	*U*	0	0	*U*	0
	1944	2·304	*U*	*U*	0	0	*U*	0
	1945	1·645	*U*	*U*	0	0	*U*	0
	1946	2·358	*U*	*U*	0	0	*U*	0
	1947	2·947	*U*	0·423 *d*	0	0	*U*	0
	1948	2·575	0·423 *d*	0·167 *d*	0	0	2·831	0
	1949	2·085	0·167 *d*	0·076 *d*	0	0	2·176	0
	1950	1·287	0·076 *d*	0·024 *d*	0	0	1·339	0
	1951	*1·400*	—	—	—	—	—	—
Korea, South	1946	*0·026*	—	—	—	—	—	—
	1947	*0·037*	—	—	—	—	—	—
	1948	*0·068*	—	—	—	—	—	—
	1949	*0·060*	—	—	—	—	—	—
	h 1950	*0·027 h*	—	—	—	—	—	—

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) − (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Pakistan	1947	0·364	*U*	0·027	0	0·004	0·333	0
	1948	0·245	0·027	0·018	0	0·006	0·248	0
	1949	0·337	0·018	0·027	0	0·007	0·321	0
	1950	0·443	0·027	0·049	0	0	0·421	0
	1951	*0·518*	—	—	—	—	—	—
Turkey	1948	0·789	0·155	0·113	0	0	0·831	0
	1949	0·979	0·113	0·125	0	0	0·967	0
	1950	0·953	0·125	0·160	0	0	0·918	0
EUROPE—								
Austria	1948	3·3	0	0	1·59	0	4·9	*U*
	1949	3·8	0	0	1·45	0	5·2	*U*
	1950	4·3	0	0	1·22	0	5·4	*U*
	1951	*4·989*	*0·015 B*	*0·005 B*	—	0	—	—
Belgium	1948	*N*	*U*	*U*	*N*	0	*U*	0·004
	1949	*N*	*U*	*U*	*N*	0	*U*	0·003
	1950	*N*	*U*	*U*	*N*	0	*U*	0·003
Bulgaria	1948	*3·825 B*	—	—	—	—	—	—
	1949	*4·3 E,B*	—	—	—	—	—	—
Czechoslovakia	1948	*23·591*	—	—	*v*	*1·214 u,B*	—	*22·4 j*
	1949	*26·526*	—	—	*v*	*1·3 u,E,B*	—	*25·2 j*
	1950	*27·506*	—	—	—	—	—	—
	1951	*31 B*	—	—	—	—	—	—
Denmark	1948	2·3	—	—	0·003	—	—	3·617
	1949	1·6	—	—	0·237	—	—	1·416
	1950	0·77	—	—	0·260	—	—	0·902
	1951	*1·53*	—	—	—	—	—	—
Finland	1948	0	0	0	*N*	0	*N*	0·238
	1949	0	0	0	*N*	0	*N*	0·208
	1950	0	0	0	*N*	0	*N*	0·190
	1951	0	0	0	*N*	0	*N*	0·230
France *CC*	1947	2·10	0·01 *e*	0·01 *e*	0	0 *i*	2·10	0·06 *k*
	1948	1·84	0·01 *e*	0·01 *e*	0·03	0 *i*	1·87	0·04 *k*
	1949	1·84	0·01 *e*	0·04 *e*	*N*	*N, i*	1·81	0·04 *k*
	1950	1·69 *P*	0·04 *e*	0·05 *e*	0	0·01 *i*	1·67	*D*
	1951	*2·003 P*	*0·05 e,B*	*0·01 e,B*	0	*0·04 B*	*2·00*	—
Germany, Eastern	1948	*111 E, B*	—	—	*4·261 y,B*	*z*	*115 j, E*	—
	1949	*122 E, B*	—	—	*3·632 y,B*	*z*	*126 j, E*	—

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) – (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Germany, Western	1946	52·905	0·308 *E*	0·437	1·975	3·052 *n*	51·699	*U*
	1947	60·137	0·437	0·366	2·170	2·963 *n*	59·415	*U*
	1948	66·236	0·366	0·406	0·955	3·104 *m*	64·047	*U*
	1949	73·845	0·406	0·511	0·998	3·573 *m*	71·165	1·205
	1950	77·403	0·511	0·466	1·635	3·623 *m*	75·460	0·942
	1951	*84·878 B*	—	—	—	—	—	—
Greece	1948	*0·126*	—	—	*O B*	—	—	—
	1949	*0·180*	—	—	*O B*	—	—	—
Hungary	1948	*9·377 R*	—	—	—	—	—	—
	r 1949	*5·528 r*	—	—	—	—	—	—
Iceland	1948	0	0	0	0	0	0	0·003
	1949	0	0	0	0	0	0	0·003
	1950	0	0	0	0	0	0	0·002 *P*
Ireland, Republic of	1948	0	0	0	0	0	0	3·864
	1949	0	0	0	0	0	0	4·08
	1950	0	0	0	0	0	0	2·68
Italy	1947	1·855	—	—	0·195	0	1·645 *E*	—
	1948	0·908	—	—	0·079	0	1·188 *E*	—
	1949	0·836	—	—	0·159	0	0·933 *E*	—
	1950	0·783	—	—	0·093	0	0·680 *E*	—
	1951	*0·854 P*	—	—	—	—	—	—
Netherlands	1948	0·279	*U*	*U*	*N*	0·036	0·243	0·855 *x*
	1949	0·205	*U*	*U*	0	0·003	0·202	0·696 *x*
	1950	0·194	*U*	*U*	0	0	0·194	0·440 *x*
	1951	*0·249 B*	—	—	—	—	—	—
Norway	1948	0	*U*	*U*	*U*	0	*U*	0·34
	1949	0	*U*	*U*	*U*	0	*U*	0·33
	1950	0	*U*	*U*	*U*	0	*U*	0·28
Poland	1948	*5·040*	—	—	—	—	—	—
	1949	*4·621*	—	—	—	*3·840 B*	—	—
	1950	*4·837 P*	—	—	—	—	—	—
Portugal	1948	0·103	0·007	0·009	0	0	0·101	0·001
	1949	0·114	0·009	0·028	0	0	0·095	*N*
	1950	0·094	0·028	0·040	0	0	0·082	*N*
	1951	*0·083*	—	—	—	—	—	—
Roumania	1947	*2·105*	—	—	—	—	—	—
	1948	*2·631 s*	—	—	—	—	—	—
	1949	*2·763 s*	—	—	—	—	—	—
	1950	*3 s, E*	—	—	—	—	—	—

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite						Peat
		Production	Stocks		Imports	Exports	Total consumption (cols. 1+2+4) − (cols. 3+5)	Production
			At beginning of year	At end of year				
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Spain	1948	*1·398 R*	—	—	—	—	—	—
	1949	*1·321*	—	—	—	—	—	—
	1950	*1·344 P*	—	—	—	—	—	—
	1951	*1·488 P*	—	—	—	—	—	—
Sweden	1948	0	*U*	*U*	0	0	*U*	0·364
	1949	0	*U*	*U*	0	0	*U*	0·094 *P*
Switzerland	1948–1950	*N*	*N*	*N*	*N*	0	*N*	*N*
United Kingdom	1948–1951	*N*	*N*	*N*	0	0	*N*	*U*
Yugoslavia	1947	8·229	—	—	0	0·312	—	0
	1948	9·751	—	—	0·019	0·257	—	0
	1949	10·833	—	—	0·005	0·140	—	0
	1950	11·712	—	—	0	0·027	—	0
	1951	10·758	—	—	0	0·191	—	0
OCEANIA—								
Australia	1948	6·799 *R*	*U*	*U*	0	0	6·799 *j,R*	*N*
	1949	7·494	*U*	*U*	0	0	7·494 *j*	*N*
	1950	7·416 *P*	*U*	*U*	0	0	7·416 *j,P*	*N*
	1951	*7·960*	—	—	—	—	*7·960 j*	—
New Zealand	*X* 1948	1·8	*U*	*U*	*N*	*N*	1·8	*U*
	X 1949	1·8	*U*	*U*	*N*	*N*	1·8	*U*

TABLE 5

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—										
Algeria	1948	0·093	0·127	0·003	0·007	—	—	0·001	0·088	0·089
	1949	0·085	0·116	0·007	0·006	—	—	0·001	0·085	0·086
	1950	0·088	0·116	0·006	0·002	—	—	0·001	0·091	0·092
Egypt	1948	0	0	—	—	0·013	0	—	—	*0·013 j*
	1949	0	0	—	—	0·007	0	—	—	*0·007 j*
	1950	0	0	—	—	0·008	0	—	—	*0·008 j*
Southern Rhodesia	1948	*0·079 o*	—	—	—	—	—	—	—	—
	1949	*0·081 o*	—	—	—	—	—	—	—	—
Tunisia	1948	0·010 *R*	0·027	*U*	*U*	0·008 *R*	0	—	—	0·020 *j*
	1949	0·011	0·027	*U*	*U*	0·011	0	—	—	0·021 *j*
	1950	0·013	0·030	*U*	*U*	0·007	0	—	—	0·030 *j*
Union of South Africa	1947	0·71	1·16	*U*	*U*	*N*	0·04	*U*	*U*	0·67 *j*
	1948	0·77	1·23	*U*	*U*	*N*	*N*	*U*	*U*	0·77 *j*
	1949	0·83	1·32	*U*	*U*	*N*	*N*	*U*	*U*	0·83 *j*
AMERICA, NORTH—										
Canada	1948	3·580	4·760 *R*	0·375 *h*	0·382 *h*	0·510	0·152	*U*	*U*	*3·931*
	1949	3·506	4·704	0·382 *h*	0·450 *h*	0·403	0·248	*U*	*U*	*3·593*
	1950	3·572 *P*	4·841 *P*	0·450 *h*	0·300 *h*	0·374	0·313	*U*	*U*	*3·783*
United States of America *L*	1948	73·793 *R*	98·392 *g,R*	2·113 *R*	2·873 *R*	0·146	0·641	*U*	*U*	72·538 *R*
	1949	62·654	83·490 *g*	2·873	2·969	0·252	0·497	*U*	*U*	62·313
	1950	70·924	94·633 *g*	2·969	2·051	0·397	0·361	*U*	*U*	71·878
AMERICA, SOUTH—										
Argentina	1947	0·020	—	—	—	—	—	—	—	—
	1948	0·024	—	—	—	—	—	—	—	—
	1949	0·027	—	—	—	—	—	—	—	—
	1950	0·026 *P*	—	—	—	—	—	—	—	—
Brazil	1946	*0·134 o*	—	—	—	—	—	—	—	—
	1947	*0·213 o*	—	—	—	—	—	—	—	—
	1948	*0·266 o*	—	—	—	—	—	—	—	—
	1949	0·272	—	—	—	—	—	—	—	—
	1950	0·287	—	—	—	—	—	—	—	—
	1951	0·286	—	—	—	—	—	—	—	—
Chile	1947	0·11	0·17	*U*	*U*	*N*	*N*	*U*	*U*	*U*
	1948	0·13	0·21	*U*	*U*	*N*	*N*	*U*	*U*	*U*
	1949	0·12	0·19	*U*	*U*	*N*	*N*	*U*	*U*	*U*
	1950	0·12	0·19	*U*	*U*	*N*	*N*	*U*	*U*	*U*
Peru	1947	*0·023 o*	—	—	—	—	—	—	—	—

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AMERICA, SOUTH—*Continued*										
Uruguay *Q*	1946	*0·023 t*	—	—	—	—	—	—	—	—
	1947	*0·025 t*	—	—	—	—	—	—	—	—
	1948	*0·027 t*	—	—	—	—	—	—	—	—
	1949	*0·028 t*	—	—	—	—	—	—	—	—
	1950	*0·033 t, P*	—	—	—	—	—	—	—	—
ASIA—										
Ceylon	1948	*0·012 t*	—	—	—	—	—	—	—	—
	1949	*0·013 t*	—	—	—	—	—	—	—	—
	1950	*0·014 t, P*	—	—	—	—	—	—	—	—
India	1946	2·3	*U*	*U*	*U*	*N*	*N*	*U*	*U*	*U*
	1947	2·4	*U*	*U*	*U*	0	*N*	*U*	*U*	*U*
	1948	2·5	*U*	*U*	*U*	*N*	*N*	*U*	*U*	*U*
	1949	2·9	*U*	*U*	*U*	0	*N*	*U*	*U*	*U*
	1950	*3·4*	—	—	—	—	—	—	—	—
Japan	*X* 1941	8·178	*U*	*U*	*U*	0	0	*U*	*U*	*U*
	X 1942	8·428	*U*	*U*	*U*	0	0	*U*	*U*	*U*
	X 1943	8·280	*U*	*U*	*U*	0	0	*U*	*U*	*U*
	X 1944	6·915	*U*	*U*	*U*	0	0	*U*	*U*	*U*
	X 1945	3·017	*U*	*U*	*U*	0	0	*U*	*U*	*U*
	X 1946	1·356	2·191	0·133	0·053	0	0	*U*	*U*	1·436
	X 1947	2·107	3·203	0·053	0·046	0	0	*U*	*U*	2·114
	X 1948	3·327	5·059	0·046	0·080	0	0	*U*	*U*	3·293
	X 1949	3·984	6·000	0·080	0·238	0	0	*U*	*U*	3·826
	X 1950	4·294	6·691	0·238	0·103	0	*N*	*U*	*U*	4·429
Korea, South	1947	*0·007 o,R*	—	—	—	—	—	—	—	—
	1948	*0·011 o*	—	—	—	—	—	—	—	—
	1949	*0·012 o*	—	—	—	—	—	—	—	—
	1950	*0·010 o,P*	—	—	—	—	—	—	—	—
Pakistan	1947	0	0	*U*	*U*	*N*	0	0	*U*	*U*
	1948	0	0	*U*	*N*	*N*	0	0	*U*	*U*
	1949	0	0	*N*	0·013	0·022	0	0	0·009	0·009
	1950	0	0	0·013	0·006	0·006	0	0	0·013	0·013
Turkey	1948	0·394	0·553	0·001	0·003	0	0	0·223	0·169	0·392
	1949	0·419	0·580	0·003	0·001	0	0	0·240	0·181	0·421
	1950	0·453	0·594	0·001	0·001	0	0	0·254	0·199	0·453
EUROPE—										
Austria	1946	0·43 *R*	0·58	*U*	*U*	0·18 *R*	0	*U*	*U*	0·61 *j,R*
	1947	0·63	0·83 *R*	*U*	*U*	0·19	0	*U*	*U*	0·82 *j*
	1948	1·16 *R*	1·52	*U*	*U*	0·30	0	*U*	*U*	1·46 *j*
	1949	1·42	1·82	*U*	*U*	0·34	0	*U*	*U*	1·76 *j*
	1950	1·54	1·93	*U*	*U*	0·27	0	*U*	*U*	1·81 *j*
	1951	*1·54 B*	*1·93 B*	—	—	*0·31 B*	0	—	—	*1·85 j*

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Belgium	1948	5·629	7·318	*U*	0·206	2·786 *R*	0·703	*U*	*U*	*U*
	1949	5·035	6·545	0·206	0·258	2·276	0·398	*U*	*U*	6·861
	1950	4·585 *P*	5·961 *P*	0·258	*D*	2·443 *P*	0·340 *P*	*U*	*U*	*D*
Czechoslovakia	1948	*4·093 o*	—	—	—	—	—	—	—	—
	1949	*6·589 o*	—	—	—	—	—	—	—	—
Denmark	1948	0·498 *t,X*	—	—	—	1·581 *c*	—	—	—	—
	1949	0·517 *t,X*	—	—	—	2·373 *c*	—	—	—	—
Finland	1948	0·064	0·078 *R*	0·023	*U*	0·413	0	*U*	*U*	*0·477 j*
	1949	0·067	0·079	*U*	*U*	0·251	0	*U*	*U*	*0·318 j*
	1950	0·068	0·084	*U*	*U*	0·469	0	*U*	*U*	*0·537 j*
France *d, CC*	1947	7·20 *R*	9·35 *R*	0·05 *f, R*	0·08 *f*	1·95	0·05 *a*	0·72 *n, R*	8·35 *R*	9·07 *R*
	1948	7·92 *R*	10·30 *R*	0·08 *f*	0·04 *f*	4·27 *m*	0·10 *a, R*	1·16 *n*	10·97 *R*	12·13 *R*
	1949	8·65	11·25	0·04 *f*	0·07 *f*	5·06 *m*	0·06 *a*	1·41 *n*	12·21	13·62
	1950	8·68 *P*	11·28 *P*	0·07 *f*	0·11 *f*	3·64 *m*	0·15 *a*	1·87 *n*	10·26	12·13
Germany, Eastern	1948	*2·025 B*	—	—	—	*0·298 aa,B*	*bb*	—	—	*2·323 j*
	1949	*2·075 B*	—	—	—	*0·836 aa,B*	*bb*	—	—	*2·911 j*
Germany, Western	1946	9·565 *i*	12·466 *i*	2·944 *E*	0·785	0·355	4·045 *k*	*U*	*U*	8·034
	1947	15·794	20·867	0·785	1·138	0·440	3·903 *k*	*U*	*U*	11·978
	1948	22·513	29·619	1·138	0·695	0·356	7·349 *q*	3·018 *x*	12·945 *v*	15 963
	1949	27·846	36·657	0·695	1·059	0·364	7·929 *q*	4·346 *x*	15·571 *v*	19·917
	1950	30·365	40·385	1·059	0·630	0·255	8·372 *q*	4·951 *x*	17·726 *v*	22·677
	1951	*37·2 B*	*48·7 g,B*	—	—	—	—	—	—	—
Iceland	1948	0·001	0·001	*N*	*N*	0·001	0	0·001	0·001	0·002
	1949	0·001	0·001	*N*	*N*	0·001	0	0·001	0·001	0·002
	1950	0·001	0·001	*N*	*N*	0·001	0	0·001	0·001	0·002
Ireland, Republic of	1949	0·079	*U*	*U*	*U*	0·024	0	*U*	*U*	*0·103 j*
	1950	0·078	*U*	*U*	*U*	0·041	0	*U*	*U*	*0·119 j*
Italy	1947	1·746	2·437	0·096 *b*	0·262 *b*	0·227	0·058	*U*	*U*	1·749
	1948	2·292	3·173	0·262 *b*	0·331 *b*	0·035	0·119	*U*	*U*	2·139
	1949	2·482	3·348	0·331 *b*	0·229 *b*	0·013	0·059	*U*	*U*	2·538
	1950	2·525	3·386	0·229 *b*	0·050 *b*	0·009	0·015	*U*	*U*	2·698
Netherlands	1948	3·243 *R*	*U*	*U*	*U*	*N*	0·896	*U*	*U*	2·347 *R*
	1949	3·489	*U*	*U*	*U*	0·007	0·957	*U*	*U*	2·539
	1950	3·800	*U*	*U*	*U*	0·164	1·111	*U*	*U*	2·853
	1951	*3·931 B*	*5·409g,B*	—	—	—	—	—	—	—
Norway	1947	0·056	*U*	0·110 *y*	0·115 *y*	0·314	*N*	0·093 *z*	0·272	0·365
	1948	0·059	*U*	0·115 *y*	0·237 *y*	0·510	*N*	0·163 *z*	0·284	0·447
	1949	0·059	*U*	0·237 *y*	0·176 *y*	0·338	*N*	0·146 *z*	0·312	0·458
	1950	0·061	*U*	0·176 *y*	0·068 *y*	0·394	*N*	0·211 *z,P*	0·352	0·563

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Poland	1947	*4·465 R*	—	—	—	—	—	—	—	—
	1948	*5·091*	—	—	—	*dd*	*1·468 cc,B*	—	—	*3·623 j*
	1949	*5·753*	—	—	—	*dd*	*1·645 cc,B*	—	—	*4·108 j*
	1950	*5·924*	—	—	—	—	—	—	—	—
Portugal	1948	0·020	0·045	0·005	0·014	0·042	0	0·016	0·046	0·062
	1949	0·027	0·055	0·014	0·014	0·024	0	0·006	0·045	0·051
	1950	0·031	0·053	0·014	0·009	0·024	0	0·008	0·052	0·060
Roumania	1947	*0·073 o*	—	—	—	—	—	—	—	—
	1948	*0·073 v,B*	—	—	—	*0·081 aa,B*	*bb*	—	—	*0·154 j*
	1949	*0·08 o,E,B*	—	—	—	*0·10 aa,B*	*bb*	—	—	*0·18 j*
Saar	1946	*0·881 o*	—	—	—	—	—	—	—	—
	1947	*1·858 o*	—	—	—	—	—	—	—	—
	1948	*2·789 o*	—	—	—	—	*dd*	*1·356 cc,B*	—	—
	1949	*3·366 o*	*4·463 g,B*	—	—	—	*dd*	*1·432 cc,B*	—	—
	1950	*3·278 o*	*4·315 g,B*	—	—	—	—	—	—	—
	1951	*3·852 o,B*	*5·032 g,B*	—	—	—	—	—	—	—
Spain	1946	*1·000 u,R*	—	—	—	—	—	—	—	—
	1947	*1·013 u,R*	—	—	—	—	—	—	—	—
	1948	*1·038 u*	—	—	—	*0·031 aa,B*	*bb*	—	—	*1·069 j*
	1949	*1·128 u*	—	—	—	*0·083 aa,B*	*bb*	—	—	*1·211 j*
	1950	*1·152 u*	—	—	—	—	—	—	—	—
Sweden	1948	0·696	*U*	*C*	*C*	1·616 *r*	0	*U*	*U*	*2·312 j*
	1949	0·670	*U*	*C*	*C*	1·985 *r*	0	*U*	*U*	*2·655 j*
	1950	*0·65 B*	*0·87 g,B*	*C*	*C*	2·309	0·027	*U*	*U*	*U*
	1951	*0·61 B*	*0·79 g,B*	*0·22 B*	*0·38 B*	—	—	—	—	—
Switzerland	1948	0·40	*U*	*N*	*N*	0·65	0	*U*	*U*	1·05
	1949	0·40	*U*	*N*	*N*	0·44	0	*U*	*U*	0·84
	1950	0·41	*U*	*N*	*N*	0·59	0	*U*	*U*	1·00
United Kingdom—Great Britain	1947	24·08 *e*	42·90 *g*	1·97 *p*	1·88 *p*	*N*	0·03	*U*	*U*	24·14
	1948	26·72 *e*	47·36 *g*	1·88 *p*	2·57 *p*	*N*	0·85	*U*	*U*	25·18
	1949	27·24 *e*	48·36 *g*	2·57 *p*	2·65 *p*	*N*	1·52	*U*	*U*	25·64
	1950	27·66 *e,P*	49·44 *g*	2·65 *p*	1·53 *p*	*N*	1·73	*U*	*U*	27·05
	1951	28·93 *e,P*	51·60 *g*	1·53 *p*	2·06 *p*	*N*	0·30	*U*	*U*	28·10
Yugoslavia	1947	0	0	0	0	0·264	*N*	0	0·264	0·264
	1948	0	0	0	0	0·474	0	0	0·474	0·474
	1949	0	0	0	0	0·429	0	0	0·429	0·429
	1950	0	0	0	0	0·371	0	0	0·371	0·371
OCEANIA—										
Australia	*Y* 1948	2·769 *R*	3·920 *R*	*U*	*U*	0·001	0·010	*U*	*U*	2·761 *j,R*
	Y 1949	2·529	3·804	*U*	*U*	*N*	0·003	*U*	*U*	2·526 *j*
	Y 1950	2·384	3·758	*U*	*U*	0·038	0·002	*U*	*U*	2·421 *j*
New Zealand	1948–1950	*N*	*N*	*N*	*N*	0	0	*N*	*N*	*N*

TABLE 6

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—										
Algeria	1948	0·077	0·077	0·022	0·013	0	0	*U*	*U*	0·086
	1949	0·056	0·056	0·013	0·011	0·001	0	0·007	0·052	0·058
	1950	0·065	0·080	0·011	0·012	0·015	0	0·009	0·070	0·079
Egypt	1948–1950	0	0	0	0	0	0	0	0	0
AMERICA, NORTH—										
Canada	1948–1950	*N*	—	—	—	—	—	—	—	—
United States of America *F*	1948	2·981 *b*	2·816 *c*	*U, N*	*U, N*	*N*	0·189	*U, e*	*U, N*	2·792 *f*
	1949	2·295 *b*	2·172 *c*	*U, N*	*U, N*	*N*	0·152	*U, e*	*U, N*	2·143 *f*
	1950	2·636 *b*	2·479 *c*	*U, N*	*U, N*	0·001	0·159	*U, e*	*U, N*	2·478 *f*
ASIA—										
Japan *S*	*X* 1936	1·336	1·311	0·028	0·053	0	0	0·963	0·348	1·311
	X 1937	1·618	1·590	0·053	0·058	0	0	1·006	0·407	1·613
	X 1938	1·810	1·781	0·058	0·059	0	0	1·370	0·439	1·809
	X 1939	2·019	1·745	0·059	0·066	0	0	1·564	0·448	2·012
	X 1940	1·911	1·625	0·066	0·073	0	0	1·456	0·448	1·904
	X 1941	1·863	1·831	0·073	0·047	0	0	1·415	0·474	1·899
	X 1942	1·525	1·493	0·047	0·037	0	0	1·099	0·436	1·535
	X 1943	1·287	1·199	0·037	0·050	0	0	0·948	0·326	1·274
	X 1944	0·711	0·640	0·050	0·036	0	0	0·594	0·131	0·725
	X 1945	0·384	0·346	0·036	0·021	0	0	0·328	0·071	0·399
	X 1946	0·492	0·353	0·021	0·023	0	0	0·399	0·091	0·490
	X 1947	0·657	0·078	0·023	0·029	0	0	0·503	0·148	0·651
	X 1948	0·764	0·573	0·029	0·025	0	0	0·519	0·249	0·768
	X 1949	0·790	0·611	0·025	0·028	0	0	0·313	0·474	0·787
	X 1950	1·586	1·427	0·028	0·033	0	0	0·581	1·000	1·581
Pakistan	1948	0·005	0·005 *R*	*U*	0	0	0	0·005	*N*	0·005
	1949	0·009	0·009	0	0	0	0	0·009	*N*	0·009
	1950	0·007	0·007	0	0·002	0·010	0	0·005	0·010	0·016
Turkey	1948	0·007	*U*	0	0	0	0	0	0·007	0·007
	1949	0·040	0·034	0	0	0	0	0	0·040	0·040
	1950	0·029	0·026	0	0	0	0	0	0·029	0·029
EUROPE—										
Austria	1949	0·36	0·48	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1950	0·40	0·55	*U*	*U*	*U*	*U*	*U*	*U*	*U*

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Belgium	1948	0·970	0·873	*U*	0·009	0	0·046	*U*	*U*	*U*
	1949	0·764	0·688	0·009	0·025	0	0·013	*U*	*U*	0·736
	1950	1·014 *P*	0·913 *P*	0·025	*D*	0·002 *P*	0·015 *P*	*U*	*U*	*D*
	1951	*1·802 B*	—	—	—	—	—	—	—	—
Denmark	1948–1950	0	—	0	0	0	0	0	0	0
Finland	1948–1950	0	—	*N*	*N*	*N*	0	*N*	*N*	*N*
France	1947	5·22	4·91	0·01 *k*	0·02 *k*	0·23 *i*	0·10 *a*	3·89 *d*	1·45	5·34
	1948	5·83	5·48	0·02 *k*	0·02 *k*	0·25 *j*	0·01 *a*	4·53 *d*	1·54	6·07
	1949	6·27	5·89	0·02 *k*	0·03 *k*	0·26 *i*	0·03 *a*	4·93 *d*	1·56	6·49
	1950	6·31 *P*	5·93 *P*	0·03 *k*	0·02 *k*	0·32 *i*	0·05 *a*	5·12 *d*	1·47	6·59
	1951	*8·05 B*	—	—	—	—	—	—	—	—
Germany, Western— Hard coal briquettes	1946	1·902	1·773	*U*	*U*	—	0·045 *h*	*U*	*U*	1·857 *j*
	1947	2·176	2·064	*U*	*U*	—	0·096 *h*	*U*	*U*	2·080 *j*
	1948	2·972	2·811	*U*	*U*	—	0·142 *s*	0·800 *u*	2·030 *v*	2·830 *j*
	1949	3·586	3·395	*U*	*U*	—	0·148 *s*	1·520 *u*	1·918 *v*	3·438 *j*
	1950	3·722	3·548	*U*	*U*	—	0·308 *s*	2·246 *u*	1·168 *v*	3·414 *j*
	1951	*4·104 B*	*3·941 B*	—	—	—	—	—	—	—
Brown coal briquettes and brown coal coke	1946	11·071	24·946	0·227 *E*	0·351	1·975	1·951 *t*	*U*	*U*	10·971
	1947	12·202	27·622	0·351	0·247	1·595	1·524 *t*	*U*	*U*	12·377
	1948	13·348	30·220	0·247	0·239	0·099	1·584 *x*	5·190 *u*	6·681 *y*	11·871
	1949	14·852	32·158	0·239	0·186	0·047	2·041 *x*	6·593 *u*	6·318 *y*	12·911
	1950	15·577	32·956	0·186	0·152	0·601	1·658 *x*	8·232 *u*	6·322 *y*	14·554
	1951	*16·615 B*	—	—	—	—	—	—	—	—
Iceland	1948–1950	0	—	*N*	*N*	*N*	0	0	*N*	*N*
Ireland, Republic of	1949	0·017	*U*	*N*	*N*	0·1	0	*U*	*U*	0·1
	1950	0·028	*U*	*N*	*N*	0·09	0	*U*	*U*	0·12
Italy	1947–1950	*U*	*U*	*U*	*U*	*r*	0	*U*	*U*	*U*
Netherlands	1948	0·999	*U*	*U*	*U*	0·275	0·005	*U*	*U*	1·269 *j*
	1949	1·053	*U*	*U*	*U*	0·223	0·006	*U*	*U*	1·370 *j*
	1950	1·106	*1·122 B*	*U*	*U*	0·353	0·010	*U*	*U*	1·449 *j*
	1951	*1·135 B*	*1·172 B*	—	—	—	—	—	—	—
Norway	1948–1950	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Portugal	1947	0·098 *z*	*U*	*N*	*N*	0	0	0·024 *E*	0·074 *E*	0·098 *E*
	1948	0·074 *z*	*U*	*N*	*N*	0·001 *aa*	0	0·019 *E*	0·056 *E*	0·075 *E*
	1949	0·071 *z*	*U*	*N*	*N*	0·001 *aa*	0	0·018 *E*	0·054 *E*	0·072 *E*
	1950	0·074 *z*	*U*	*N*	*N*	0·011 *aa*	0	0·021 *E*	0·064 *E*	0·085 *E*

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Sweden	1948	0·111	*U*	*U*	*U*	0·215	*N*	*U*	*U*	*U*
	1949	0·059	*U*	*U*	*U*	0·005	0	*U*	*U*	*U*
	1950	*D*	*U*	*U*	*U*	0·021	0	*U*	*U*	*U*
Switzerland	1948	*N*	—	*N*	*N*	0·16	0	*U*	*U*	0·16
	1949	*N*	—	*N*	*N*	0·20	0	*U*	*U*	0·20
	1950	*N*	—	*N*	*N*	0·30	0	*U*	*U*	0·30
United Kingdom—Great Britain	1947	1·87	1·74	*U*	*U*	*N*	0	*U*	*U*	1·87 *j*
	1948	1·49	1·42	*U*	*U*	*N*	0·20	*U*	*U*	1·29 *j*
	1949	1·54	1·46	*U*	0·04	*N*	0·38	*U*	*U*	1·12 *j*
	1950	1·42	1·36	0·04	*N*	*N*	0·40	*U*	*U*	1·04
	1951	1·78	1·68	*N*	0·01	*N*	0·48	*U*	*U*	1·29
Yugoslavia *m*	1947	0	0	0	0	0	0	*U*	*U*	0
	1948	0	0	0	0	0·048	0	*U*	*U*	0·048
	1949	0	0	0	0	0·014	0	*U*	*U*	0·014
	1950	0	0	0	0	0·004	0	*U*	*U*	0·004
OCEANIA—										
Australia	*Y* 1948	0·553 *p*	1·511	*U*	*U*	0	0	*N*	0·553 *p*	0·553 *p*
	Y 1949	0·568 *p*	1·491	*U*	*U*	0	0	*N*	0·568 *p*	0·568 *p*
	Y 1950	0·599 *p*	1·578	*U*	*U*	0	0	*N*	0·599 *p*	0·599 *p*
New Zealand	1948–1950	*N*	*N*	*N*	*N*	0	0	*U*	*U*	*N*

STATISTICAL YEAR-BOOK

OF THE

WORLD POWER CONFERENCE

No. 6

Annual statistics for 1948-1950,
with some supplementary and revised statistics
for earlier years and available statistics for 1951;
some additional and revised data on resources

EDITED, WITH INTRODUCTORY AND EXPLANATORY TEXTS

by

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II. SOLID FUELS—A. COALS, BROWN COAL, LIGNITE, PEAT, COKE, AND OTHER MANUFACTURED FUEL

Some revised and additional estimates of *resources* of coals, brown coal and lignite, and peat, are shown in Table 2, and supplement the estimates presented in *Statistical Year-book of the World Power Conference*, Nos. 4, 5, and 6.

The statistics relating to coals, which are shown in Table 3, include, in addition to those reported to the World Power Conference by its National Committees and conforming with the definitions adopted by that organisation, other statistics (printed in italics) which do not necessarily conform to those definitions and which have been extracted from publications of the United Nations Statistical Office and Economic Commission for Europe. It is believed that in the statistics of coal production (Table 3, Column 1) no country with important coal production (except the U.S.S.R. and China) has been omitted.

Continental and world totals of coal production in 1950, 1951, 1952, and 1953 are shown in Table A1 (below). The sharp decline in production of coals in North America is, of course, due principally to the decline in the United States, where production in 1953 was very little above the 1949 recession level, and 30 per cent. below the peak production of 1944.

TABLE A1: PRODUCTION OF COALS, 1950–1953

	Millions of metric tons				% of 1950*		
	1950	1951	1952	1953 *E*	1951	1952	1953 *E*
Principal countries in:							
Africa	30	31	32	33	*101*	*108*	*110*
America, North	523	531	474	449	*101½*	*90½*	*86*
America, South	5	5	5	5	*99*	*104½*	*D*
Asia †	79	87	90	94	*109½*	*113½*	*118½*
Europe †	549	574	591	591	*104½*	*107½*	*107½*
Oceania	18	17	20	20	*98*	*115*	*111*
Totals † ..	1,204	1,245	1,212	1,192	*103½*	*100½*	*99*

* The percentages have been calculated from more exact statistics than those shown in this table, which have been rounded.
† No statistics for the U.S.S.R. or China are included in this table.
D Data sufficiently exact for the calculation of a percentage figure are not yet available.
E Estimated, wholly or in part.

Continental totals of the *production of brown coal and lignite* are shown in Table A2. Total reported production in 1948 was 258 million metric tons, of which nearly 70 per cent. was in East and West Germany. Production in West Germany increased rapidly to 1951, since when it has levelled off.

TABLE A2: PRODUCTION OF BROWN COAL AND LIGNITE, 1946–1952

	Millions of metric tons				
	1946	1948	1950	1951	1952
Africa	0·1	0·1	*N*	*N*	*N*
North America	3·8	4·2	5·1	5 *A*	5 *A*
Asia	3·3	3·7	3·4	3·5	3·5
"Western Europe"	69·2	86·2	98·5	107·4	108·0
Oceania	7·6	8·6	9·2	9·8	10·0
Totals ..	84·0	102·8	116·2	126 *A*	126·5 *A*
Other Europe *a*	*U*	155·4	*U*	*U*	*U*
"World" *b*	*U*	258·2	*U*	*U*	*U*

a Bulgaria, Czechoslovakia, Eastern Germany, Hungary, Poland, and Roumania.
b Excluding the U.S.S.R.
A Approximate.
D Data not yet available.
N Less than 0·05 million metric tons.
U Data not available.

TABLES 2, 3, 4, 5, AND 6—DEFINITIONS

The following definitions (including the introductory paragraph), adopted by the World Power Conference, were distributed with the forms for the guidance of the organisations which supplied the statistics:

On account of the varying characteristics of coal in the several countries, of the different bases of classification employed, and of the fact that international study of coal classification is already in progress, it has been deemed inadvisable to attempt to segregate the higher ranking coals —anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from lignite and brown coal or which separate the latter from peat. It will, therefore, be the responsibility of each reporting country when submitting its statistics of solid fuels to determine for itself the basis of classification to be used in distinguishing the three groups to be reported: *viz.* coals, brown coal and lignite, and peat.

13 *Proved Reserves—Coals, Lignite and Brown Coal*

"Proved reserves" of coals, of lignite and of brown coal shall mean the total amounts thereof, occurring within the limits hereinafter prescribed, as are of economic value and with respect to which there exist reliable data of actual thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

(*a*) Coals: Seams containing not less than 30 centimetres of merchantable coal and situated not more than 1200 metres below the surface, including workable submarine seams.

(*b*) Lignite and Brown Coal: Seams containing not less than 30 centimetres of merchantable lignite or brown coal and situated not more than 500 metres below the surface.

14 *Probable Reserves—Coals, Lignite and Brown Coal*

"Probable reserves" of coals, of lignite and of brown coal shall mean the aggregate within the reporting country of proved reserves thereof plus such further reserves of economic value within the limits of thickness and depth of seams specified in paragraph 13 hereof, as may, from uncompleted investigations or from relation to proved reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

15 *Peat*

A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent. of organic matter.

16 *Probable Reserves of Peat*

"Probable reserves of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent. moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

17 *Domestic Production—Coals, Lignite and Brown Coal*

"Domestic production" of coals, of lignite and of brown coal shall mean the gross amounts thereof raised to the pit-head, less the amounts of dirt or other waste removed in washeries or cleaning plants, plus any increase in weight between the pit-head and weighing-point due to absorption of water in washeries, but without deduction for other losses beyond point of weighing or for amounts used in operation of mines or collieries.

18 *Coal Stocks*

"Coal stocks" shall include the following:

(*a*) "Mine stocks", or the amounts held or stored at the producing properties, whether in dumps at pit-heads, in cars at colliery sidings, or otherwise, and whether billed to purchasers or not.

(*b*) "Stocks in transit", or amounts held or stored in railway classification yards or at points of transhipment from rail to water or water to rail while in process of domestic transit from producers to consumers.

(*c*) "Dealers' and consumers' stocks", or the amounts held in storage by coal dealers and by large industrial users, such as by-product coke ovens, railways, electric-power utilities, steel and rolling mills, etc. This item will, in general, include the stocks of only those dealers and consumers to whom, except in case of transhipment, delivery is made directly from mine or water terminal in car-load lots or in boats or barges.

(*d*) "Import stocks", or amounts of foreign coal held in storage at ports of entry pending shipment in domestic trade.

(*e*) "Export stocks", or amounts in storage at export points pending actual export.

(*f*) "Bunker stocks", or amounts held in storage at ports for fuelling vessels engaged in either foreign or domestic trade.

Statistics of stocks shall be reported in totals and may also be reported by the several classes above defined; but each reporting country in submitting its statistics shall state which of the preceding classes, if any, have been omitted from the total which it reports.

19 *Lignite and Brown Coal Stocks*

In so far as there regularly are within any reporting country stocks of lignite or of brown coal in significant quantities within the several classes as specified for coal in paragraph 18 hereof, data for such classes shall be considered necessary for a complete report on stocks. Each reporting country in which complete data are not available, or are not reported, shall state what classes have been included in making up its report.

20 *Statistics of Products*

Where coal, brown coal or lignite are imported, exported, shipped as bunker fuel, or carried in stock in the form of coke or briquettes or other manufactured product, such statistics shall be separately reported in Tables 5 and 6. Petroleum coke shall not be reported in Table 5, but shall be reported in Table 10, Column 7.

TABLE 2

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In millions of metric tons)

Name of country	Coals				Brown coal and lignite				Peat	
	Proved reserves		Probable total reserves		Proved reserves		Probable total reserves		Probable total reserves	
	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity	Date to which estimate refers*	Quantity
0	1	2	3	4	5	6	7	8	9	10
AFRICA—										
Algeria	1952	2	1952	12	—	—	—	—	—	—
Madagascar	1952	100	1952	300	—	0	—	0	—	0
Morocco, French	1952	30	1952	130	—	0	—	0	—	0
Tunisia	—	0	—	0	—	*N*	—	*N*	—	*N*
Union of South Africa	1950	21,540	1950	46,000	—	0	—	—	0	0
AMERICA, NORTH—										
Alaska	1952	*a*	1952	*a*	1952	*a*	1952	*a*	1952	*b*
Canada	1953	43,744	1953	64,382	1953	12,615	1953	25,262	1953	*U*
United States of America	1952	325,767 *c*	1952	1,303,066	—	*U*	1952	420,350	1952	12,544
AMERICA SOUTH—										
Surinam	1952	0	1952	0	1952	0	1952	0	1952	0
ASIA—										
India	1953	4,350	1953	62,427	1953	508	1953	*U*	1953	0
Indochina	1952	200	1952	1,000	1952	0	1952	0	1952	0
Israel	1952	0	1952	0	1952	0	1952	0	1952	*U*
Japan	1951	4,543	1951	9,897	1951	135	1951	258	—	*U*
Pakistan	1952	0	1952	0	1952	*U*	1952	164	1952	8
EUROPE—										
Belgium	1952	3,268	1947	5,988	—	*N*	—	*N*	—	*N*
Germany, Western	1953	67,128	1953	224,328	1953	63,000	—	—	—	—
Netherlands	1950	2,400 *d*	—	*U*	1953	4 *KK*	—	*U*	1953	25
Portugal	1953	17	1953	28	1953	28	1953	33	—	*U*
Sweden	1953	40	1953	40	1936	0	1936	0	1950	6,000
United Kingdom	1952	128,841	1952	171,141	1952	*N*	1952	*N*	1952	*U*
Yugoslavia	1952	21	1952	79	1952	6,867	1952	14,000	—	—
OCEANIA—										
Australia	1953	5,500	1953	16,800	1953	7,000	1953	41,000	—	*U*
New Caledonia	1952	5	1952	15	1952	0	1952	0	1952	0
New Zealand	1952	28	1952	79	1952	65	1952	940	1952	*N*

TABLE 3

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
AFRICA—								
Algeria	1950	0·258	0·176 *R*	0·154 *R*	0·473 *R*	0·034 *R*	0·127 *R*	0·590 *R*
	1951	0·247	0·154	0·156	0·561	0·075	0·116	0·615
	1952	0·269	0·156	0·169	0·477	0·068	0·066	0·599
Angola	1950	0	*U*	*U*	0·020	0	*N*	*U*
	1951	0	*U*	*U*	0·030	0	0	*U*
	1952	0	*U*	*U*	0·037	0	0	*U*
Belgian Congo	1950	*0·160*	—	—	—	—	—	—
	1951	*0·218*	—	—	—	—	—	—
	1952	*0·253*	—	—	—	—	—	—
Cape Verde Islands	1950	0	*U*	*U*	0·033	0	0·036	*U*
	1951	0	*U*	*U*	0·027	0	0·025	*U*
	1952	0	*U*	*U*	0·017	0	0·010	*U*
Morocco, French	1950	0·368	0·048	0·091	0·122	0·149	0	*0·298* *R*
	1951	0·394	0·091	0·046	0·127	0·243 *g*	*i*	0·323
	1952	0·460	0·046	0·084	0·131	0·188 *g*	*i*	0·365
	1953	*0·565*	—	—	—	—	—	—
Mozambique	1950	0·056	*U*	*U*	0·220	0·006	*N*	*U*
	1951	0·078	*U*	*U*	0·213	0·025	*N*	*U*
	1952	*U*	*U*	*U*	0·225	0	0	*U*
Nigeria	1950	0·59	*U*	*U*	0·06	0·002	0	*U*
	1951	0·6	*U*	*U*	*N*	0·1	0·1	*U*
	1952	0·6 *P*	*U*	*U*	0·03 *P*	*N*	*N*	*U*
Southern Rhodesia	1950	*2·128*	—	—	—	—	—	—
	1951	*2·300 R*	—	—	—	—	—	—
	1952	*2·559*	—	—	—	—	—	—
	1953	*2·617*	—	—	—	—	—	—
Tunisia	1948	—	—	—	0·251 *R*	—	—	0·251 *S*
	1949	—	—	—	0·224	—	0·009	0·215 *S*
	1950	—	—	—	0·196	—	—	0·196 *S*
	1951	—	—	—	0·210	—	0·005	0·205 *S*
	1952	—	—	—	0·170	—	0·001	0·169 *S*
Union of South Africa	1950	26·46	*U*	*U*	0·038	2·945	0·42	22·63 *Q*
	1951	26·63	*U*	*U*	0·049	1·959	0·51	23·62 *Q*
	1952	28·06	*U*	*U*	0·084	*D*	0·83	25·51 *Q*
	1953	*28·463*	—	—	—	—	—	—
AMERICA, NORTH—								
Canada	1950	15·364 *R*	9·471 *a, R*	11·428 *a, R*	24·446 *R*	0·357 *R*	0·494	37·003 *b, R*
	1951	14·845	11·428 *a*	12·818 *a*	24·306	0·394	0·478	36·889 *b*
	1952	14·058	12·818 *a*	13·011 *a*	22·612	0·352	0·428	35·697 *b*
	1953	*12·604*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
AMERICA, NORTH—*Continued*								
Mexico	1950	*0·912*	—	—	—	—	—	—
	1951	*1·104*	—	—	—	—	—	—
	1952	*1·319*	—	—	—	—	—	—
United States of America	1950	506·702 *q*	48·916 *r*	77·124 *r*	0·329	26·635	0·651	451·537
	1951	*515*	77·124 *r*	71 *s*	—	—	—	—
	1952	458	71 *s*	72 *s*	*N*	47	1	409
	1953	435 *E*	72 *s*	75 *s*	*N*	33	1	398
AMERICA, SOUTH—								
Argentina	1950	0·026	—	—	1·447	0	—	—
	1951	0·039	—	—	2·168	0	—	—
	1952	0·112	—	—	*D*	0	—	—
Brazil	1950	*1·959*	—	—	—	—	—	—
	1951	1·963	—	—	—	—	—	—
	1952	1·960	—	—	—	—	—	—
Chile	1949	2·138 *R*	0·144 *R*	0·230 *R*	0·018 R	0·066	*N*	2·004 *R*
	1950	2·217 *R*	0·230 *R*	0·232 *R*	0·066 *R*	0·071	*N*	2·210 *R*
	1951	2·210	0·232	0·034	0·204	0·053	*N*	2·559
	1952	2·450	0·034	0·059	0·183	0	*N*	2·608
Colombia	1950	*0·534 n, R*	—	—	—	—	—	—
	1951	*0·506 n*	—	—	—	—	—	—
	1952	*0·418 n*	—	—	—	—	—	—
Peru	1949	*0·170 R*	—	—	—	—	—	—
	1950	*0·196*	—	—	—	—	—	—
	1951	*0·186*	—	—	—	—	—	—
	1952	*0·230*	—	—	—	—	—	—
Surinam	1950	0	*U*	*U*	0·005	0	*U*	*U*
	1951	0	*U*	*U*	*N*	0	*U*	*U*
	1952	0	*U*	*U*	0·003	0	*U*	*U*
Venezuela	1951	*0·027 c*	—	—	—	—	—	—
	1952	*0·025 c*	—	—	—	—	—	—
ASIA—								
Ceylon	1950	0	*U*	*U*	0·334	0	0·086	0·248 *S*
	1951	0	*U*	*U*	0·286	0	0·072	0·214 *S*
	1952	0	*U*	*U*	0·279	0	0·033	0·246 *S*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS
(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
ASIA—*Continued*								
China—								
Taiwan (Formosa)	1948	*1·662 R*	—	—	—	—	—	—
	1949	*1·557 R*	—	—	—	—	—	—
	1950	*1·405 R*	—	—	—	—	—	—
	1951	*1·657*	—	—	—	—	—	—
	1952	*2·286*	—	—	—	—	—	—
India	1950	32·506 *R*	1·096 *R*	1·575 *R*	0	0·965	*AA*	*31·062 BB*
	1951	34·981 *R*	1·575 *R*	2·128 *R*	0	2·843	*AA*	*31·585 BB*
	1952	36·883	2·128	2·498	0	3·354	*AA*	*33·159 BB*
	1953	*36·422*	—	—	—	—	—	—
Indochina	1950	0·502	0·044	0·067	0	0·059	0	0·420
	1951	0·642 *R*	0·067	0·099	0	0·203 *g*	*i*	0·407
	1952	0·837	0·099	0·240	0	0·213 *g*	*i*	0·483
	1953	*0·832*	—	—	—	—	—	—
Indonesia	1950	*0·804 R*	—	—	—	—	—	—
	1951	*0·868 R*	—	—	—	—	—	—
	1952	*0·959*	—	—	—	—	—	—
Israel	*MM* 1950–1952	0	*U*	*U*	0·036 *E*	0	0·001	0·035 *E*
Japan *u*	*K* 1950	38·459	4·729 *v*	2·990 *v*	0·832 *R*	0·935 *R*	0·210	39·885 *R*
	K 1951	43·312 *R*	2·990 *v*	1·132 *v*	1·935	0·842	0·355	45·908
	K 1952	43·358	1·132 *v*	1·058 *v*	3·355	1·323	0·299	45·165
	K 1953	*46·524*	—	—	—	—	—	—
Korea, South	1950	*0·634*	—	—	—	—	—	—
	1951	*0·162*	—	—	—	—	—	—
	1952	*0·576*	—	—	—	—	—	—
	1953	*0·866*	—	—	—	—	—	—
Malaya	1950	0·42	*U*	*U*	0·09	*N*	0·04	*0·47 S*
	1951	0·4	*U*	*U*	0·2	*N*	0·04	*U*
	1952	0·3	*U*	*U*	0·2	*N*	0·03	*U*
Pakistan	1950	0	0·168	0·109	1·031 *R*	0	0·008 *R*	1·082
	1951	0	0·109	*U*	1·404	0	0·009	1·395 *S*
	1952	0	0	*U*	1·314	0	0·010	1·304 *S*
Philippines	1950	*0·159*	—	—	—	—	—	—
	1951	*0·151*	—	—	—	—	—	—
	1952	*0·139*	—	—	—	—	—	—
Turkey	1950	2·813	0·026	0·036	0	0	0·007	2·796
EUROPE—								
Austria	1950	0·183	*U*	*U*	4·28	0	0	4·46 *S*
	1951	0·196	*U*	*U*	4·33	0	0	4·53 *S*
	1952	0·190	*U*	*U*	3·75	0	0	3·94 *S*
	1953	0·162	*U*	*U*	3·44	0	0	3·60 *S*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Belgium	1950	27·321 *R*	1·805	1·042 *R*	0·900 *R*	2·740 *R*	0·033	26·211 *R*
	1951	29·651	1·042 *R*	0·221 *R*	2·469	1·822	0·066	31·053
	1952	30·384	0·221	1·678	2·005	2·401	0·028	28·503
	1953	*30·060 B*	1·678	*3·08 B*	—	—	—	—
Czechoslovakia	1950	*18·456 B*	—	—	*3·72 B, E*	*0·72 B, E*	—	—
	1951	*18·3 B*	—	—	—	—	—	—
	1952	*20·3 B*	—	—	—	—	—	—
	1953	*20·341*	—	—	—	—	—	—
Denmark	1950	—	*0·614 d,B*	*0·700 d,B*	4·005	—	—	—
	1951	—	*0·700 d,B*	*1·226 d,e,B,R*	4·550 *E*	—	—	—
	1952	—	*1·226 d,e,B*	*1·190 d,e,B*	4·090	—	—	—
Finland	1950	0	*U*	*U*	1·460	0	*U*	*U*
	1951	0	*U*	*U*	2·038	0	*U*	*U*
	1952	0	*U*	*U*	2·255	0	*U*	*U*
France *CC*	1950	50·84	1·51 *f*	2·73 *f*	9·81 *j*	2·14 *z*	*h*	57·29 *g*
	1951	53·0	2·73 *f*	1·56 *f*	13·76 *j*	1·84 *z*	*h*	66·1 *g*
	1952	55·4	1·56 *f*	4·39 *f*	12·48 *j*	1·58 *z*	*h*	63·5 *g*
	1953	*52·588 B*	*4·390 f*	*5·787 f*	—	*2·39 B*	—	—
Germany, Western *CC*	1948	87·033 *R*	3·897 *E, R*	3·330 *E, R*	3·515 *R*	10·090 *R*	0·132 *R*	80·893 *R*
	1949	103·238	3·330 *E, R*	3·528 *R*	4·439 *R*	13·012 *R*	0·331	94·136 *R*
	1950	110·755	3·528 *R*	1·934 *R*	4·005 *R*	15·377 *R*	0·372 *R*	100·605 *R*
	1951	118·925	1·934	3·237	9·573	13·411	0·357	113·437
	1952	123·278	3·237	4·343	11·832	12·164	0·365	121·475
	1953	124·472	4·343	4·833	9·458	13·554	0·192	119·694
Hungary	1950	*1·4*	—	—	—	—	—	—
	1951	*1·6*	—	—	—	—	—	—
Iceland	1950	0	*U*	*U*	0·095	0	*U*	*U*
	1951	0	*U*	*U*	0·068	0	*U*	*U*
	1952	0	*U*	*U*	0·060	0	*U*	*U*
Ireland, Republic of	1950	0·172	0·371	0·239	1·858	0	0·001 *R*	2·161
	1951	0·179 *R*	0·239	0·225	2·069	0	*N*	2·262
	1952	0·166	0·225	0·328	1·725	0	*N*	1·788
Italy	1950	1·030	1·057	0·723	8·532	0·012	*U*	9·884 *g*
	1951	1·167	0·723	1·718	10·517	*N*	0·002	10·687
	1952	1·090	1·718	1·270	9·143	*N*	0·004	10·677
	1953	*1·13 B*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Netherlands	1950	12·247	0·144 *m*	0·151 *m*	4·517	0·023	0·114	16·627 *S*
	1951	12·424 *R*	0·151 *m*	0·140 *m*	5·135	0·012	0·073	17·474 *S*
	1952	12·532	0·140 *m*	0·237 *m*	5·274	0·016	0·050	17·740 *S*
	1953	*12·297 B*	0·237 *m*	*0·213 m, B*	—	—	—	—
Norway	1950	0·316 *k, R*	0·504	0·434	0·974	0·011	*U*	1·322 *S, Q*
	1951	0·467 *k, R*	0·434	0·862	1·500	0·120	*U*	1·419 *S*
	1952	0·453 *k*	0·862	0·635	0·688	0·169	*U*	1·199 *S*
	1953	0·397 *k, P*	0·635	*D*	*D*	0·124	*U*	*D*
Poland	1950	*78·001 B*	—	—	—	*31·448 B, E*	—	—
	1951	*81·992 B*	—	—	—	—	—	—
	1952	*84·437 B*	—	—	—	—	—	—
	1953	*88·6 B*	—	—	—	—	—	—
Portugal	1950	0·419	0·211	0·180	0·718	0	*N*	1·168
	1951	0·418	0·180	0·270	0·592	0	*N*	0·920
	1952	0·446	0·270	0·273	0·442	0	*N*	0·885
	1953	*0·48 B*	—	—	—	—	—	—
Saar	1950	*15·091 B*	*0·233 m*	*0·201 m*	*0·969 B*	*8·176 R, B*	0	*7·916*
	1951	*16·279 B*	*0·201 m*	*0·073 m*	*1·050 B*	*8·424 R, B*	0	*9·033*
	1952	*16·235 B*	*0·073 m*	*0·466 m*	*1·092 B*	*7·916 B*	0	*9·018*
	1953	*16·418 B*	*0·466 m*	*0·54 B*	*0·933 B*	*8·874 B*	0	*8·40*
Spain	1950	*11·030 B*	—	—	—	—	—	—
	1951	*11·333 B*	—	—	—	—	—	—
	1952	*12·004 B*	—	—	—	—	—	—
	1953	*12·155 B*	—	—	—	—	—	—
Sweden	1950	0·309	0·725	1·146	4·830	0	*U*	4·718 *g*
	1951	0·279	1·146	1·270	5·322	0	*U*	5·477 *g*
	1952	0·347 *P*	1·270	1·200	4·842	0	*U*	5·259 *g*
	1953	*0·282*	—	—	—	—	—	—
Switzerland	1950	0	*N*	*N*	1·9	0	0	1·9
	1951	0	*N*	*N*	2·5	0	0	2·5
	1952	0	*N*	*N*	2·0	0	0	2·0
Trieste	1950	—	*0·002 B*	*0·002 B*	*0·145 B*	—	*0·004 B*	*0·141 E*
	1951	—	*0·002 B*	*0·005 B*	*0·193 B*	—	*0·006 B*	*0·184 E*
	1952	—	*0·005 B*	*0·001 B*	*0·198 B*	—	*0·010 B*	*0·192 E*
	1953	—	*0·001 B*	*0·001 B*	—	—	—	—
United Kingdom—Great Britain	1950	219·80	17·61	14·33	*N*	13·77	4·09	205·22
	1951	226·95	14·33	17·83	1·24	7·93	3·78	212·98
	1952	230·46	17·83	21·28	0·33	11·94	3·35	212·05
	1953	*228 B*	—	—	*0·57 B*	*17·06 g, B*	*i*	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Yugoslavia	1947	1·062	*U*	*U*	0·180 *R*	0·101	*U*	*U*
	1948	0·973 *R*	*U*	*U*	0·134 *R*	0·108	*U*	*U*
	1949	1·275	*U*	*U*	0·033 *R*	0·203 *R*	*U*	*U*
	1950	1·154	*U*	*U*	0·045 *R*	0·106	*U*	*U*
	1951	0·992	*U*	*U*	0·058 *R*	0·061	*U*	*U*
	1952	1·011	*U*	*U*	0·136	0·061	*U*	*U*
	1953	*0·93 B*	—	—	—	—	—	—
OCEANIA—								
Australia	*Y* 1951	16·68	*U*	0·65	0·61 *t*	0·73 *t*	0·07	*U*
	Y 1952	19·48	0·65	1·95	0·29 *t*	0·14 *t*	0·06	18·27
	Y 1953	18·84 *P*	1·95	2·49	0·15 *t*	0·26 *t*	0·04	18·15
New Zealand	1950	*0·934*	*U*	*U*	*N*	*N*	*N*	*0·934 S*
	1951	*0·688*	*U*	*U*	*N*	*N*	*N*	*0·688 S*
	1952	*0·875*	*U*	*U*	*N*	*N*	*N*	*0·875 S*
U.S.S.R.	1937	*109 B*	—	—	—	—	—	—
	1938	*113 B*	—	—	—	—	—	—
	1949	*189 B*	—	—	—	—	—	—
	1950	*205 B*	—	—	—	—	—	—
	1951	*221 B*	—	—	—	—	—	—
	1952	*230 B*	—	—	—	—	—	—

TABLE 4

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Brown coal and lignite						Peat
	Production	Stocks		Imports	Exports	Total consumption (cols. 1+2+4) − (cols. 3+5)	Production
		At beginning of year	At end of year				
0	1	2	3	4	5	6	7
AFRICA—							
Tunisia 1950	0·041	—	—	0	—	0·040	0
1951	0·008	0	0	0	0	0·008	0
1952	0	0	0	0	0	0	0
Union of South Africa 1950–1952	0	0	0	0	0	0	0
AMERICA, NORTH—							
Canada 1950	1·999	0·002 *f*	0·009 *f*	0·007	0·001 *R*	1·997 *R*	*N*
1951	2·017	0·009 *f*	0·001 *f*	0·008	0·001	2·032	*N*
1952	1·890	0·001 *f*	0·003 *f*	0·007	*N*	1·894	*N*
1953	*1·837*	—	—	—	—	—	—
United States of America 1950	3·057	*U, N*	*U, N*	0·002	0	3·059	0·119 *g*
ff 1951	3	*N*	*N*	*N*	*N*	3	0·176 *g*
1952	3	*N*	*N*	*N*	*N*	3	0·191 *g*
AMERICA, SOUTH—							
Argentina 1950–1952	0	—	—	*D*	0	—	*N*
Chile 1949–1952	*N*	*N*	*N*	0	0	*N*	0
Surinam 1950–1952	0	*U*	*U*	0	0	*U*	*U*
ASIA—							
India 1951	0·034	*U*	*U*	*N*	*U*	*U*	*N*
1952	0·046	*U*	*U*	*N*	*U*	*U*	*N*
Israel 1950–1952	0	0	0	0	0	0	0
Japan *a* *K* 1950	1·287	0·076 *b*	0·024 *b*	0	0	1·339	0
K 1951	1·355	0·024 *b*	0·015 *b*	0	0	1·364	0
K 1952	1·539	0·015 *b*	0·020 *b*	0	0	1·534	0
K 1953	*1·482*	—	—	—	—	—	—
Korea, South 1950	*0·027*	—	—	—	—	—	—
1951	*0·006*	—	—	—	—	—	—
1952	*0·002*	—	—	—	—	—	—

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Brown coal and lignite: Stocks: At beginning of year	Brown coal and lignite: Stocks: At end of year	Brown coal and lignite: Imports	Brown coal and lignite: Exports	Brown coal and lignite: Total consumption (cols. 1+2+4) − (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Malay, Federation of *j*	1950	*0·422*	—	—	—	—	—	—
	1951	*0·389*	—	—	—	—	—	—
	1952	*0·320*	—	—	—	—	—	—
	1953	*0·291*	—	—	—	—	—	—
Pakistan	1950	0·437	0·026	0·048	0	0	0·415	0
	1951	0·503 *R*	0·048	0·046	0	0	0·505	0
	1952	0·601	0·046	0·014	0	0	0·633	0
Turkey	1950	0·953	0·125	0·160	0	0	0·918	0
EUROPE—								
Austria	1950	4·3	*U*	*U*	1·22	0	5·4	*U*
	1951	4·989	*U*	*U*	0·58	0	5·6	*U*
	1952	5·179	*U*	*U*	0·34	0	5·5	*U*
	1953	5·6 *E*	*U*	*U*	0·21	0	5·8 *E*	*U*
Belgium	1950	*N*	*U*	*U*	*N*	0	*U*	0·003
	1951	*N*	*U*	*U*	*N*	0	*U*	0·002
	1952	*N*	*U*	*U*	*N*	0	*U*	0·006
Bulgaria	1949	*4·722 c*	—	—	—	—	—	—
	1950	*5·712 c*	—	—	—	—	—	—
	1951	*6·169 c*	—	—	—	—	—	—
	1952	*6·235 c*	—	—	—	—	—	—
Czechoslovakia	1950	*27·506*	—	—	—	*1·435 B*	—	—
	1951	*31*	—	—	—	—	—	—
	1952	*32·5*	—	—	—	—	—	—
Denmark	1950	0·770	—	—	0·260	—	—	—
	1951	1·582 *R*	—	—	0·106	—	—	—
	1952	1·601	—	—	0·225	—	—	—
	1953	*0·737*	—	—	—	—	—	—
Finland	1950	0	0	0	0·001	0	0·001	0·186 *R*
	1951	0	0	0	0·034	0	0·034	0·235 *R*
	1952	0	0	0	0·051	0	0·051	0·250
France *CC*	1950	1·69	0·04 *e*	0·05 *e*	0	0·01 *h*	1·67	—
	1951	2·00	0·05 *e*	*N, e*	0	*N*	2·05	0·07 *k*
	1952	1·99	*N, e*	0·09 *e*	0	*N*	1·90	0·08 *k*
	1953	*1·95*	0·09 *e*	—	—	—	—	—

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite						Peat
		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) − (cols. 3+5)	Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Germany, Western	1948	66·236	0·370 *E, R*	0·365 *E, R*	0·798 *R*	1·520 *R*	*65·519 R*	*U*
	1949	73·845	0·365 *E, R*	0·401 *R*	0·951 *R*	1·532 *R*	*73·226 R*	1·205
	1950	77·403	0·401 *R*	0·313 *R*	1·034 *R*	1·965 *R*	*76·560 R*	0·942
	1951	84·878	0·313	0·477	0·484	2·053	*83·145*	—
	1952	85·152	0·477	0·423	0·581	0·842	*84·945*	—
	1953	85·840	0·423	0·412	0·595	—	—	—
Greece	1948	*0·120 R*	—	—	—	—	—	—
	1949	*0·176 R*	—	—	—	—	—	—
	1950	*0·180*	—	—	—	—	—	—
	1951	*0·180*	—	—	—	—	—	—
	1952	*0·256*	—	—	—	—	—	—
Hungary	1949	*10·438*	—	—	—	—	—	—
	1950	*11·850*	—	—	—	—	—	—
	1951	*14·0*	—	—	—	—	—	—
	1952	*18·8 d*	—	—	—	—	—	—
Iceland	1950–1952	0	0	0	0	0	0	0·002 *E, m*
Ireland, Republic of	1950	0	0	0	0	0	0	3·090 *R*
	1951	0	0	0	0	0	0	3·989
	1952	0	0	0	0	0	0	3·859
Italy	1950	0·783	*U*	*U*	0·093	0	0·680 *E*	*U*
	1951	0·879	*U*	*U*	0·064	0	0·943 *S*	*U*
	1952	0·839	*U*	*U*	0·050	0	0·889 *S*	*U*
	1953	*0·771*	—	—	—	—	—	—
Netherlands	1950	0·194	*U*	*U*	0	0	0·194 *S*	0·440
	1951	0·249	*U*	*U*	0	0	0·249 *S*	0·534
	1952	0·235	*U*	*U*	0	0	0·235 *S*	0·597
Norway	1950	—	—	—	—	—	—	0·31 *R*
	1951	—	—	—	—	—	—	0·28
	1952	—	—	—	—	—	—	0·29
	1953	—	—	—	—	—	—	0·22
Poland	1950	*4·837*	—	—	—	—	—	—
	1951	*4·591*	—	—	—	—	—	—
Portugal	1950	0·094	0·028	0·036 *R*	0	0	0·086 *R*	*N*
	1951	0·082	0·036	0·038	0	0	0·080	0
	1952	0·076	0·038	0·041	0	0	0·073	*N*

TABLE 4—*continued*

BROWN COAL, LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) − (cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Roumania	1949	*2·576 R*	—	—	—	—	—	—
	1950	*2·90 R*	—	—	—	—	—	—
	1951	*3·44*	—	—	—	—	—	—
	1952	*3·48*	—	—	—	—	—	—
Spain	1950	*1·344*	—	—	—	—	—	—
	1951	*1·489*	—	—	—	—	—	—
	1952	*1·596*	—	—	—	—	—	—
	1953	*1·791*	—	—	—	—	—	—
Sweden	1950	0	*U*	*U*	0	0	*U*	0·075
	1951	0	*U*	*U*	0	0	*U*	0·116
	1952	0	*U*	*U*	0	0	*U*	*D*
Switzerland	1950–1952	*N*	*N*	*N*	*N*	0	*N*	*N*
United Kingdom—Great Britain	1950–1952	0	*U*	*U*	0	0	*N*	*U*
Yugoslavia	1950	11·712	*U*	*U*	0	0·027	*U*	0
	1951	11·050	*U*	*U*	0	0·191	*U*	0
	1952	11·087	*U*	*U*	0	0·095	*U*	0
OCEANIA—								
Australia	1950	7·44 *R*	*U*	*U*	*U*	*U*	6·80 *S*	0
	1951	7·96	*U*	*U*	*U*	*U*	7·49 *S*	0
	1952	8·19	*U*	*U*	*U*	*U*	7·42 *S*	0
	1953	*8·4*	—	—	—	—	—	—
New Zealand	1950	1·8	*U*	*U*	*N*	*N*	1·8 *S*	*U*
	1951	1·8	*U*	*U*	*N*	*N*	1·8 *S*	*U*
	1952	1·8	*U*	*U*	*N*	*N*	1·8 *S*	*U*

TABLE 5

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	Domestic consumption: For other purposes	Domestic consumption: Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—										
Algeria	1950	0·088	0·097 *R*	0·006	0·002	—	—	0·001	0·091	0·092
	1951	0·096	0·106	0·002	0·006	—	—	0·001	0·091	0·092
	1952	0·097	0·107	0·006	0·013	—	—	0·001	0·089	0·090
Egypt	1950	0	0	—	—	0·008	0	—	—	0·008 *S*
Southern Rhodesia	1950	*0·096 a*	—	—	—	—	—	—	—	—
	1951	*0·094 a*	—	—	—	—	—	—	—	—
	1952	*0·110 a*	—	—	—	—	—	—	—	—
Tunisia	1950	0·013	0·030	*U*	*U*	0·007	0	—	—	0·020*R*,*S*
	1951	0·014	0·030	*U*	*U*	0	0	*U*	*U*	0·014 *S*
	1952	0·013	0·028	*U*	*U*	0	0	*U*	*U*	0·013 *S*
Union of South Africa	1950	2·2	4·4	*U*	*U*	*N*	*N*	*N*	2·2 *S*	2·2 *S*
	1951	2·5	4·6	*U*	*U*	*N*	*N*	*N*	2·5 *S*	2·5 *S*
	1952	2·9	4·9	*U*	*U*	*N*	*N*	*N*	2·9 *S*	2·9 *S*
AMERICA, NORTH—										
Canada	1950	3·597 *R*	4·796 *R*	0·554 *R*	0·364 *R*	0·307 *R*	0·313	0·471	3·300	3·771 *R*
	1951	3·543	5·812	0·364	0·413	0·321	0·147	0·326	3·342	3·668
	1952	3·672	5·984	0·413	0·408	0·488	0·275	0·293	3·596	3·889
Mexico	1947	*0·530 a*	—	—	—	—	—	—	—	—
	1948	*0·408 a*	—	—	—	—	—	—	—	—
	1949	*0·375 a*	—	—	—	—	—	—	—	—
	1950	*0·392 a*	—	—	—	—	—	—	—	—
	1951	*0·389 a*	—	—	—	—	—	—	—	—
	1952	*0·463 a*	—	—	—	—	—	—	—	—
United States of America	1950	70·924	94·633 *g*	2·969	2·051	0·397	0·361	*U*	*U*	71·878
	1951	76·829	103·321 *g*	2·051	2·117	0·147	0·931	*U*	*U*	75·979
	1952	66·231	88·807 *g*	2·117	2·427 *P*	0·284	0·719	*U*	*U*	65·486
	1953	76·184 *P*	101·946 *g*,*P*	2·427 *P*	2·484 *P*	0·143 *P*	0·472 *P*	*U*	*U*	75·798 *P*
AMERICA, SOUTH—										
Argentina	1950	0·026	—	—	—	—	0	—	—	—
	1951	0·022	—	—	—	—	0	—	—	—
	1952	0·023	—	—	—	—	0	—	—	—
Brazil	1950	0·287 *a*	—	—	—	—	—	—	—	—
	1951	0·286 *a*	—	—	—	—	—	—	—	—
	1952	0·494	—	—	—	—	—	—	—	—

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)−(cols. 4+6)		
	Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0	1	2	3	4	5	6	7	8	9
AMERICA, SOUTH—*Continued*									
Chile 1950	0·25 *R*	—	*U*	*U*	*N*	0	0·12	0·13	0·25 *S*
1951	0·36	—	*U*	*U*	*N*	0	0·11	0·25	0·36 *S*
1952	0·39	—	*U*	*U*	*N*	0·018	0·12	0·27	0·39 *S*
Surinam 1950–1952	0	0	*U*	*U*	*N*	0	*U*	*U*	*U*
ASIA—									
China—									
Taiwan (Formosa) 1947	*0·028 a*	—	—	—	—	—	—	—	—
1948	*0·032 a*	—	—	—	—	—	—	—	—
1949	*0·036 a*	—	—	—	—	—	—	—	—
1950	*0·039 a*	—	—	—	—	—	—	—	—
1951	*0·086 a*	—	—	—	—	—	—	—	—
1952	*0·144 a*	—	—	—	—	—	—	—	—
India 1950	3·63 *R*	5·35 *k*	0·16 *i*	0·24 *i*	0	0·001	*U*	*U*	*3·55 A*
1951	3·60	4·89 *k*	0·24 *i*	0·34 *i*	0	0·008	*U*	*U*	*3·49 A*
1952	3·61	4·93 *k*	0·34 *i*	0·24 *i*	0	0·011	*U*	*U*	*3·70 A*
Israel 1950	0	0	*U*	*U*	0·001	0	0	0·001 *S*	0·001 *S*
1951	0	0	*U*	*U*	0·002	0	0	0·002 *S*	0·002 *S*
1952	0	0	*U*	*U*	0·001	0	0	0·001 *S*	0·001 *S*
Japan *K* 1950	4·050	6·305	0·565 *s*	0·226 *s*	0	*N*	*U*	*U*	4·389
K 1951	5·548	8·349	0·226 *s*	0·139 *s*	*N*	*N*	*U*	*U*	5·635
K 1952	5·875	8·780	0·139 *s*	0·151 *s*	*N*	*N*	*U*	*U*	5·863
Korea, South 1950	*0·005 a,R*	—	—	—	—	—	—	—	—
1951	*0·003 a*	—	—	—	—	—	—	—	—
1952	*0·003 a*	—	—	—	—	—	—	—	—
Pakistan 1950	0	0	0·015	0·007	0·006	0	0·008	0·006	0·014
1951	0	0	0·007	0·004	0·051	0	0·018	0·036	0·054
1952	0	0	0·004	0·017	0·039	0	0·019	0·010	0·029
Turkey 1950	0·453	0·594	0·001	0·001	0	0	0·254	0·199	0·453
1951	*0·306 b*	—	—	—	—	—	—	—	—
1952	*0·370 b*	—	—	—	—	—	—	—	—
EUROPE—									
Austria 1950	1·54	1·93	*U*	*U*	0·27	0	*U*	*U*	1·81 *S*
1951	1·54	1·93	*U*	*U*	0·31	0	*U*	*U*	1·85 *S*
1952	2·03	2·11	*U*	*U*	0·29	0	0·5	1·4	1·9 *S*
1953	1·60	1·84	*U*	*U*	0·29	0	0·47	1·4	1·87 *S*

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Belgium	1950	4·598	5·977	0·258	0·054	2·455	0·342	*U*	*U*	6·915
	1951	6·096	7·925	0·054	0·065	3·105	0·358	*U*	*U*	8·262
	1952	6·407	8·329	0·065	0·093	3·220	0·854	*U*	*U*	9·315
Czechoslovakia	1950	*4·876 a*	—	—	—	—	—	—	—	—
Denmark	1950	0·517 *t*	*U*	*U*	*U*	2·373 *c*	*U*	*U*	*U*	*U*
	1951	0·535 *t*	*U*	*U*	*U*	1·436 *c*	*U*	*U*	*U*	*U*
	1952	0·559 *t*	*U*	*U*	*U*	1·850 *c*	*U*	*U*	*U*	*U*
Finland	1950	0·068	0·084	*U*	*U*	0·469	0	*U*	*U*	*0·537 S*
	1951	0·076	0·098	*U*	*U*	0·345	0	*U*	*U*	*0·421 S*
	1952	0·115	0·142	*U*	*U*	0·347	0	*U*	*U*	*0·462 S*
France *CC*	1950	8·68	11·28	0·07 *f*	0·11 *f*	3·64 *m*	0·15 *h*	1·87 *n*	10·26	12·13
	1951	9·92	12·90	0·11 *f*	0·03 *f*	4·49 *m*	0·10 *h*	1·95 *n*	12·44	14·39
	1952	10·98	14·30	0·03 *f*	0·11 *f*	5·11 *m*	0·06 *h*	1·94 *n*	14·01	15·95
Germany, Western *CC*	1948	22·615*E,R*	29·589*E,R*	1·161*A,R*	0·713*A,R*	0·334 *R*	7·303 *R*	2·705*E,R*	13·389*E,R*	16·094*A,R*
	1949	27·941 *R*	36·571 *R*	0·713*A,R*	1·089 *R*	0·364	7·783 *R*	3·859 *R*	16·287 *R*	20·146 *R*
	1950	30·473 *R*	40·215 *R*	1·089 *R*	0·494 *R*	0·255	8·110 *R*	5·387 *R*	17·826 *R*	23·213 *R*
	1951	37·305 *R*	48·523 *R*	0·494	0·618	0·221	9·949	6·314	21·112	27·453
	1952	41·504	54·133	0·618	1·219	0·397	10·617	7·102	23·581	30·683
	1953	41·970	54·908	1·219	4·747	0·237	9·078	7·811	21·790	29·601
Iceland	1950–1952	0·001 *d*	0·001 *d*	*N*	*N*	0·001 *d*	0	0·001 *d*	0·001 *d*	0·002 *d*
Ireland, Republic of	1950	0·078	*U*	*U*	*U*	0·041	0	*U*	*U*	*0·119 S*
	1951	0·090	*U*	*U*	*U*	0·025	0	*U*	*U*	*0·115 S*
	1952	0·088	*U*	*U*	*U*	0·019	0	*U*	*U*	*0·107 S*
Italy	1950	2·581 *R*	3·386	0·229 *r*	0·050 *r*	0·009	0·015	*U*	*U*	2·754 *R*
	1951	3·273	4·384	0·050 *r*	0·064 *r*	0·047	0·015	*U*	*U*	3·291
	1952	3·582	4·835	0·064 *r*	0·170 *r*	0·042	0·226	*U*	*U*	3·292
Luxembourg	1950	*0·021 u,B*	*0·040 g,B*	*U*	*U*	*2·622 B*	*N*	*0·062 v,B*	*2·582 B*	*2·644 B*
	1951	*0·023 u,B*	*0·047 g,B*	*U*	*U*	*3·166 B*	*N*	*0·066 v,B*	*3·122 B*	*3·188 B*
	1952	*0·022 u,B*	*0·041 g,B*	*U*	*U*	*3·304 B*	*N*	*0·077 v,B*	*3·249 B*	*3·326 B*
Netherlands	1950	3·800	5·170	*U*	*U*	0·164	1·111	*U*	*U*	2·853
	1951	3·931	5·409	*U*	*U*	0·185	1·196	*U*	*U*	2·920
	1952	4·166	5·750	*U*	*U*	0·193	1·398	*U*	*U*	2·961
Norway	1950	0·052 *R*	*U*	0·123 *R*	0·116 *R*	0·516 *R*	*N*	0·252 *R*	0·323 *R*	0·575 *R*
	1951	0·048	*U*	0·116	0·081	0·322	0	0·140	0·265	0·405
	1952	0·053	*U*	0·081	0·133	0·419	0	0·138	0·282	0·420

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)-(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Poland	1950	*6·047*	—	—	—	—	—	—	—	—
	1951	*6·350*	—	—	—	—	—	—	—	—
Portugal	1950	0·031	0·053	0·014	0·009	0·024	0	0·008	0·052	0·060
	1951	0·033	0·054	0·009	0·009	0·039	0	0·007	0·065	0·072
	1952	0·039	0·066	0·009	0·009	0·022	0	0·005	0·056	0·061
Saar	1950	*3·257 u,B*	*4·316 g,B*	*U*	*U*	*0·053 B*	*1·377 B*	*0·129 v,B*	*1·829 B*	*1·958 y,B*
	1951	*3·849 u,B*	*5·026 g,B*	*U*	*U*	*0·041 B*	*1·091 B*	*0·139 v,B*	*2·659 B*	*2·798 y,B*
	1952	*3·953 u,B*	*5·193 g,B*	*U*	*U*	*0·044 B*	*0·947 B*	*0·147 v,B*	*2·893 B*	*3·040 y,B*
Spain	1950	*0·954 a*	—	—	—	—	—	—	—	—
	1951	*0·995 a*	—	—	—	—	—	—	—	—
	1952	*1·176 a*	—	—	—	—	—	—	—	—
Sweden	1950	0·629	*U*	0·590	0·290	2·309	0·027	*U*	*U*	3·211
	1951	0·567	*U*	0·290	0·500	2·516	0·001	*U*	*U*	2·872
	1952	*D*	*U*	0·500	0·753	2·622	0	*U*	*U*	*D*
Switzerland	1950	0·41	*U*	*N*	*N*	0·59	0	*U*	*U*	1·00
	1951	0·46	*U*	*N*	*N*	0·57	0	*U*	*U*	1·03
	1952	0·46	*U*	*N*	*N*	0·65	0	*U*	*U*	1·11
Trieste	1949	*0·102 a*	—	—	—	—	—	—	—	—
	1950	*0·093 a*	—	—	—	—	—	—	—	—
	1951	*0·093 a*	—	—	—	—	—	—	—	—
	1952	*0·113 a*	—	—	—	—	—	—	—	—
United Kingdom—Great Britain	1950	27·65 *e*	49·43 *g*	2·65 *p*	1·53 *p*	*N*	1·73	*U*	*U*	27·04
	1951	28·90 *e*	51·51 *g*	1·53 *p*	2·05 *p*	*N*	0·30	*U*	*U*	28·08
	1952	30·15 *P,e*	53·76 *P,g*	2·05 *p*	2·96 *P,p*	0·02	0·95	*U*	*U*	28·31
Yugoslavia	1950	0	0	0	0	0·371	0	0	0·371	0·371
	1951	0	0	0	0	0·485	0	0	0·485	0·485
	1952	0	0	0	0	0·466	0	0	0·466	0·466
OCEANIA—										
Australia	*Y* 1950	2·47 *R*	3·85 *R*	*U*	*U*	*N*	*N*	*U*	*U*	2·47 *S*
	Y 1951	2·91	4·69	*U*	*U*	*N*	*N*	*U*	*U*	2·91 *S*
	Y 1952	3·14	5·09	*U*	*U*	*N*	*N*	*U*	*U*	3·14 *S*
New Zealand	1950–1952	*N*	*N*	*N*	*N*	0	0	*N*	*N*	*N*

TABLE 6

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—										
Algeria	1950	0·080 *R*	—	0·011	0·012	0·001	0	*U*	*U*	0·080 *R*
	1951	0·067	—	0·012	0·010	0·003	0	*U*	*U*	0·072
	1952	0·052	—	0·010	0·012	0·003	0	*U*	*U*	0·053
Union of South Africa	1952	0	0	0	0	0	0	0	0	0
AMERICA, NORTH—										
United States of America	1950	2·636 *b*	2·479 *c*	*U, N*	*U, N*	*N*	0·159	*U, e*	*U, N*	2·477 *R*
	1951	2·063 *b*	2·139 *c*	*U, N*	*U, N*	*N*	0·153	*U, e*	*U, N*	2·121
	1952	1·955 *b*	2·025 *c*	*U, N*	*U, N*	*N*	0·120	*U, e*	*U, N*	2·035
AMERICA, SOUTH—										
Chile	1949	0·086 *A*	0·089 *n*	*U*	*U*	*N*	*N*	0·076 *A*	0·010 *A*	0·086 *A*
	1950	0·084 *A*	0·087 *n*	*U*	*U*	*N*	*N*	0·074 *A*	0·010 *A*	0·084 *A*
	1951	0·062 *A*	0·064 *n*	*U*	*U*	*N*	*N*	0·052 *A*	0·010 *A*	0·062 *A*
	1952	0·061 *A*	0·063 *n*	*U*	*U*	*N*	*N*	0·048 *A*	0·013 *A*	0·061 *A*
Surinam	1950–1952	*U*	*U*	*U*	*U*	0	0	*U*	*U*	*U*
ASIA—										
Israel	1950–1952	0	0	0	0	0	0	0	0	0
Japan	*X* 1950	1·586	1·427	0·028	0·033	0	0	0·581	1·000	1·581
	X 1951	1·724 *A*	1·379 *A*	*U*	*U*	0	0	0·770 *A*	0·954 *A*	1·724 *A,S*
	X 1952	1·712 *A*	1·370 *A*	*U*	*U*	0	0	0·850 *A*	0·862 *A*	1·712 *A,S*
Pakistan	1950	0·007	0·007	*N*	0·002	0	0	0·005	0	0·005
	1951	0·014	0·013	0·002	*N*	0	0	0·016	0	0·016
	1952	0·011	0·011	*N*	0·003	0	0	0·008	0	0·008
EUROPE—										
Austria	1950	0·40	0·55	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1951	0·06	0·07	*U*	*U*	0·82	0	*U*	*U*	*0·88 S*
	1952	0·04	0·05	*U*	*U*	0·67	0	*U*	*U*	*0·71 S*
	1953	*N*	*N*	*U*	*U*	0·58	0	*U*	*U*	*0·58 S*
Belgium	1950	1·097 *R*	0·918 *R*	0·025	0·006	0·002	0·015	*U*	*U*	*1·103*
	1951	1·810 *R*	1·629	0·006	0·005	0·254	0·278	*U*	*U*	*1·787*
	1952	1·483	1·335	0·005	0·038	0·003	0·295	*U*	*U*	*1·158*
Finland	1950–1952	0	0	0	0	*N*	0	*N*	*N*	*N*

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
France	1950	6·31	5·93	0·03 *k*	0·02 *k*	0·32 *i*	0·05 *a*	5·12 *d*	1·47	6·59
	1951	8·05	7·61	0·02 *k*	0·03 *k*	0·50 *i*	0·08 *a*	6·85 *d*	1·61	8·46
	1952	7·94	7·57	0·03 *k*	0·03 *k*	0·49 *i*	0·05 *a*	6·82 *d*	1·56	8·38
Germany, Western—										
Hard coal briquettes	1948	2·972	2·811	0·002	0·001	0	0·125 *R*	1·194 *R*	1·654 *R*	2·848 *R*
	1949	3·586	3·394	0·001	0·001	0	0·101 *R*	1·851 *R*	1·634 *R*	3·485 *R*
	1950	3·722	3·548	0·001	0·001	0	0·258 *R*	2·406 *R*	1·058 *R*	3·464 *R*
	1951	4·104	3·941	0·001	0·002	0	0·259	2·999	0·845	3·844
	1952	4·962	4·752	0·002	0·003	0	0·272	3·905	0·784	4·689
	1953	4·899	4·688	0·003	0·003	0	0·381	3·655	0·863	4·518
Brown coal briquettes and brown coal coke	1948	13·349	29·249 *R*	0·248 *E*	0·218 *E,R*	0·079 *R*	1·585	4·826 *R*	7·047 *R*	11·873
	1949	14·852	32·159	0·218 *E,R*	0·224 *R*	0·047	1·606 *R*	6·814 *R*	6·473 *R*	13·287 *R*
	1950	15·577	32·954	0·224*R*	0·153	1·241 *R*	1·602 *R*	8·902*R*	6·385 *R*	15·287 *R*
	1951	16·615	34·714	0·153	0·167	0·823	1·644	8·608	7·172	15·780
	1952	17·104	36·009	0·167	0·259	1·437	1·521	9·259	7·669	16·928
	1953	17·303	36·673	0·259	0·218	2·292	1·583	10·378	7·675	18·053
Iceland	1950–1952	0	0	*N*	*N*	*N*	0	0	*N*	*N*
Ireland, Republic of	1950	0·028	*U*	*U*	*U*	0·095	0	*U*	*U*	*0·123 S*
	1951	0·027	*U*	*U*	*U*	0·108	0	*U*	*U*	*0·135 S*
	1952	0·032	*U*	*U*	*U*	0·097	0	*U*	*U*	*0·129 S*
Italy	1950	*U*	*U*	*U*	*U*	0·022	*N*	*U*	*U*	*U*
	1951	*U*	*U*	*U*	*U*	0·094	*N*	*U*	*U*	*U*
	1952	*U*	*U*	*U*	*U*	0·062	*N*	*U*	*U*	*U*
Netherlands	1950	1·106	*U*	*U*	*U*	0·353	0·010	*U*	*U*	1·449 *S*
	1951	1·135	*U*	*U*	*U*	0·464	0·012	*U*	*U*	1·587 *S*
	1952	1·018	*U*	*U*	*U*	0·525	0·027	*U*	*U*	1·516 *S*
Norway	1950–1952	*N*	*N*	*N*	*N*	*N*	0	*N*	*N*	*N*
Portugal	1950	0·074 *z*	0·067 *E*	*N*	*N*	0·011 *x*	0	0·021 *E*	0·064 *E*	0·085
	1951	0·090 *w*	0·081 *E*	*N*	*N*	0·010 *x*	0	0·025 *E*	0·075 *E*	0·100
	1952	0·094 *w*	0·085 *E*	*N*	*N*	0	0	0·023 *E*	0·071 *E*	0·094
Sweden	1949	0·059	*U*	0	0	0·005	0	*U*	*U*	0·064
	1950	0·003	*U*	0	0·010	0·024	0	*U*	*U*	0·017
	1951	0·058	*U*	0·010	0·061	0·604	0	*U*	*U*	0·611
	1952	*D*	*U*	0·061	0·010	0·550	0	*U*	*U*	*D*
Switzerland	1950	*N*	*N*	*N*	*N*	0·23 *R*	0	*U*	*U*	0·23 *R*
	1951	*N*	*N*	*N*	*N*	0·31	0	*U*	*U*	0·31
	1952	*N*	*N*	*N*	*N*	0·20	0	*U*	*U*	0·20

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
United Kingdom—										
Great Britain	1950	1·42	1·36	0·04	*N*	*N*	0·40	*U*	*U*	1·06 *R*
	1951	1·78	1·68	*N*	0·01	*N*	0·45 *R*	*U*	*U*	1·32 *R*
	1952	1·80	1·74	0·01	0·08	*N*	0·54	*U*	*U*	1·19
Yugoslavia *u*	1947	0·036 *R*	*U*	*U*	*U*	0	0·017 *R*	*U*	*U*	*0·019 S*
	1948	0·078 *R*	*U*	*U*	*U*	*N, R*	0·018 *R*	*U*	*U*	*0·060 S*
	1949	0·042 *R*	*U*	*U*	*U*	0·002 *R*	0·007 *R*	*U*	*U*	*0·037 S*
	1950	0·028 *R*	*U*	*U*	*U*	0	0·007 *R*	*U*	*U*	*0·021 S*
	1951	0·043	*U*	*U*	*U*	0	0·013	*U*	*U*	*0·030 S*
	1952	0·033	*U*	*U*	*U*	0	0·011	*U*	*U*	*0·022 S*
OCEANIA—										
Australia—	*Y* 1950	0·599	1·578	*U*	*U*	*N*	*N*	0·010	0·589	0·599
Victoria *v*	*Y* 1951	0·518	1·362	*U*	*U*	*N*	*N*	0·007	0·511	0·518
	Y 1952	0·577	1·517	*U*	*U*	*N*	*N*	0·001	0·576	0·577
New Zealand	1950–1952	*N*	*N*	*N*	*N*	0	0	*N*	*N*	*N*

STATISTICAL YEAR-BOOK

OF THE

WORLD POWER CONFERENCE

No. 7

Annual statistics for 1950-1952,
with some supplementary and revised statistics
for earlier years and available statistics for 1953;
some additional and revised data on resources

EDITED, WITH INTRODUCTORY AND EXPLANATORY TEXTS
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II. SOLID FUELS—A. COALS, BROWN COAL AND LIGNITE, PEAT, COKE, AND OTHER MANUFACTURED FUEL

RESOURCES

Estimates of some countries' coal reserves fluctuate widely—generally increasing, sometimes decreasing—as successive surveys are made. This is due in part to the discovery of new fields or seams, or to disappointment as to the existence or extent of seams previously thought to have been identified. It arises also from the use of varying criteria as to the technical or economic recoverability of coal in seams according to their thickness, depth, and accessibility to transportation. The subject is complicated, and has an extensive literature of its own, which should be studied if misconceptions are to be avoided. Unlike annual reviews of production, trade, consumption, etc., estimates of resources cannot usually be adapted to standard definitions or explained in brief footnotes. Accordingly, no attempt is made here to calculate continental or world totals of coal resources.

PRODUCTION

Continental and world production of coals in 1934, 1950, 1952, 1953, and 1954, with estimates for 1955, are presented in Table A1, where also the percentage changes during the twenty years from 1934 to the average of 1953–55 are shown. The increase of 45 per cent. in total world production is equivalent to an average annual increase ("compound interest basis") of 1·86 per cent. The corresponding figure for the USSR, where coal production increased more than four-fold in the two decades, and now approaches one-quarter of the world total, is 7·83 per cent. per annum.

TABLE A1: PRODUCTION OF COALS

	Millions of metric tons						% of world production*		1953–55 av. as % of 1934*
	1934	1950	1952	1953	1954	1955 *E*	1934	1953–55 av.	
Africa	13	30	30	31	34	38	*1·2*	*2·2*	*268*
America, North ..	389	523	476	457	394	463	*36·6*	*28·5*	*113*
America, South ..	3	5	6	6	6	7	*0·3*	*0·4*	*220*
Asia †	71	79	90	94	91	93	*6·7*	*6·0*	*131*
Europe ‡	496	553	594	594	603	609	*46·6*	*39·1*	*121*
Oceania	10	16	20	20	21	20	*0·9*	*1·3*	*195*
USSR ø	82	261	301	320	347	370 *A*	*7·7*	*22·5*	*422*
World *§ ..	1,064	1,468	1,518	1,522	1,496	1,600 *A*	*100·0*	*100·0*	*145*

* The percentages and totals have been calculated from more exact statistics than those shown in this table, which have been rounded.
† Excluding the mainland of China (where production in 1934 was reported as 21 million metric tons) and the USSR.
‡ Excluding the USSR and therefore relating to a larger area before than after World War II.
ø Area increased after World War II.
§ Excluding the mainland of China.
A Approximate.
E Estimated, wholly or in part.

Some totals of brown coal and lignite production are shown in Table A2. Total reported production (excluding the USSR) increased in the twenty years from 1934 to 1954 in the proportion 100 : 219, or at an average rate ("compound interest basis") of 4·01 per cent. per annum.

TABLE A2: PRODUCTION OF BROWN COAL AND LIGNITE

	Millions of metric tons					1954 as % of 1934*
	1934	1950	1952	1953	1954	
Europe ‡	171	288	335	356	375	*220*
North America, Asia †, and Oceania ..	9	17	19	19	20	*211*
USSR	11	*U*	*U*	*U*	*U*	—

* The percentages have been calculated from more exact statistics than those shown in this table, which have been rounded.
† Excluding the mainland of China and the USSR.
‡ Excluding the USSR and therefore relating to a larger area before than after World War II.
U Not available.

Totals of reported production of coke are shown in Table A3. Except that production in North America (principally in the United States) has recently varied considerably from year to year, there was relatively little change over the two decades prior to 1952–54 in the continental distribution of coke production. The increase of 86 per cent. in total reported production represents an average annual increase ("compound interest basis") of 3·33 per cent.—a rate considerably greater than that for world coal production.

TABLE A3: PRODUCTION OF COKE

	Millions of metric tons					% of world production*		1952–54 av. as % of 1934*
	1934	1950	1952	1953	1954	1934	1952–54 av.	
Certain countries in:								
Africa	0·3	1·2	1·6	1·7	1·7	*0·3*	*0·8*	*523*
America, North	36·5	74·9	70·4	80·8	61·4	*33·1*	*34·5*	*194*
America, South	*N*	0·6	0·7	0·8 *E*	0·9 *E*	*N*	*0·4*	*U*
Asia †	4·8	7·9	9·9	10·9	10·7	*4·3*	*5·1*	*219*
Europe ‡	67·1	96·2	118·6	118·6	118·1	*60·9*	*57·7*	*177*
Oceania	1·5	2·5	3·1	3·1	3·3	*1·4*	*1·5*	*208*
Totals *†‡	110·2	183·3	204·3	215·9	196·1	*100·0*	*100·0*	*186*

* The percentages and totals have been calculated from more exact statistics than those shown in this table, which have been rounded. Nevertheless, they should be regarded as only approximate.
† Excluding the mainland of China and the USSR.
‡ Excluding the USSR. The figure for 1934 includes the whole of pre-war Germany, while those for post-war years exclude Eastern Germany.
N Reported production negligible.
U Figure not calculable.

TABLES 2, 3, 4, 5, AND 6—DEFINITIONS

The following definitions (including the introductory paragraph), adopted by the World Power Conference, were distributed with the forms for the guidance of the organizations which supplied the statistics:

On account of the varying characteristics of coal in the several countries, of the different bases of classification employed, and of the fact that international study of coal classification is already in progress, it has been deemed inadvisable to attempt to segregate the higher ranking coals —anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from lignite and brown coal or which separate the latter from peat. It will, therefore, be the responsibility of each reporting country when submitting its statistics of solid fuels to determine for itself the basis of classification to be used in distinguishing the three groups to be reported: *viz.* coals, brown coal and lignite, and peat.

13 *Proved Reserves—Coals, Lignite, and Brown Coal*
"Proved reserves" of coals, of lignite, and of brown coal shall mean the total amounts thereof, occurring within the limits hereinafter prescribed, as are of economic value and with respect to which there exist reliable data of actual thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

(*a*) Coals: Seams containing not less than 30 centimetres of merchantable coal and situated not more than 1,200 metres below the surface, including workable submarine seams.

(*b*) Lignite and Brown Coal: Seams containing not less than 30 centimetres of merchantable lignite or brown coal and situated not more than 500 metres below the surface.

14 *Probable Reserves—Coals, Lignite, and Brown Coal*
"Probable reserves" of coals, of lignite, and of brown coal shall mean the aggregate within the reporting country of proved reserves thereof plus such further reserves of economic value within the limits of thickness and depth of seams specified in paragraph 13 hereof, as may, from uncompleted investigations or from relation to proved reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

15 *Peat*
A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent. of organic matter.

16 *Probable Reserves of Peat*
"Probable reserves of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent. moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

17 *Domestic Production—Coals, Lignite, and Brown Coal*
"Domestic production" of coals, of lignite, and of brown coal shall mean the gross amounts thereof raised to the pit-head, less the amounts of dirt or other waste removed in washeries or cleaning plants, plus any increase in weight between the pit-head and weighing-point due to absorption of water in washeries, but without deduction for other losses beyond point of weighing or for amounts used in operation of mines or collieries.

18 *Coal Stocks*
"Coal stocks" shall include the following:

(*a*) "Mine stocks", or the amounts held or stored at the producing properties, whether in dumps at pit-heads, in cars at colliery sidings, or otherwise, and whether billed to purchasers or not.

(*b*) "Stocks in transit", or amounts held or stored in railway classification yards or at points of trans-shipment from rail to water or water to rail while in process of domestic transit from producers to consumers.

(*c*) "Dealers' and consumers' stocks", or the amounts held in storage by coal dealers and by large industrial users, such as by-product coke ovens, railways, electric-power utilities, steel and rolling mills, etc. This item will, in general, include the stocks of only those dealers and consumers to whom, except in case of transhipment, delivery is made directly from mine or water terminal in car-load lots or in boats or barges.

(*d*) "Import stocks", or amounts of foreign coal held in storage at ports of entry pending shipment in domestic trade.

(*e*) "Export stocks", or amounts in storage at export points pending actual export.

(*f*) "Bunker stocks", or amounts held in storage at ports for fuelling vessels engaged in either foreign or domestic trade.

Statistics of stocks shall be reported in totals and may also be reported by the several classes above defined; but each reporting country in submitting its statistics shall state which of the preceding classes, if any, have been omitted from the total which it reports.

19 *Lignite and Brown Coal Stocks*

In so far as there regularly are within any reporting country stocks of lignite or of brown coal in significant quantities within the several classes as specified for coal in paragraph 18 hereof, data for such classes shall be considered necessary for a complete report on stocks. Each reporting country in which complete data are not available, or are not reported, shall state what classes have been included in making up its report.

20 *Statistics of Products*

Where coal, brown coal or lignite are imported, exported, shipped as bunker fuel, or carried in stock in the form of coke or briquettes or other manufactured product, such statistics shall be separately reported in Tables 5 and 6. Petroleum coke shall not be reported in Table 5, but shall be reported in Table 10, Column 7.

TABLE 2

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In millions of metric tons)

Name of country	Coals				Brown coal and lignite				Peat	
	Proved reserves		Total reserves (proved and probable)		Proved reserves		Total reserves (proved and probable)		Total reserves (proved and probable)	
	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity
0	1	2	3	4	5	6	7	8	9	10
AFRICA—										
Algeria	1954	5	1954	20	—	—	—	—	—	—
Egypt	1954	0	1954	0	1954	0	1954	0	1954	0
Union of South Africa	1954	36,874	1954	68,000 *A*	—	*N*	—	*N*	—	0
AMERICA, NORTH—										
Canada	1945	42,227	1945	62,472	1945	12,209	1945	24,450	1924	526
Netherlands Antilles	—	0	—	0	—	0	—	0	—	0
Trinidad and Tobago	—	0	—	0	—	0	—	0	—	0
United States of America	1954	430,560 *g*	1954	1,302,650	—	*U*	1954	419,590	1954	12,544
AMERICA, SOUTH—										
Surinam	1954	0	1954	0	1954	0	1954	0	1954	0
Venezuela	1954	28 *P*	1955	3,068 *P*	—	0	—	0	—	0
ASIA—										
Israel	1954	0	1954	0	1954	0	1954	0	1954	*U*
Japan *a*	1950	4,543 *P*	1950	9,897 *P*	1950	135 *b,P*	1950	258 *b,P*	—	*U*
Pakistan	—	0	—	0	—	0	1954	163·0	1954	8
EUROPE—										
Austria	1955	3·0	1955	4·0	1955	250·0	1955	290	1955	*N*
Belgium	1952	3,268	1947	5,988	—	*N*	—	*N*	—	*N*
Iceland	1955	0	1955	0	—	*U*	—	*U*	—	*U*
Finland	—	0	—	0	—	0	—	0	1950	11,000 *RE*
France *c*	1949	2,748	1949	12,288	1949	100	1949	430	—	—
Germany, Western	1955	67,000	1955	224,300	1955	62,000	—	*U*	—	*U*
Luxembourg	—	0	—	0	—	0	—	0	—	0
Netherlands	1955	3,000 *d*	1955	3,400 *d*	1955	1·4 *e*	1955	1·4 *e*	1955	12·8 *f*
Norway	—	*U*	1939	1,500	—	0	—	0	1955	*h*
Portugal *M*	1954	17	1954	28	1954	28	1954	33	—	*U*

TABLE 2—*continued*

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In millions of metric tons)

Name of country	Coals				Brown coal and lignite				Peat	
	Proved reserves		Total reserves (proved and probable)		Proved reserves		Total reserves (proved and probable)		Total reserves (proved and probable)	
	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity
0	1	2	3	4	5	6	7	8	9	10
EUROPE—*Continued*										
Saar	1954	*U*	1954	*U*	1954	0	1954	0	1954	0
Sweden	1953	40	1953	40	1953	0	1953	0	1952	9,400
Switzerland	—	*N*	—	*N*	—	*N*	—	*N*	—	*N*
United Kingdom	1954	128,386	1954	170,686	1954	*N*	1954	*N*	1954	*U*
Yugoslavia	1954	21	1954	183	1954	7,136	1954	14,032	—	—
OCEANIA—										
Australia	1954	5,500	1954	16,800	1954	7,000	1954	41,000	—	*U*
Netherlands New Guinea	1955	0	1955	0	1955	0	1955	0	1955	0
New Zealand	1954	40	1954	84·5	1954	122·5	1954	785·6	1954	*N*

TABLE 3

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks		Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5 +6)
			At beginning of year	At end of year				
0		1	2	3	4	5	6	7
AFRICA—								
Algeria	1952	0·269	0·156	0·169	0·477	0·068	0·066	0·599
	1953	*0·295*	0·169	0·11	0·3	0·09	0·04	0·53
	1954	*0·303*	0·11	0·1	0·3	0·05	0·02	0·53
	1955	*0·303*	—	—	—	—	—	—
Angola	1952	0	*U*	*U*	0·037	0	0	*0·037 S*
	1953	0	*U*	*U*	0·024	0	0	*0·024 S*
	1954	0	*U*	*U*	0·032	0	0	*0·032 S*
Belgian Congo	1952	*0·253*	—	—	—	—	—	—
	1953	*0·315*	—	—	—	—	—	—
	1954	*0·379*	—	—	—	—	—	—
Egypt	1952	0	—	—	0·190	0	0·008	0·182
	1953	0	—	—	0·070	0	0·002	0·068
	1954	0	—	—	0·123	0	0·003	0·120
Morocco, French	1952	0·450 *R*	0·042	0·078	0·111	0·186 *g*	*x*	0·339
	1953	0·565	0·078	0·083	0·103	0·168 *g*	*x*	0·495
	1954	0·486	0·083	0·120	0·116	0·217 *g*	*x*	0·348
	1955	*0·467*	—	—	—	—	—	—
Mozambique	1952	0·115 *R*	*U*	*U*	0·225	0	0	*0·340S*
	1953	0·162	*U*	*U*	0·210	0	0	*0·372S*
	1954	0·142	*U*	*U*	0·227	0	0	*0·369S*
Nigeria	1952	0·6	*U*	*U*	*N*	*N*	*N*	*U*
	1953	0·7	*U*	*U*	*N*	*N*	*N*	*U*
	1954	0·6	*U*	*U*	*N*	*N*	*N*	*U*
	1955	*0·760*	—	—	—	—	—	—
Portuguese Guinea	1952	0	*U*	*U*	0·001	*U*	*U*	*U*
	1953	0	*U*	*U*	*U*	*U*	*U*	*U*
	1954	0	*U*	*U*	*U*	*U*	*U*	*U*
Southern Rhodesia	1952	*2·559*	—	—	—	—	—	—
	1953	*2·618*	—	—	—	—	—	—
	1954	*2·748*	—	—	—	—	—	—
	1955	*3·316*	—	—	—	—	—	—
Tunisia	1952	0	0	0	0·169	0	*U*	0·169 *A*
	1953	0	0	0	0·074	0	*U*	0·074 *A*
	1954	0	0	0	0·064	0	*U*	0·064 *A*
Union of South Africa	1952	26·17 *R*	*U*	*U*	0·08	0·85	0·16 *R*	25·26 *R*
	1953	26·46 *R*	*U*	*U*	0·03	1·20	0·08	25·20
	1954	*29·317*	*U*	*U*	*N*	1·13	0·07	*D*
	1955	*32·256*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
AMERICA, NORTH—								
Canada	1952	14·06	0·16 a	0·18 a	22·31	0·34	0 b	36·01
	1953	12·59	0·18 a	0·30 a	20·77	0·22	0 b	33·02
	1954	11·61	0·30 a	0·36 a	16·62	0·19	0 b	27·98
	1955	*11·296*	—	—	—	—	—	—
Mexico	1952	*1·319*	—	—	—	—	—	—
	1953	*1·436*	—	—	—	—	—	—
	1954	*1·311*	—	—	—	—	—	—
	1955	*1·340*	—	—	—	—	—	—
Netherlands Antilles	1954	0	*D*	*D*	*N*	0	0	*D*
Trinidad and Tobago	1952	0	*U*	*U*	0·016 q	0	*U*	*U*
	1953	0	*U*	*U*	0·015 q	0	*U*	*U*
	1954	0	*U*	*U*	0·002 q	0	*U*	*U*
United States of America	1952	460·8	75·5 s	76·9 s	*N*	48·1	*N*	411·3
	1953	443·1	76·9 s	79·3 s	*N*	33·5	*N*	406·3
	1954	380·6	79·3 s	68·1 s	*N*	30·6	*N*	429·4 *E*
	1955	*450 A*	—	—	—	—	—	—
AMERICA, SOUTH—								
Argentina	1952	0·112	—	—	—	0	—	—
	1953	*0·082*	—	—	—	—	—	—
	1954	*0·093*	—	—	—	—	—	—
	1955	*0·133*	—	—	—	—	—	—
Brazil	1952	1·960	*N*	*N*	0·883	0	*N*	1·843
	1953	2·025	*N*	*N*	0·765	0	*N*	2·790
	1954	2·055	*N*	*N*	0·907	0	*N*	2·962
	1955	*2·296*	—	—	—	—	—	—
Chile	1952	2·450	0·034	0·059	0·183	0	*N*	2·608
	1953	*2·336 aa*	—	—	—	—	—	—
	1954	*2·267 aa*	—	—	—	—	—	—
	1955	*2·307 aa*	—	—	—	—	—	—
Columbia	1950	*1·010 R*	—	—	—	—	—	—
	1951	*1·115 R*	—	—	—	—	—	—
	1952	*0·966 R*	—	—	—	—	—	—
	1953	*1·230*	—	—	—	—	—	—
	1954	*1·5 P*	—	—	—	—	—	—
Peru	1952	*0·225 R*	—	—	—	—	—	—
	1953	*0·210*	—	—	—	—	—	—
	1954	*0·2*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5+6)
0		1	2	3	4	5	6	7
AMERICA, SOUTH—*Continued*								
Surinam	1952	0	0·000	0·001	0·003	0	0	0·003
	1953	0	0·001	0·002	0·004	0	0	0·003
	1954	0	0·002	0·001	0·002	0	0	0·003
Venezuela	1952	0·025 *P*	0	0	0	0	0	0·025
	1953	0·029 *P*	0	0	0	0	0	0·029
	1954	0·032 *P*	0	0	0	0	0	0·032
ASIA—								
Ceylon	1952	—	—	—	0·275 *R*	—	0·033	—
	1953	—	—	—	0·250	—	0·024	—
	1954	—	—	—	0·272	—	0·019	—
China—Taiwan (Formosa)	1952	*2·286*	—	—	—	—	—	—
	1953	*2·393*	—	—	—	—	—	—
	1954	*2·113*	—	—	—	—	—	—
	1955	*2·360*	—	—	—	—	—	—
India	1952	*36·887 bb*	*2·688 m*	*3·068 m*	—	—	—	—
	1953	*36·556 bb*	*3·068 m*	*3·466 m*	—	—	—	—
	1954	*37·358 bb*	*3·466 m*	*3·557 m*	—	—	—	—
	1955	*38·826 bb*	*3·557 m*	*3·667 m*	—	—	—	—
Indochina	1952	0·835 *R*	*U*	*U*	0·025	0·195	*U*	*U*
	1953	0·887	*U*	*U*	*U*	0·347	*U*	*U*
	1954	0·973	*U*	*U*	*U*	0·461	*U*	*U*
Indonesia	1952	*0·969 R*	—	—	—	—	—	—
	1953	*0·897*	—	—	—	—	—	—
	1954	*0·894*	—	—	—	—	—	—
	1955	*0·814*	—	—	—	—	—	—
Iran	1952	*0·170*	—	—	—	—	—	—
	1953	*0·150*	—	—	—	—	—	—
	1954	*0·155*	—	—	—	—	—	—
Israel	1952	0	*U*	*U*	0·036 *E*	0	0·001	0·035 *E*
	1953	0	*U*	*U*	0·034	0	*U*	0·034 *g*
	1954	0	*U*	*U*	0·033	0	*U*	0·033 *g*
Japan *u*	1952	43·359 *R*	3·448 *R,v*	3·688 *R,v*	3·355	0·471 *R*	0·299	45·704 *R*
	1953	46·531	3·688 *v*	6·891 *v*	4·921	0·485	0·165	47·599
	1954	42·718	6·891 *v*	7·335 *v*	3·598	0·321	0·102	45·449
	1955	*42·425*	7·335 *v*	*6·5 A*	—	—	—	—
Korea, South	1952	*0·578 cc*	—	—	—	—	—	—
	1953	*0·867 cc*	—	—	—	—	—	—
	1954	*0·891 cc*	—	—	—	—	—	—
	1955	*1·308 cc*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5 +6)
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Macao	1952	0	*U*	*U*	0·003	0	0	0·003 *S*
	1953	0	*U*	*U*	0·004	0	0	0·004 *S*
	1954	0	*U*	*U*	0·003	0	0	0·003 *S*
Malaya	1952	0·320	*U*	*U*	0·180	*N*	0·033	0·47 *S*
	1953	0·291	*U*	*U*	0·089	*N*	0·015	0·36 *S*
	1954	0·228	*U*	*U*	0·066	*N*	0·014	0·28 *S*
Pakistan	1952	0	*N*	0·650	1·694	0	0·007	1·037
	1953	0	0·650	0·574	1·211	0	0·007	1·280
	1954	0	0·574	0·343	1·108	0	0·007	1·332
Philippines	1952	*0·139*	—	—	—	—	—	—
	1953	*0·155*	—	—	—	—	—	—
	1954	*0·120*	—	—	—	—	—	—
Turkey	1950	*4·361 R*	—	—	—	—	—	—
	1951	*4·730*	—	—	—	—	—	—
	1952	4·846	*U*	*U*	0	0·134	*N*	*4·712 S*
	1953	5·655	*U*	*U*	0	0	*N*	*5·655 S*
	1954	5·714	*U*	*U*	0	0	*N*	*5·714 S*
	1955	*5·503*	—	—	—	—	—	—
U.S.S.R.: see end of table								
EUROPE—								
Austria	1952	0·19	*U*	*U*	3·75	0	0	3·94 *S*
	1953	0·16	*U*	*U*	3·45	0	0	3·61 *S*
	1954	0·18	*U*	*U*	3·86	0	0	4·04 *S*
	1955	*0·171*	—	—	*4·1 B*	—	—	—
Belgium	1952	30·384	0·221	1·678	2·005	2·401	0·028	28·503
	1953	30·060	1·678	3·063	2·432	4·008	0·015	27·069
	1954	29·249	3·076	2·815	3·725	5·681	*h*	27·554 *g*
	1955	*29·955*	2·815	*0·371*	—	—	—	—
Czechoslovakia	1948	17·7	—	—	—	—	—	—
	1949	17·0	—	—	—	—	—	—
	1950	18·5	—	—	—	—	—	—
	1951	18·4	—	—	—	—	—	—
	1952	20·3	—	—	—	—	—	—
	1953	20·3	—	—	—	—	—	—
	1954	21·6	—	—	—	—	—	—
	1955	22·1 *P*	—	—	—	—	—	—
Denmark	1952	0	*1·226 t,wB,*	1·188	4·090	0	*U*	*U*
	1953	0	1·188	1·238	4·215	0	*U*	*U*
	1954	0	1·238	*1·167*	4·380	0	*U*	*U*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Finland	1952	0	*U*	*U*	2·255	0	*U*	*U*
	1953	0	*U*	*U*	1·824	0	*U*	*U*
	1954	0	*U*	*U*	1·794	0	*U*	*U*
France	1952	55·4	1·56 *f*	4·39 *f*	12·48 *j*	1·58 *z*	*h*	63·5 *g*
	1953	52·59	4·39 *f*	5·79 *f*	10·16 *j*	2·39 *z*	*h*	58·96 *g*
	1954	54·40	5·79 *f*	7·87 *f*	11·25 *j*	2·85 *z*	*h*	60·72 *g*
	1955	*55·336*	7·87 *f*	*6·05 f*	*10·78 B*	*5·84 B*	—	—
Germany, Eastern	1945	*1·9*	—	—	—	—	—	—
	1946	*2·52*	—	—	—	—	—	—
	1947	*2·75*	—	—	—	—	—	—
	1948	*2·8*	—	—	—	—	—	—
	1949	*3·0*	—	—	—	—	—	—
	1950	*2·8*	—	—	—	—	—	—
	1951	*3·2*	—	—	—	—	—	—
	1952	*2·9*	—	—	—	—	—	—
	1953	*2·9*	—	—	—	—	—	—
	1954	*2·9*	—	—	—	—	—	—
Germany, Western	1952	123·278	3·518 *R,c*	4·628 *R,c*	11·832 *d*	14·355 *R,d*	0·365	119·280 *R*
	1953	124·472	4·628 *R,c*	5·041 *R,c*	9·441 *R,d*	15·820 *R,d*	0·193 *R*	117·487 *R*
	1954	128·035	5·041 *c*	4·411 *c*	8·323 *d*	17·920 *d*	0·204	118·864
	1955	*130·728*	—	—	*15·88 B*	—	—	—
Hungary	1952	1·8	—	—	—	—	—	—
	1953	2·1	—	—	—	—	—	—
	1954	2·6	—	—	—	—	—	—
Iceland	1952	0	*U*	*U*	0·060	0	*U*	*U*
	1953	0	*U*	*U*	0·048	0	*U*	*U*
	1954	0	*U*	*U*	0·043	0	*U*	*U*
Ireland, Republic of	1952	0·166	0·225	0·328	1·725	0	*N*	1·788
	1953	0·167	0·328	0·302	1·667	0·012	*N*	1·848
	1954	0·195 *E*	0·302	0·236	1·737	0·011 *e*	*N*	1·987
	1955	*0·198*	0·236	*0·123*	—	*0·002 B*	—	—
Italy	1952	1·090	1·718	1·270	9·143	*N*	0·004	10·677
	1953	1·131	*C*	*C*	9·206	*N*	0·003	10·477
	1954	1·074	*C*	*C*	9·512	*N*	0·003 *E*	10·9
	1955	1·135	*C*	*C*	10·317	*N*	*D*	11·5 *E*
Luxembourg	1952	0	*U, N*	*U, N*	0·374	0	0	0·374
	1953	0	*U, N*	*U, N*	0·276	0	0	0·276
	1954	0	*U, N*	*U, N*	0·286	0	0	0·286
	1955	—	—	—	*0·291 B*	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Netherlands	1952	12·532	0·140 *m*	0·237 *m*	5·274 *y,SS*	0·016 *SS*	0·050	17·740 *S*
	1953	12·297	0·237 *m*	0·213 *m*	5·147 *y,SS*	0·296 *SS*	0·030	17·118 *S*
	1954	12·071	0·213 *m*	0·287 *m*	7·019 *y,SS*	1·051 *SS*	0·012	18·027 *S*
	1955	*11·893*	0·287 *m*	*0·292 m*	—	*0·92 B*	—	—
Norway	*R* 1952	0·452 *k*	0·861	0·636	0·689	0·168	*N*	1·198
	1953	0·398 *k*	0·636	0·535	0·718	0·126	*N*	1·091
	1954	0·332 *k*	0·535	0·415	0·632	0·136	*N*	0·948
	1955	*0·322 k*	—	—	—	—	—	—
Poland	1952	*84·437 B*	—	—	—	—	—	—
	1953	*88·6 B*	—	—	—	—	—	—
	1954	*91·3 B*	—	—	—	—	—	—
Portugal *PP*	1952	0·446	0·270	0·273	0·442	*N, R*	*U, R*	0·885 *g*
	1953	0·478	0·273	0·280	0·551	*N*	*U*	1·002 *g*
	1954	0·432	0·280	0·295	0·446	*N*	*U*	0·863 *g*
	1955	*0·413*	0·295	*0·351*	—	—	—	—
Saar	1952	16·235	0·010 *R*	0·191 *R*	1·092	7·916	*N*	9·230 *R*
	1953	16·417 *R*	0·191 *R*	0·340 *R*	0·934 *R*	8·873 *R*	*N*	8·329 *R*
	1954	16·818	0·340	0·543	0·895	9·048	*N*	8·462
	1955	*17·331*	—	—	*1·022 B*	*9·771 B*	—	—
Spain	1952	*12·060 R*	—	—	—	—	—	—
	1953	*12·156 R*	—	—	—	—	—	—
	1954	*12·384*	—	—	—	—	—	—
	1955	*12·390*	—	—	—	—	—	—
Sweden	1952	0·347	1·27	1·20	4·8	0	*U*	5·26 *g*
	1953	0·285	1·20	*C*	3·7	0	*U*	*U*
	1954	0·267	*C*	*C*	3·0	0	*U*	*U*
	1955	*0·280*	—	—	*3·2 B*	—	—	—
Switzerland	1952	0	*N*	*N*	2·0	0	0	2·0
	1953	0	*N*	*N*	1·5	0	0	1·5
	1954	0	*N*	*N*	1·9	0	0	1·9
	1955	0	*N*	*N*	1·9	0	0	1·9
United Kingdom	1952	230·23 *R*	17·32 *R,p*	20·77 *R,p*	0·32	11·94	3·35	211·81 *R*
	1953	227·81	20·77 *p*	19·84 *p*	0·56	14·20	2·88	212·22
	1954	227·91	19·84 *p*	17·09 *p*	3·00	13·94	2·54	217·18
	1955	*225·13*	17·09 *p*	*20·9 A,p*	*11·55 B*	—	—	—
Yugoslavia	1952	1·011	*C*	*C*	0·136	0·061	*U*	*U*
	1953	0·925	*C*	*C*	0·448	0·092	*U*	*U*
	1954	0·952	*C*	*C*	0·617	0·089	*U*	*U*
	1955	*1·1*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0	1	2	3	4	5	6	7
EUROPE—*Continued*							
U.S.S.R.: see end of table							
OCEANIA—							
Australia *Y* 1952	19·477	1·155 *R*	2·696 *R*	0·290	0·141	0·055	18·030 *R*
Y 1953	18·841	2·696 *R*	3·266 *R*	0·146	0·261	0·044	18·112 *R*
Y 1954	19·735	3·266	3·523	0·002	0·392	0·033	19·055
Y 1955	*19·660*	—	—	—	—	—	—
Netherlands New Guinea 1952–1954	0	0	0	*N*	0	0	0
New Zealand 1952	0·9	*U*	*U*	*N*	*N*	—	0·9 *S*
1953	0·7	*U*	*U*	*N*	*N*	—	0·7 *S*
1954	0·8	*U*	*U*	*N*	*N*	—	0·8 *S*
1955	*0·797*	—	—	—	—	—	—
U.S.S.R. 1950	*261·1 dd*	—	—	—	—	—	—
1951	*281·9 dd*	—	—	—	—	—	—
1952	*300·9 dd*	—	—	—	—	—	—
1953	*320·4 dd*	—	—	—	—	—	—
1954	*347·1 dd*						

TABLE 4

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite						Peat
		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) —(cols. 3+5)	Production
0		1	2	3	4	5	6	7
AFRICA—								
Egypt	1952–1954	0	0	0	0	0	0	0
Union of South Africa	1952–1954	0	0	0	0	0	0	0
AMERICA, NORTH—								
Canada	1952	1·890	0·001	0·003	0·007	0·012	1·883	0
	1953	1·833	0·003	0·003	0·003	0·012	1·824	0
	1954	1·920	0·003	0·004	0·003	0·012	1·910	0
	1955	*2·082*	—	—	—	—	—	—
Trinidad and Tobago	1952–1954	*n*	*n*	*n*	*n*	*n*	*n*	0
United States of America	1952	3	*N*	*N*	*N*	*N*	3	0·191 *g*
	1953	3	*N*	*N*	*N*	*N*	3	0·185 *g*
	1954	3	*N*	*N*	*N*	*N*	3	0·221 *g*
AMERICA, SOUTH—								
Brazil	1952–1954	0	0	0	0	0	0	0
Surinam	1952–1954	0	0	0	0	0	0	0
Venezuala	1952–1954	0	0	0	0	0	0	0
ASIA—								
Israel	1952–1954	0	0	0	0	0	0	0
Japan *a*	1952	1·539 *a*	0·015 *a,m*	0·020 *a,m*	0	0	1·534 *a*	*U*
	1953	1·486 *a*	0·020 *a,m*	0·010 *a,m*	0	0	1·496 *a*	*U*
	1954	1·444 *a*	0·010 *a,m*	0·011 *a,m*	0	0	1·443 *a*	*U*
	1955	*1·369 a*	—	—	—	—	—	—
Malaya, Federation of	1952	*0·320 q*	—	—	—	—	—	—
	1953	*0·291 q*	—	—	—	—	—	—
	1954	*0·229 q*	—	—	—	—	—	—
	1955	*0·209 q*	—	—	—	—	—	—
Pakistan	1952	0·601	0·046	0·014	0	0	0·633	0
	1953	0·585	0·014	0·034	0	0	0·565	0
	1954	0·549	0·034	0·038	0	0	0·545	0

TABLE 4—*continued*

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite						Peat
		Production	Stocks		Imports	Exports	Total consumption (cols. 1+2+4) —(cols. 3+5)	Production
			At beginning of year	At end of year				
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Turkey	1952	1·387	*U*	*U*	0	0	1·387 *S*	0
	1953	1·640	*U*	*U*	0	0	1·640 *S*	0
	1954	2·100	*U*	*U*	0	0	2·100 *S*	0
EUROPE—								
Austria	1951	4·99	*U*	*U*	0·57 *R*	0	5·56 *R*	*N*
	1952	5·18	*U*	*U*	0·34	0	5·52	*N*
	1953	5·57	*U*	*U*	0·21	0	5·78	*N*
	1954	6·29	*U*	*U*	0·22	0·2	6·49	*N*
	1955	*6·62 B*	—	—	—	—	—	—
Belgium	1952	*N*	*U*	*U*	*N*	0	*U*	0·006
	1953	*N*	*U*	*U*	*N*	0	*U*	0·008
	1954	*N*	*U*	*U*	*N*	0	*U*	0·002
Bulgaria	1950	*5·6 c,B,R*	—	—	—	—	—	—
	1951	*6·1 c,B,R*	—	—	—	—	—	—
	1952	*7·1 c,B,R*	—	—	—	—	—	—
	1953	*8·0 c,B*	—	—	—	—	—	—
	1954	*8·6 c,B*	—	—	—	—	—	—
Czechoslovakia	1948	23·6	—	—	—	—	—	—
	1949	26·5	—	—	—	—	—	—
	1950	27·5	—	—	—	—	—	—
	1951	30·2	—	—	—	—	—	—
	1952	33·3	—	—	—	—	—	—
	1953	34·4	—	—	—	—	—	—
	1954	37·9	—	—	—	—	—	—
	1955	40·7 *P*	—	—	—	—	—	—
Denmark	1952	1·601	—	—	0·225	—	—	—
	1953	0·798 *R*	0·001	0·004	0·115	0	0·910	0·574
	1954	0·679	0·004	—	0·194	0	—	0·545
	1955	*0·8*	—	—	—	—	—	—
Finland	1952	0	*U*	*U*	0·051 *b*	0	*U*	0·24 *R*
	1953	0	*U*	*U*	0·044 *b*	0	*U*	0·20
	1954	0	*U*	*U*	0·045 *b*	0	*U*	0·15
France	1952	1·99	*N, e*	0·09 *e*	0	*N*	1·90	0·08 *k*
	1953	1·95	0·09 *e*	0·18 *e*	0	0·01	1·85	0·02 *k*
	1954	1·91	0·18 *e*	0·16 *e*	0	0·04	1·89	0·05 *k*
	1955	*2·05 B*	—	—	—	*0·23 B*	—	—
Germany, Eastern	1945	*85·2 q,B*	—	—	—	—	—	—
	1946	*109·8 q,B*	—	—	—	—	—	—
	1947	*101·7 q,B*	—	—	—	—	—	—
	1948	*110·1 q,B*	—	—	—	—	—	—
	1949	*127·5 q,B*	—	—	—	—	—	—

Continued on page 26

TABLE 4—*continued*

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite						Peat
		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) −(cols. 3+5)	Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Germany, Eastern—*Continued*	1950	*137·3 q,B*	—	—	—	—	—	—
	1951	*152·5 q,B*	—	—	—	—	—	—
	1952	*159·1 q,B*	—	—	—	—	—	—
	1953	*175·0 q,B*	—	—	—	—	—	—
	1954	*183·8 q,B*	—	—	—	—	—	—
Germany, Western *s*	1952	85·152 *s*	0·477 *t*	0·422 *t,R*	0·597 *R*	0·842 *u*	84·962 *s,R*	*U*
	1953	86·237 *s,R*	0·422 *t,R*	0·419 *t,R*	0·595	0	86·835 *s*	*U*
	1954	89·540 *s*	0·419 *t*	0·408 *t*	0·694	0·085 *u*	90·160 *s*	*U*
	1955	*92·174 s,B*	—	—	—	—	—	—
Greece	1952	*0·256 q*	—	—	—	—	—	—
	1953	*0·444 q*	—	—	—	—	—	—
	1954	*0·700 q*	—	—	—	—	—	—
	1955	*0·9 q*	—	—	—	—	—	—
Hungary	1952	16·9	—	—	—	—	—	—
	1953	19·2	—	—	—	—	—	—
	1954	19·4	—	—	—	—	—	—
Iceland	1952	0	0	0	0	0	0	0·002 *E*
	1953	0	0	0	0	0	0	*N*
	1954	*N*	0	0	0	0	*N*	*N*
Ireland, Republic of	1952	0	0	0	*U*	0·005	*U*	3·955 *R*
	1953	0	0	0	*U*	0·005	*U*	3·845
	1954	0	0	0	*U*	0·003	*U*	2·744 *P*
Italy	1952	0·839	*U*	*U*	0·050	0	0·889 *S*	*U*
	1953	0·758	*U*	*U*	0	0	0·846 *E*	*U*
	1954	0·644	*U*	*U*	0	0	0·765 *E*	*U*
	1955	0·416	*U*	*U*	0	0	0·520 *E*	*U*
Luxembourg	1952	0	*N*	*N*	0·152	0	0·152	0
	1953	0	*N*	*N*	0·131	0	0·131	0
	1954	0	*N*	*N*	0·139	0	0·139	0
Netherlands	1952	0·235	*U*	*U*	0·000 *SS*	0·011 *SS,R*	0·224 *S,R*	0·597
	1953	0·252	*U*	*U*	0·000 *SS*	0·002 *SS*	0·250 *S*	0·329 *v*
	1954	0·172	*U*	*U*	0·076 *SS*	0·002 *SS*	0·246 *S*	0·387 *v*
	1955	*0·255 B*	—	—	—	*0·011 B*	—	—
Norway	1952	0	0·002	0·010	0·042	0	0·034	1·112 *w*
	1953	0	0·010	0·001	0·011	0	0·020	0·846 *w*
	1954	0	0·001	0·002	0·007	0	0·006	0·795 *w*

TABLE 4

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Brown coal and lignite: Production	Brown coal and lignite: Stocks: At beginning of year	Brown coal and lignite: Stocks: At end of year	Brown coal and lignite: Imports	Brown coal and lignite: Exports	Brown coal and lignite: Total consumption (cols. 1+2+4)−(cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Poland	1951	*5·9 R,B*	—	—	—	—	—	—
	1952	*6·2 B*	—	—	—	—	—	—
	1953	*6·9 B*	—	—	—	—	—	—
	1954	*7·1 B*	—	—	—	—	—	—
Portugal *M*	1952	0·076	0·038	0·041	0	0	0·073	*N*
	1953	0·071	0·041	0·032	0	0	0·080	*N*
	1954	0·065	0·032	0·029	0	0	0·068	*N*
	1955	*0·089*	—	—	—	—	—	—
Roumania	1951	*3·5 R,B*	—	—	—	—	—	—
	1952	*3·9 R,B*	—	—	—	—	—	—
	1953	*4·1 B*	—	—	—	—	—	—
	1954	*4·1 B*	—	—	—	—	—	—
Saar	1952–1954	0	0	0	0	0	0	0
Spain	1952	*1·596*	—	—	—	—	—	—
	1953	*1·788 R*	—	—	—	—	—	—
	1954	*1·740*	—	—	—	—	—	—
	1955	*1·824*	—	—	—	—	—	—
Sweden	1952	0	*U*	*U*	0	0	*U*	0·070
	1953	0	*U*	*U*	0	0	*U*	0·031
	1954	0	*U*	*U*	0	0	*U*	*D*
Switzerland	1952–1955	*N*	*N*	*N*	*N*	0	*N*	*N*
United Kingdom	1952–1954	0	*U*	*U*	0	0	*N*	*U*
Yugoslavia	1952	11·087	*C*	*C*	0	0·095	*U*	0
	1953	10·321	*C*	*C*	0	0·054	*U*	0
	1954	12·675	*C*	*C*	0	0·099	*U*	0
	1955	*14*	—	—	—	—	—	—
OCEANIA—								
Australia	1952	8·226	*U*	*U*	0	0	8·226 *S*	0
	1953	8·204	*U*	*U*	0	0	8·204 *S*	0
	1954	8·870	*U*	*U*	0	0	8·870 *S*	0
Netherlands New Guinea	1952–1954	0	0	0	0	0	0	0
New Zealand	1952	1·8	*U*	*U*	*N*	*N*	1·8 *S*	*U*
	1953	1·8	*U*	*U*	*N*	*N*	1·8 *S*	*U*
	1954	1·8	*U*	*U*	*N*	*N*	1·8 *S*	*U*
	1955	*1·8*	—	—	—	—	—	—

TABLE 5

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—										
Algeria	1952	0·097	0·107	0·006	0·013	—	—	0·001	0·089	0·090
	1953	0·088	0·097	0·013	0·009	—	—	0·002	0·090	0·092
	1954	0·094	0·104	0·009	0·010	—	—	0·002	0·091	0·093
Egypt	1952	0·022	0·031	0·007	0·009	0·008	0	—	—	0·037
	1953	0·021	0·029	0·009	0·007	0·006	0	—	—	0·036
	1954	0·021	0·030	0·007	0·006	0·013	0	—	—	0·041
Southern Rhodesia	1952	*0·110 a*	—	—	—	—	—	—	—	—
	1953	*0·135 a*	—	—	—	—	—	—	—	—
	1954	*0·144 a*	—	—	—	—	—	—	—	—
Tunisia	1952	0·013	0·030	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1953	0·016	0·034	*U*	*U*	*U*	*U*	*U*	*U*	*U*
	1954	0·010	0·021	*U*	*U*	*U*	*U*	*U*	*U*	*U*
Union of South Africa	1952	1·31 *R*	1·89 *R*	*U*	*U*	*N*	0·04	*U*	*U*	1·27 *S*
	1953	1·40	2·00	*U*	*U*	*N*	0·01	*U*	*U*	1·39 *S*
	1954	*1·4 a*	—	*U*	*U*	*N*	0·01	*U*	*U*	—
AMERICA, NORTH—										
Canada	1952	3·67	5·05	0·41	0·41	0·49	0·27	0·42	3·47	3·89
	1953	3·87	5·27	0·41	0·47	0·33	0·15	0·33	3·66	3·99
	1954	3·09	4·23	0·47	0·49	0·23	0·10	0·29	2·92	3·21
Mexico	1952	*0·463 a*	—	—	—	—	—	—	—	—
	1953	*0·389 a*	—	—	—	—	—	—	—	—
	1954	*0·399 a*	—	—	—	—	—	—	—	—
Netherlands Antilles	1954	0	0	*D*	*D*	*D*	*D*	0	0	0
Trinidad and Tobago	1952–1954	0	0	*U*	*U*	*N*	0	*U*	*U*	*U*
United States of America	1952	66·231	88·807 *g*	2·117	2·427	0·284	0·719	*U*	*U*	65·486
	1953	76·579	103·032 *g*	2·427	3·218	0·143	0·472	*U*	*U*	75·459
	1954	57·948	78·021 *g*	3·218	3·278	0·105	0·349	*U*	*U*	57·644
AMERICA, SOUTH—										
Brazil	1952	0·321	0·437	*N*	0·001	0·031	0	0	*0·351*	*0·351*
	1953	0·356	0·484	0·001	0·019	0·004	0	0	*0·342*	*0·342*
	1954	0·492	0·669	0·019	0·002	0·035	0	0	*0·544*	*0·544*
Chile	1952	0·39	—	*U*	*U*	*N*	0·018	0·12	0·27	0·39 *S*
Surinam	1952–1954	*N*	*N*	*N*	*N*	0	*N*	0	*N*	*N*

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AMERICA, SOUTH—*Continued*										
Venezuela	1952–1954	0	0	0	0	0	0	0	0	0
ASIA—										
China—Tairan (Formosa)	1952	*0·130 a*	—	—	—	—	—	—	—	—
	1953	*0·151 a*	—	—	—	—	—	—	—	—
	1954	*0·123 a*	—	—	—	—	—	—	—	—
India	1952	3·61	4·93 *k*	0·34 *i*	0·24 *i*	0	0·011	*U*	*U*	*3·70 A*
Israel	1952	0	0	*U*	*U*	0·001	0	0	0·001 *S*	0·001 *S*
	1953	0	0	*U*	*U*	0·002	0	0	0·002 *S*	0·002 *S*
	1954	0	0	*U*	*U*	0·003	0	0	0·003 *S*	0·003 *S*
Japan	1952	5·876 *R*	8·780	0·337 *R,s*	0·282 *R,s*	*N*	0·001 *R*	*U*	*U*	5·930 *R*
	1953	6·912	10·137	0·282 *s*	0·332 *s*	*N*	*N*	*U*	*U*	6·862
	1954	6·595	9·642	0·332 *s*	0·330 *s*	*N*	0·001	*U*	*U*	6·596
Pakistan	1952	0	0	—	—	0·039	0	0·019	0·010	0·029
	1953	0	0	—	—	0·047	0	0·018	0·029	0·047
	1954	0	0	—	—	0·045	0	0·014	0·031	0·045
Turkey	1952	0·331 *A*	*U*	*U*	*U*	0	0	—	—	—
	1953	0·410 *A*	*U*	*U*	*U*	0	0	—	—	—
	1954	0·440 *A*	*U*	*U*	*U*	0	0	—	—	—
EUROPE—										
Austria	1952	1·68 *R*	2·11	*U*	*N*	0·29	0	0·50	1·47 *R*	1·97 *R*
	1953	1·63 *R*	2·04 *R*	*N*	*N*	0·29	0	0·47	1·45	1·92 *R*
	1954	1·81	2·31	*N*	*N*	0·37	0	0·63	1·55	2·18
	1955	*1·886 B*	*2·38 B*	—	—	*0·37 B*	*0 B*	*0·63 B*	*1·63*	*2·26*
Belgium	1952	6·407	8·329	0·063	0·093	3·220	0·854	*U*	*U*	8·743
	1953	5·945	7·729	0·093	0·201	3·018	0·736	*U*	*U*	8·119
	1954	6·147	7·991	0·201	0·127	0·083	0·886	*U*	*U*	5·418
	1955	*6·60 B*	*8·58 B*	—	—	—	*0·78 B*	—	—	—
Czechoslovakia	1951	*5·076 a*	—	—	—	—	—	—	—	—
	1952	*5·580 a*	—	—	—	—	—	—	—	—
	1953	*5·913 a*	—	—	—	—	—	—	—	—
	1954	*5·987 a*	—	—	—	—	—	—	—	—
Denmark	1952	0·559 *t*	*U*	*U*	*U*	1·850 *c*	*U*	*U*	*U*	*U*
	1953	0·545 *t*	*U*	0·470	0·525	1·9	0	*U*	*U*	*U*
	1954	0·539 *t*	*U*	0·525	—	2·2	0	*U*	*U*	*U*

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Finland	1952	0·115	0·142	*U*	*U*	0·347	0	*U*	*U*	*U*
	1953	0·117	0·143	*U*	*U*	0·201	0	*U*	*U*	*U*
	1954	0·109	0·142	*U*	*U*	0·480	0	*U*	*U*	*U*
France *CC*	1952	10·98	14·30	0·03 *f*	0·11 *f*	5·11 *m*	0·06 *h*	1·94 *n*	14·01	15·95
	1953	10·22	13·30	0·11 *f*	0·26 *f*	4·12 *m*	0·10 *h*	1·83 *n*	12·26	14·09
	1954	10·68	13·90	0·26 *f*	0·26 *f*	3·82 *m*	0·13 *h*	1·94 *n*	12·69	14·63
Germany, Western *CC,z*	1952	41·540 *R*	54·016 *R*	0·806 *j,R*	1·447 *j,R*	0·397	11·070 *q,R*	7·130 *w,R*	23·096 *R*	30·226 *R*
	1953	42·036 *R*	54·977 *R*	1·447 *j,R*	1·649 *j,R*	0·327	9·535 *q,R*	7·355 *w,R*	25·181 *R*	32·536 *R*
	1954	39·505	52·731	1·649 *j*	1·432 *j*	0·267	10·208 *q*	8·894 *w*	20·887	29·781
	1955	*45·7 B*	*60·6 B*	—	—	*0·409 B*	—	—	—	—
Iceland *MM*	1952–1954	0·001	0·001	*N*	*N*	0·001	0	0·001	0·001	0·002
Ireland, Republic of	1952	0·090 *R*	*U*	*U*	*U*	0·019	0	*U*	*U*	0·109 *R*
	1953	0·090	*U*	*U*	*U*	0·015	0·001	*U*	*U*	0·104
	1954	0·100	*U*	*U*	*U*	0·018	*d*	*U*	*U*	0·118
Italy	1952	3·582	4·835	0·064 *r*	0·170 *r*	0·042	0·226	*U*	*U*	3·292
	1953	3·515	4·706	*C*	*C*	0·020	0·103	*U*	*U*	3·443
	1954	3·667	4·971	*C*	*C*	0·042	0·053	*U*	*U*	3·768
	1955	3·928	5·340	*C*	*C*	0·067	0·072	*U*	*U*	3·972 *P*
Luxembourg	1952	0·032	0·042	*N*	*N*	3·30	0	0·084	3·248	3·332
	1953	0·031	0·040	*N*	*N*	3·10	0	0·070	3·061	3·131
	1954	0·033	0·043	*N*	*N*	3·11	0	0·070	3·073	3·143
	1955	*0·036 B*	—	—	—	*3·53 B*	—	—	—	—
Netherlands	1952	4·156 *R*	5·846 *R*	*U*	*U*	0·193 *SS*	1·398 *SS*	*U*	*U*	2·951 *S*
	1953	4·028	5·537	*U*	*U*	0·310 *SS*	1·291 *SS*	*U*	*U*	3·057 *S*
	1954	4·215	5·619	*U*	*U*	0·360 *SS*	1·538 *SS*	*U*	*U*	3·037 *S*
	1955	*4·77 B*	*6·32 B*	—	—	—	*1·9 B*	—	—	—
Norway	1952	0·054	0·105	0·056	0·099	0·317	0	0·137	0·191	0·328
	1953	0·053	0·105	0·099	0·163	0·338	0	0·152	0·175	0·327
	1954	0·048	0·100	0·163	0·130	0·349	0	0·246	0·184	0·430
Poland	1950	*5·976 R*	—	—	—	—	—	—	—	—
	1951	*6·336 R*	—	—	—	—	—	—	—	—
	1952	*7·358*	—	—	—	—	—	—	—	—
	1953	*7·873*	—	—	—	—	—	—	—	—
	1954	*8*	—	—	—	—	—	—	—	—
Portugal *M*	1952	0·028 *R*	0·041 *R*	0·009	0·009	0·022	0	0·008 *R,A*	0·042 *R,A*	0·050 *R*
	1953	0·034	0·049	0·009	0·014	0·022	0	0·010 *A*	0·041 *A*	0·051
	1954	0·038	0·055	0·014	0·016	0·020	0	0·009 *A*	0·047 *A*	0·056

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Saar	1952	3·981 *R*	5·31	0·010	0·020	0·044	0·947	0·175 *R*	2·893	3·068 *R*
	1953	3·672	4·89	0·020	0·044	0·034	0·778	0·201	2·693	2·904
	1954	3·757	5·00	0·044	0·039	0·036	0·801	0·279	2·718	2·997
	1955	*4·053 B*	—	—	—	*0·155 B*	*0·674 B*	—	—	—
Spain	1952	*1·176 a*	—	—	—	—	—	—	—	—
	1953	*1·172 a*	—	—	—	—	—	—	—	—
	1954	*1·224 a*	—	—	—	—	—	—	—	—
Sweden	1952	0·671	*U*	0·50	0·75	2·6	0·000	*U*	*U*	3·04
	1953	0·712	*U*	0·75	*C*	2·0	0·031	*U*	*U*	*U*
	1954	*D*	*U*	*C*	*C*	2·0	0·054	*U*	*U*	*U*
Switzerland	1952	0·46	*U*	*N*	*N*	0·65	0	*U*	*U*	1·11
	1953	0·45	*U*	*N*	*N*	0·60	0	*U*	*U*	1·05
	1954	0·45	*U*	*N*	*N*	0·66	0	*U*	*U*	1·11
United Kingdom	1952	30·10 *e,R*	53·73 *g,R*	0·53 *b*	1·35 *b*	0·02	0·95	2·66 *u*	*U*	28·35 *v*
	1953	30·26 *e*	53·85 *g*	1·35 *b*	1·93 *b*	*N*	0·94	3·07 *u*	*U*	28·74 *v*
	1954	30·64 *e*	54·73 *g*	1·93 *b*	1·65 *b*	*N*	1·21	3·34 *u*	*U*	29·71 *v*
	1955	*31·3 B*	—	—	—	—	*1·25 B*	—	—	—
Yugoslavia	1952	0	0	0	0	0·466	0	0	0·466	0·466
	1953	0·296	0·384	*C*	*C*	0·240	0	0	*U*	*U*
	1954	0·404	0·532	*C*	*C*	0·217	0	0	*U*	*U*
OCEANIA—										
Australia	1952	3·138 *y*	5·067 *y*	*U*	*U*	0·007	0·001	*U*	*U*	*3·144 S*
	1953	3·144 *y*	5·074 *y*	*U*	*U*	0·001	0·017	*U*	*U*	*3·128 S*
	1954	3·267 *y*	5·275 *y*	*U*	*U*	0·011	0·028	*U*	*U*	*3·250 S*
Netherlands New Guinea	1952–1954	0	0	0	0	0	0	0	0	0
New Zealand	1952–1954	*N*	*N*	*N*	*N*	0	0	*N*	*N*	*N*

TABLE 6

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—										
Algeria	1952	0·052	*f*	0·005 *R*	0·005 *R*	0·003	0	0·014	0·041	0·055 *R*
	1953	0·040	*f*	0·005	0·005	0·002	0	0·014	0·028	0·042
	1954	0·029	*f*	0·005	0·005	0·004	0	0·014	0·019	0·033
Egypt	1952	0	0	*U*	*U*	0·007	0	—	—	0·007 *S*
	1953	0	0	*U*	*U*	0·002	0	—	—	0·002 *S*
	1954	0	0	*U*	*U*	0·006	0	—	—	0·006 *S*
Union of South Africa	1952–1954	0	0	0	0	*U*	0	*U*	*U*	*U*
AMERICA, NORTH—										
Canada *h*	1952	0·64	0·65	0·03 *g*	0·04 *g*	0·14	*N*	0·31	0·47 *g*	0·78 *g*
	1953	0·64	0·65	0·04 *g*	0·03 *g*	0·12	0	0·25	0·25 *g*	0·77 *g*
	1954	0·75	0·76	0·03 *g*	0·03 *g*	0·12	0	0·25	0·62 *g*	0·87 *g*
Netherlands Antilles	1952–1954	*U*	*U*	*U*	*U*	*N*	*N*	*U*	*U*	*U*
Trinidad and Tobago	1952	0	0	*U*	*U*	0	0	*U*	*U*	*U*
	1953	0	0	*U*	*U*	*N*	0	*U*	*U*	*U*
	1954	0	0	*U*	*U*	0	0	*U*	*U*	*U*
Unied States of America	1952	2·155 *b,R*	2·025 *c*	*U, N*	*U, N*	*N*	0·120	*U, e*	*U, N*	2·035 *S*
	1953	1·687 *b*	1·580 *c*	*U, N*	*U, N*	*N*	0·093	*U, e*	*U, N*	1·594 *S*
	1954	1·544 *b*	1·447 *c*	*U, N*	*U, N*	*N*	0·090	*U, e*	*U, N*	1·454 *S*
AMERICA, SOUTH—										
Brazil	1952–1954	0	0	0	0	0	0	0	0	0
Surinam	1952–1954	0	0	0	0	0	0	0	0	0
Venezuala	1952–1954	0	0	0	0	0	0	0	0	0
ASIA—										
Israel	1952–1954	0	0	0	0	0	0	0	0	0
Japan	*X* 1952	1·712 *A*	1·456 *R*	*U*	*U*	0	0	0·850 *A*	0·862	1·712 *A*
	X 1953	2·072 *A*	1·763	*U*	*U*	0	0	1·043 *A*	1·029	2·072 *A*
	X 1954	2·469 *A*	2·121	*U*	*U*	0	0	1·202 *A*	1·267	2·469 *A*
Pakistan	1952	0·011	0·011	*N*	0·005	0	0	0·006	0	0·006
	1953	0·010	0·010	0·005	0·003	0	0	0·013	0	0·013
	1954	0·003	0·003	0·003	0·004	0	0	0·002	0	0·002

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country	and year	Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—										
Austria	1951	0·36 *R*	0·51 *R*	*U*	*U*	0·81 *R*	0	0·84	0·33	1·17 *R*
	1952	0·39 *R*	0·55 *R*	*U*	*U*	0·66 *R*	0	0·71	0·34	1·05 *R*
	1953	0·41 *R*	0·58 *R*	*U*	*U*	0·58	0	0·63	0·36	0·99 *R*
	1954	0·42	0·59	*U*	*U*	0·51	0	0·56	0·37	0·93
Belgium	1952	1·483	1·335	0·005	0·038	0·003	0·295	*U*	*U*	1·158
	1953	1·333	1·199	0·038	0·012	0·007	0·271	*U*	*U*	1·094
	1954	1·378	1·241	0·012	0·012	0·040	0·325	*U*	*U*	1·093
	1955	*1·553 B*	—	—	—	*0·05 B*	*0·48 B*	—	—	—
Finland	1952–1954	0	0	0	0	*N*	0	*N*	*N*	*N*
France	1952	7·94	7·57	0·03 *k*	0·03 *k*	0·49 *i*	0·05 *a*	6·82 *d*	1·56	8·38
	1953	6·98	6·63	0·03 *k*	0·06 *k*	0·72 *i*	0·03 *a*	6·40 *d*	1·24	7·64
	1954	6·73	6·39	0·06 *k*	0·08 *k*	0·86 *i*	0·02 *a*	6·30 *d*	1·25	7·55
Germany, Western— Patent fuel	1952	5·358 *R*	5·151 *R*	0·002 *j*	0·003 *j*	0·000	0·357 *m,R*	4·302 *p,R*	0·698 *R*	5·000 *R*
	1953	5·246 *R*	5·037 *R*	0·003 *j*	0·003 *j*	0·000	0·430 *m,R*	3·955 *p,R*	0·861 *R*	4·816 *R*
	1945	6·030	5·783	0·003 *j*	0·004 *j*	0·033	0·588 *m*	4·648 *p*	0·826	5·474
Brown coal briquettes and brown coal coke	1952	17·105 *R*	36·009	0·167 *q*	0·259 *q*	0·891 *R*	2·128 *m,R*	8·895 *p,R*	6·881 *R*	15·776 *R*
	1953	17·303	36·673	0·259 *q*	0·221 *q,R*	1·134 *R*	1·673 *m,R*	9·490 *p,R*	7·312 *R*	16·802 *R*
	1954	17·360	37·251	0·221 *q*	0·237 *q*	2·422	1·656 *m*	10·573 *p,R*	7·537	18·110
Iceland	1952–1954	0	0	*N*	*N*	*N*	0	0	*N*	*N*
Ireland, Republic of	1952	0·031 *R*	*U*	*U*	*U*	0·097	*U*	*U*	*U*	0·128 *R*
	1953	0·038	*U*	*U*	*U*	0·086	*U*	*U*	*U*	0·124
	1954	0·035	*U*	*U*	*U*	0·077	*U*	*U*	*U*	0·112
Italy	1952	*U*	*U*	*U*	*U*	0·022	*N*	*U*	*U*	*U*
	1953	*U*	*U*	*U*	*U*	0·102	0	*U*	*U*	0·102 *E*
	1954	0·022	*U*	*U*	*U*	0·166	0	*U*	*U*	0·181 *E*
	1955	D	*U*	*U*	*U*	0·182	0	*U*	*U*	*U*
Luxembourg	1952	0	0	*U, N*	*U, N*	0·168	0	0·152	0·016	0·168
	1953	0	0	*U, N*	*U, N*	0·140	0	0·131	0·009	0·140
	1954	0	0	*U, N*	*U, N*	0·146	0	0·139	0·007	0·146
	1955	—	—	—	—	*0·159 B*	—	—	—	—
Netherlands	1952	1·018	*U*	*U*	*U*	0·525 *SS*	0·027 *SS*	*U*	*U*	1·516 *S*
	1953	0·988	*U*	*U*	*U*	0·497 *SS*	0·078 *SS*	*U*	*U*	1·405 *S*
	1954	1·000	*U*	*U*	*U*	0·577 *SS*	0·155 *SS*	*U*	*U*	1·422 *S*
Norway	1952–1954	0	—	—	—	*N*	0	—	—	—

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Portugal *M*	1952	0·094 *w*	0·085	*N*	*N*	0	0	0·023 *E*	0·071 *E*	0·094
	1953	0·084 *w*	0·076	*N*	*N*	0·005 *x*	0	0·022 *E*	0·067 *E*	0·089
	1954	0·093 *w*	0·084	*N*	*N*	0·003 *x*	0	0·024 *E*	0·072 *E*	0·096
Saar	1952–1954	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Sweden	1952	0·054	*U*	0·06	0·01	0·550	0	*U*	*U*	0·66
	1953	0·060	*U*	0·01	*C*	0·174	0	*U*	*U*	*U*
	1954	D	*U*	*C*	*C*	0·160	0	*U*	*U*	*U*
Switzerland	1952	*N*	—	*N*	*N*	0·21	0	*U*	*U*	0·21
	1953	*N*	—	*N*	*N*	0·24	0	*U*	*U*	0·24
	1954	*N*	—	*N*	*N*	0·25	0	*U*	*U*	0·25
	1955	*N*	—	*N*	*N*	0·26	0	*U*	*U*	0·26
United Kingdom	1952	1·80	1·74	0·01	0·08	*N*	0·54	*U*	*U*	1·19
	1953	1·60	1·56	0·08	0·09	*N*	0·27	*U*	*U*	1·32
	1954	1·71	1·67	0·09	0·04	*N*	0·25	*U*	*U*	1·51
	1955	*1·71 B*	—	—	—	—	*0·27 B*	—	—	—
Yugoslavia *r*	1952	0·016 *R*	*U*	*C*	*C*	0	0 *R*	*U*	*U*	*U*
	1953	0·004	*U*	*C*	*C*	0	*N*	*U*	*U*	*U*
	1954	0·014	*U*	*C*	*C*	0	0·002	*U*	*U*	*U*
OCEANIA—										
Australia—Victoria *t*	*Y*1952	0·577	1·517	*U*	*U*	*N*	*N*	0·001	0·576	0·577
Netherlands New Guinea	1952–1954	0	0	0	0	0	0	0	0	0
New Zealand	1952–1954	*N*	*N*	*N*	*N*	0	0	*N*	*N*	*N*

STATISTICAL YEAR-BOOK

OF THE

WORLD POWER CONFERENCE

No. 8

Data on Resources and Annual statistics for 1952-1954, with some supplementary and revised statistics for earlier years and available statistics for 1955

EDITED, WITH INTRODUCTORY AND EXPLANATORY TEXTS

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II. SOLID FUELS—A. COALS, BROWN COAL AND LIGNITE, PEAT, COKE, AND OTHER MANUFACTURED FUEL

Continental and world totals of production of coals, shown in Table A1, are comprehensive (there being few, if any, important omissions) except for those for Asia and the world in 1957 and 1958; comparable figures for these areas, designated by the note sign *b*, represent about half the total production in Asia and three quarters of world production. It will be seen that world production, in so far as reported, declined in 1958, chiefly because of a decline in North America. In several other important producing areas, production was substantially maintained by a policy of stocking mined coal in dumps. The relation between production and stocks is shown, for those of the largest producing countries for which the necessary statistics are available, in Table A2. In India production increased between 1954 and 1958 while mine stocks decreased, though they increased in the first half of 1959. In Japan total stocks (which include the usually more stable distributed stocks) increased much more sharply than production. In five of the most important European coal-producing countries, and in the Saar, production either increased or decreased a little while mine stocks increased considerably. In some of these European countries stocks at the end of 1957 already exceeded those at the end of 1954; in others the upward movement did not get under way until 1958; in all of them mine stocks

TABLE A1: PRODUCTION OF COALS

	Millions of metric tons					% of world production *a*	% of 1954	
	1954	1955	1956	1957	1958	1956	1956	1958
Principal producing countries in:								
Africa	34	38	39	41	43*E*	*2·4*	*116*	*126*
America, North ...	368	434	467	458	399	*28·2*	*127*	*108*
America, South ...	6	7	7	6	6*E*	*0·4*	*115*	*108A*
Asia *a*	171	186	204	*U*	*U*	*12·3*	*120*	—
Asia *b*	(90)	(91)	(98)	(108)	(109)*E*	*(5·9)*	*(109)*	*(121)*
Europe	603	609	615	616	609	*37·1*	*102*	*101*
Oceania	22	22	22	23	23*E*	*1·3*	*98*	*104*
U.S.S.R.	244	277	304	328	*U*	*18·3*	*125*	—
Totals *a* ...	1 448	1 572	1 658	*U*	*U*	*100·0*	*114½*	—
Totals *b* ...	(1 122)	(1 199)	(1 245)	(1 250)	(1 187)	*(75·1)*	*(111)*	*(106)*

The percentages and totals have been calculated from more exact statistics than those shown in this table, which have been rounded.
a Including the mainland of China, Iran, Pakistan.
b Excluding the countries mentioned in note *a*, and excluding also the U.S.S.R.
A Approximate.
E Partly estimated.
U Not available.

TABLE A2: STOCKS AND PRODUCTION OF COALS IN SELECTED COUNTRIES

	Production	Mine stocks as % of end-1954			Mine stocks as % of production during preceding 12 months		
	1958 as % of 1954	end-1957	end-1958	mid-1959	end-1954	end-1958	mid-1959
India	*126*	*89*	*77*	*91*	*9·8*	*6·1*	*7·1*
Japan	*116*	*120t*	*165t*	*175t*	*17·2t*	*24·4t*	*26·4t*
Belgium	*93*	*50*	*246*	*271*	*9·6*	*26A*	*31·6*
France	*106*	*60*	*95*	*133*	*14·5*	*12·9*	*18·1*
Germany, West	*104*	*116*	*1 069*	*1 401*	*0·6*	*6·6*	*8·9*
Saar	*98*	*23*	*109*	*166*	*4·9*	*5·5*	*8·5*
Netherlands	*98*	*109*	*260*	*330*	*2·4*	*6·3*	*7·9*
Great Britain	*96*	*738*	*1 694*	*2 473*	*0·5*	*9·1*	*13·6*

t Total stocks.
A Approximate.

increased rapidly during the first half of 1959. As is well known, the situation documented in Table A2 largely reflects the substitution for coal of other fuels and power sources, notably petroleum, hydro-electricity, and natural gas (which some time ago partly replaced gas made from coal in the U.S.A.).

Production in all the important lignite and brown coal producing countries except China is probably included in Table A3. In the three years 1954 to 1957 total reported production (but excluding that of the U.S.S.R.) increased at the average annual rate ("compound interest basis") of 5·22 per cent per annum, as compared with an average annual rate of 4·01 per cent between 1934 and 1954; if the U.S.S.R. is included, the average annual rate of increase from 1954 to 1957 was 6·08 per cent.

TABLE A3: PRODUCTION OF BROWN COAL AND LIGNITE

	Millions of metric tons				1957 as % of 1954
	1954	1955	1956	1957	
America, North	5·7	4·2	4·7	3·7	*65*
Asia *a*	3·8	4·0	4·8	5·5*E*	*145*
Europe	372·7	400·9	419·8	436·4*E*	*117*
Oceania	10·0	10·7	11·1	11·2	*112*
U.S.S.R.	103·4	114·6	125·5	134·9	*130*
World *a*	495·7	534·5	565·9	591·8	*119*

a Not including China.
E Partly estimated.

Totals of reported production of coke are shown in Table A4.

TABLE A4: PRODUCTION OF COKE

	Millions of metric tons				% of world production	1957 as % of 1954
	1954	1955	1956	1957*E*	1956	
Principal producing countries in:						
Africa	1·9	2·0	2·1	2·5	*0·7*	*130A*
America, North	61·4	77·0	77·5	77·7	*27·4*	*126½*
America, South	0·9	0·9	0·9	*U*	*0·3*	*U*
Asia *a*	11·6	12·1	13·3	14·5	*4·8*	*124½*
Europe	115·4	126·7	135·6	138·4	*48·7*	*120*
Oceania	3·6	3·6	3·6	3·6	*1·3*	*100*
	194·9	222·3	231·9	237·5	83·3	*122*
U.S.S.R.	40·3	43·6	46·6	*U*	16·7	*U*
Totals *a*	235·2	265·9	278·5	*U*	100·0	*U*

a Excludes China.
A Approximate.
E Partly estimated.
U Not available.

TABLES 2, 3, 4, 5, AND 6—DEFINITIONS

The following definitions (including the introductory paragraph), adopted by the World Power Conference, were distributed with the forms for the guidance of the organizations which supplied the statistics:

On account of the varying characteristics of coal in the several countries, of the different bases of classification employed, and of the fact that international study of coal classification is already in progress, it has been deemed inadvisable to attempt to segregate the higher ranking coals —anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from lignite and brown coal or which separate the latter from peat. It will, therefore, be the responsibility of each reporting country when submitting its statistics of solid fuels to determine for itself the basis of classification to be used in distinguishing the three groups to be reported: *viz.* coals, brown coal and lignite, and peat.

13 *Proved Reserves—Coals, Lignite, and Brown Coal*
"Proved reserves" of coals, of lignite, and of brown coal shall mean the total amounts thereof, occurring within the limits hereinafter prescribed, as are of economic value and with respect to which there exist reliable data of actual thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

(*a*) Coals: Seams containing not less than 30 centimetres of merchantable coal and situated not more than 1 200 metres below the surface, including workable submarine seams.

(*b*) Lignite and Brown Coal: Seams containing not less than 30 centimetres of merchantable lignite or brown coal and situated not more than 500 metres below the surface.

14 *Probable Reserves—Coals, Lignite, and Brown Coal*
"Probable reserves" of coals, of lignite, and of brown coal

shall mean the aggregate within the reporting country of proved reserves thereof plus such further reserves of economic value within the limits of thickness and depth of seams specified in paragraph 13 hereof, as may, from uncompleted investigations or from relation to proved reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

15 *Peat*

A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent of organic matter.

16 *Probable Reserves of Peat*

"Probable reserves of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

17 *Domestic Production—Coals, Lignite, and Brown Coal*

"Domestic production" of coals, of lignite, and of brown coal shall mean the gross amounts thereof raised to the pit-head, less the amounts of dirt or other waste removed in washeries or cleaning plants, plus any increase in weight between the pit-head and weighing-point due to absorption of water in washeries, but without deduction for other losses beyond point of weighing or for amounts used in operation of mines or collieries.

18 *Coal Stocks*

"Coal stocks" shall include the following:

(*a*) "Mine stocks", or the amounts held or stored at the producing properties, whether in dumps at pit-heads, in cars at colliery sidings, or otherwise, and whether billed to purchasers or not.

(*b*) "Stocks in transit", or amounts held or stored in railway classification yards or at points of trans-shipment from rail to water or water to rail while in process of domestic transit from producers to consumers.

(*c*) "Dealers' and consumers' stocks", or the amounts held in storage by coal dealers and by large industrial users, such as by-product coke ovens, railways, electric-power utilities, steel and rolling mills, etc. This item will, in general, include the stocks of only those dealers and consumers to whom, except in case of transhipment, delivery is made directly from mine or water terminal in car-load lots or in boats or barges.

(*d*) "Import stocks", or amounts of foreign coal held in storage at ports of entry pending shipment in domestic trade.

(*e*) "Export stocks", or amounts in storage at export points pending actual export.

(*f*) "Bunker stocks", or amounts held in storage at ports for fuelling vessels engaged in either foreign or domestic trade.

Statistics of stocks shall be reported in totals and may also be reported by the several classes above defined; but each reporting country in submitting its statistics shall state which of the preceding classes, if any, have been omitted from the total which it reports.

19 *Lignite and Brown Coal Stocks*

In so far as there regularly are within any reporting country stocks of lignite or of brown coal in significant quantities within the several classes as specified for coal in paragraph 18 hereof, data for such classes shall be considered necessary for a complete report on stocks. Each reporting country in which complete data are not available, or are not reported, shall state what classes have been included in making up its report.

20 *Statistics of Products*

Where coal, brown coal or lignite are imported, exported, shipped as bunker fuel, or carried in stock in the form of coke or briquettes or other manufactured product, such statistics shall be separately reported in Tables 5 and 6. Petroleum coke shall not be reported in Table 5, but shall be reported in Table 10, Column 7.

TABLE 2

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In millions of metric tons)

Name of country	Coals				Brown coal and lignite				Peat	
	Proved reserves		Total reserves (proved and probable)		Proved reserves		Total reserves (proved and probable)		Total reserves (proved and probable)	
	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity
0	1	2	3	4	5	6	7	8	9	10
AFRICA—										
Algeria	1957	9	1957	20	—	—	—	—	—	—
Basutoland	1947	*N*	1947	*N*	1947	*N*	1947	*N*	1947	*N*
Belgian Congo	—	—	1913	*100*	—	—	—	—	—	—
Egypt	1954	0	1954	0	1954	0	1954	0	1954	0
Madagascar	1952	100	1952	300	—	0	—	0	—	0
Morocco, former French	1952	30	1952	130	—	0	—	0	—	0
Nigeria	1937	113	1937	300*A*	1937	13	1937	200*A*	1937	0
Nyasaland	—	*U*	—	*U*	1933	0	1933	0	1933	0
Swaziland	1958	189·8	1958	611·3	—	0	—	0	—	0
Tanganyika	1934	800	1934	*U*	1934	*U*	1934	*U*	1934	*U*
Union of South Africa	1957	36 900	1957	70 000	1957	*N*	1957	*N*	1957	0
AMERICA, NORTH—										
Canada	1956	31 589	1956	63 126	1956	11 302	1956	22 604	1924	526
Netherlands Antilles	—	0	—	0	—	0	—	0	—	0
Trinidad and Tobago	—	0	—	0	—	0	—	0	—	0
United States of America*x*	1956	62 650*a*	1956	1 253 000*b*	1956	14 710*c*	1956	420 250*d*	1922	12 540*e*
Alaska	1952	*f*	1952	*f*	1952	*f*	1952	*f*	1952	*g*
AMERICA, SOUTH—										
Argentina	—	—	—	—	1950	250	—	—	1928	80
Brazil	1955	387·5	1955	1 700	1955	1·7	1955	*U*	1955	*U*
Chile	1949	61·5	1949	698·5	—	*U*	—	*U*	1949	*N*
Honduras	—	—	1913	*1*	—	—	1913	*4*	—	—
Peru	—	—	1913	*1 000*	—	—	—	—	—	—
Surinam	1957	0	1957	0	1957	0	1957	0	1957	0
Venezuela	1954	28*P*	1955	3 068*P*	—	0	—	0	—	0

TABLE 2—*continued*

COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES

(In millions of metric tons)

Name of country	Coals				Brown coal and lignite				Peat	
	Proved reserves		Total reserves (proved and probable)		Proved reserves		Total reserves (proved and probable)		Total reserves (proved and probable)	
	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity
0	1	2	3	4	5	6	7	8	9	10
ASIA—										
Ceylon	1957	0	1957	0	1957	0	1957	0	1957	0
China	—	—	1913	*1 011 000*	—	—	1913	*600*	—	—
India	1957	43 284*h*	1957	124 974*h*	*i*	212·4	*i*	2 077	1953	0
Indochina	1952	200	1952	1 000	1952	0	1952	0	1952	0
Israel	1957	0	1957	0	1957	0	1957	0	1957	0
Japan*k*	1955	5 699*R,j*	1955	19 059*R,j*	1955	237*R,j*	1955	1 733*R,j*	—	*U*
Korea	—	—	1913	*5 585*	—	—	1913	*27*	—	—
Malaya, Federation of	1957	0	1957	0	1957	19·3*m*	1957	29·0*m*	1957	*U*
North Borneo	—	*U*	—	*U*	1938	0	1938	0	1938	0
Pakistan	1957	*U*	1957	163·3*P*	1957	*U*	1957	8·0*P*	1957	160*A,n*
Philippines	1957	2·74	1957	35·37	—	*U*	—	*U*	—	*U*
Singapore	1957	0	1957	0	1957	0	1957	0	1957	0
Thailand	1957	0	1957	0	1957	14*A*	1957	35*A*	1957	0
Turkey	1957	463	1957	1 225	1957	105	1957	600	—	*U*
EUROPE—										
Austria	1957	3·0	1957	4·0	1957	249	1957	286	1957	*N*
Belgium	1952	3 268	1947	5 988	—	*N*	—	*N*	—	*N*
Bulgaria	1938	0·56	1938	1·4	1938	493	1938	997	—	—
Czechoslovakia	—	—	—	6 450	—	—	—	12 500	—	—
Finland	—	0	—	0	—	0	—	0	1950	11 000
France*p*	1953	1 495	1953	9 425	1953	47	1953	121	—	*U*
Germany, Western	1955	67 000	1955	224 300	1955	62 000	—	*U*	—	*U*
Saar	1954	*U*	1954	*U*	1954	0	1954	0	1954	0
Greece	—	0	—	0	1948	350	1948	2 000	—	0
Hungary	1931	210	1931	210	1931	1 500	1931	1 500	1931	120
Iceland	1957	0	1957	0	—	*U*	—	*U*	1957	2 000*A*
Ireland, Republic of	—	*U*	—	*U*	—	*U*	—	*U*	1950	3 490

TABLE 2—*continued*
COALS, BROWN COAL, LIGNITE, AND PEAT—RESOURCES
(In millions of metric tons)

Name of country	Coals				Brown coal and lignite				Peat	
	Proved reserves		Total reserves (proved and probable)		Proved reserves		Total reserves (proved and probable)		Total reserves (proved and probable)	
	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity	Date to which estimate refers	Quantity
0	1	2	3	4	5	6	7	8	9	10
EUROPE—*Continued*										
Italy	1938	493	1938	563	1938	307	1938	456	—	*U*
Luxembourg	1957	0	1957	0	1957	0	1957	0	1957	0
Netherlands	1958	3 000	1958	3 400	1958	2·5	1958	2·5	1955	12·8*q*
Norway	1958	300*A*	1958	1 500*A*	—	—	—	—	1955	40*r*
Poland	1935	15 000	1940	80 000	—	*U*	1945	18·4	1935	6 000
Portugal	1957	17	1957	29	1957	28	1957	33	1957	*U*
Roumania	1932	78	—	*U*	1932	2 839	—	*U*	1932	67·6*s*
Spain	—	*D*	1956	2 698	—	*D*	1956	699	1956	0
Sweden	1953	40	1953	40	1953	0	1953	0	1952	9 400
Switzerland	1957	*N*	1957	*N*	1957	*N*	1957	*N*	1957	*N*
United Kingdom	1957	127 708	1957	170 008	1957	*N*	1957	*N*	1957	*U*
Yugoslavia	1956	22	1956	237	1956	7 206	1956	21 406	—	—
OCEANIA—										
Australia	1958	4 401	1958	13 373	1958	46 030	1958	51 230	—	—
Netherlands New Guinea	1958	0	1958	0	1958	0	1958	0	1958	0
New Caledonia	1952	5	1952	15	1952	0	1952	0	1952	0
New Zealand	1955	148·5*y*	1955	310·2*t,y*	1955	16·6*z*	1955	59·2*t,z*	—	*U*
U.S.S.R.	1956	241 210*u*	1956	1 183 100*u,v*	1955–57	5 800*w*	1955–57	29 800*w,aa*	1957	158 000

TABLE 3

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5 +6)
0		1	2	3	4	5	6	7
AFRICA—								
Algeria	1954	0·303	0·102	0·103	0·293	0·055	0·023	0·517
	1955	0·301	0·103	0·096	0·300	0·036	0·009	0·563
	1956	0·297	0·096	0·112	0·326	0·031	0·010	0·566
	1957	0·236	0·112	0·128	0·489	0·018	0·007	0·684
	1958	*0·153*	*0·044 m*	*0·017 m*	—	—	—	—
Angola	1954	0	*U*	*U*	0·032	0·002	*U*	*U*
	1955	0	*U*	*U*	0·047	*N*	*U*	*U*
	1956	0	*U*	*U*	0·024	*N*	*U*	*U*
	1957	*N*	*U*	*U*	0·059	*N*	*U*	*U*
Basutoland	1957	0	0	0	0·078 *A*	0	0	*0·078 A*
Bechuanaland	1958	0	—	—	—	—	—	—
Belgian Congo	1954	*0·379*	—	—	—	—	—	—
	1955	*0·480*	—	—	—	—	—	—
	1956	*0·420*	—	—	—	—	—	—
Cape Verde Islands	1954	0	*U*	*U*	0·007	0·003	*U*	*U*
	1955	0	*U*	*U*	0·008	0·002	*U*	*U*
	1956	0	*U*	*U*	0	0·005	*U*	*U*
	1957	0	*U*	*U*	*N*	0·001	*U*	*U*
Egypt	1954	0	—	—	0·123	0	0·003	0·120
Morocco	1954	0·486	0·083	0·120	0·116	0·217 *b*	*a*	0·348
	1955	0·457	0·126	0·078	0·132	0·262	0	0·375
	1956	0·482	0·078	0·072	0·105	0·241	0	0·352
	1957	0·520	0·072	0·122	0·073	0·256	0	0·287
	1958	*0·510*	0·122	*0·178*	—	—	—	—
Mozambique	1954	0·142	*U*	*U*	0·225 *R*	0·046	*U*	*U*
	1955	0·173	*U*	*U*	0·242	0·024	*U*	*U*
	1956	0·218	*U*	*U*	0·263	0·037	*U*	*U*
	1957	*U*	*U*	*U*	0·279	0·036	*U*	*U*
Nigeria	1954	*0·646*	*U*	*U*	*N*	*N*	*N*	*U*
	1955	*0·761*	*U*	*U*	*N*	0·1	*N*	*U*
	1956	0·8	*U*	*U*	*N*	0·1	*N*	*U*
	1957	0·8	*U*	*U*	*N*	0·1	*N*	*U*
	1958	*0·939*	—	—	—	—	—	—
Portuguese Guinea	*MM*1954–1956	0	*U*	*U*	*N*	0	*U*	*U*
	1957	0	*U*	*U*	*N*	*N*	*U*	*U*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks		Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5 +6)
			At beginning of year	At end of year				
0		1	2	3	4	5	6	7
AFRICA—*Continued*								
Southern Rhodesia	1954	*2·748*	—	—	—	—	—	—
	1955	*3·315*	—	—	—	—	—	—
	1956	*3·553*	—	—	—	—	—	—
	1957	*3·854*	—	—	—	—	—	—
	1958	*3·534*	—	—	—	—	—	—
Swaziland	1958	0	0	0	0	0	0	0
Tunisia	1954	0	0	0	0·064	0	*U*	0·064 *A*
Union of South Africa	1954	*29·32*	—	—	*N*	1·13	0·07	—
	1955	*32·15*	—	—	—	—	—	—
	1956	*33·60*	—	—	—	—	—	—
	1957	*34·76*	—	—	—	—	—	—
	1958	*37·086*	—	—	—	—	—	—
AMERICA, NORTH—								
Canada	1954	11·609	*U*	*U*	16·619	0·199 *c*	*U*	29·745 *E*
	1955	11·363	*U*	*U*	17·529	0·538 *c*	*U*	30·284 *E*
	1956	11·407	*U*	*U*	20·138	0·539 *c*	*U*	32·943 *E*
	1957	9·925	*U*	*U*	17·270	0·360 *c*	*U*	28·591 *E*
	1958	*8·539*	—	—	—	—	—	—
Mexico	1954	*1·314 R*	—	—	—	—	—	—
	1955	*1·342 R*	—	—	—	—	—	—
	1956	*1·408*	—	—	—	—	—	—
	1957	*1·421*	—	—	—	—	—	—
	1958	*1·478*	—	—	—	—	—	—
Netherlands Antilles	1954–1957	0	0	0	0	0	0	0
Trinidad and Tobago	1954	0	0	0	0·002	0	0·002	0·001
	1955	0	0	0	0·003	0	0·001	0·002
	1956	0	0	0	0·002	0	0·002	0·001
	1957	0	0	0	0·003	0	0·002	0·001
United States of America	1954	355·3	73·1	62·7	0·2	28·1	1·2 *d*	336·6
	1955	421·5	62·7	62·1	0·3	46·5	1·5 *d*	374·7
	1956	454·4	62·1	70·7	0·3	62·1	1·5 *d*	382·5
	1957	446·9	70·7	73·2	0·3	69·2	1·4 *d*	374·3
	1958	*389 E*	73·2	*69·2*	—	—	—	—
AMERICA, SOUTH—								
Argentina	1954	*0·093*	—	—	—	—	—	—
	1955	*0·133*	—	—	—	—	—	—
	1956	*0·162*	—	—	—	—	—	—
	1957	*0·232*	—	—	—	—	—	—
	1958	*0·261*	—	—	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0	1	2	3	4	5	6	7
AMERICA, SOUTH—*Continued*							
Brazil 1954	2·055	*N*	*N*	0·907	0	0	2·962
1955	2·349	*N*	*N*	1·092	0	0	3·441
1956	2·286	*N*	*N*	0·896	0	0	3·182
1957	*2·11*	*N*	*N*	—	—	—	—
Chile 1954	*2·033*	*0·123*	*0·091*	—	—	—	—
1955	*2·061*	*0·091*	*0·108*	—	—	—	—
1956	*2·278z*	*0·108*	*0·140*	—	—	—	—
1957	*2·096z*	*0·140*	*0·209*	—	—	—	—
1958	*2·000z*	*0·209*	*0·260*	—	—	—	—
Colombia 1954	*1·5*	—	—	—	—	—	—
1955	*1·8*	—	—	—	—	—	—
1956	*1·9*	—	—	—	—	—	—
Peru 1954	*0·258*	—	—	—	—	—	—
1955	*0·136*	—	—	—	—	—	—
1956	*0·145*	—	—	—	—	—	—
1957	*0·140*	—	—	—	—	—	—
1958	*0·174*	—	—	—	—	—	—
Surinam 1954	0	0·002	0·001	0·002	0	0	0·003
*MM*1955–1957	0	*N*	*N*	*N*	0	0	*N*
Venezuela 1954	0·032	0	0	0	0	0	0·032
1955	*0·030*	—	—	—	—	—	—
1956	*0·031*	—	—	—	—	—	—
ASIA—							
Ceylon 1954	—	—	—	0·272	—	0·019	—
China—							
Continental 1952	*63·528*	—	—	—	—	—	—
1953	*66·572*	—	—	—	—	—	—
1954	*79·928*	—	—	—	—	—	—
1955	*93·604*	—	—	—	—	—	—
1956	*105·922*	—	—	—	—	—	—
Taiwan 1954	*2·118 R*	—	—	—	—	—	—
1955	*2·359 R*	—	—	—	—	—	—
1956	*2·529*	—	—	—	—	—	—
1957	*2·927*	—	—	—	—	—	—
1958	*3·183*	—	—	—	—	—	—
India 1954	37·470	3·465	3·657	0	2·054	0·075	35·341
1955	38·838	3·657	3·662	0	1·599	0·090	37·144
1956	40·062	3·662	2·824	0	1·756	0·041	39·109
1957	44·200	2·824	3·331	0	1·778	0·075	41·840
1958	*46·065*	3·331	*2·808*	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5 +6)
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Indonesia	1954	*0·900*	—	—	—	—	—	—
	1955	*0·814*	—	—	—	—	—	—
	1956	*0·828*	—	—	—	—	—	—
	1957	*0·717*	—	—	—	—	—	—
	1958	*0·605*	—	—	—	—	—	—
Iran	*V*1954	*0·252*	—	—	—	—	—	—
	*V*1955	*0·18*	—	—	—	—	—	—
	*V*1956	*0·33*	—	—	—	—	—	—
Israel	1954	0	*U*	*U*	0·028 *R*	0	*U*	0·028 *R*
	1955	0	*U*	*U*	0·032	0	*U*	0·032
	1956	0	*U*	*U*	0·023	0	*U*	0·023
	1957	0	*U*	*U*	0·033	0	*U*	0·033
Japan	1954	42·718	6·891	7·335	3·608 *R*	*N*	*N*	45·882
	1955	42·423 *R*	7·335	6·392 *R*	2·862	*N*	*N*	46·228
	1956	46·555	6·392	3·998	3·820	*N*	*N*	52·768
	1957	51·732	3·998	6·900	6·427	*N*	*N*	55·257
	1958	*49·673*	*8·820 t*	*12·136 t*	—	—	—	—
Korea, South	1954	*0·891*	*0·393 n*	*0·392 n*	—	—	—	—
	1955	*1·308*	*0·392 n*	*0·370 n*	—	—	—	—
	1956	*1·815*	*0·370 n*	*0·433 n*	—	—	—	—
	1957	*2·441*	*0·433 n*	*0·515 n*	—	—	—	—
	1958	*2·671*	*0·515 n*	*0·333 n*	—	—	—	—
Macao	*MM*1954–1957	0	*U*	*U*	0·003	0	*U*	*U*
Malaya, Federation of	*MM*1954–1957	0	*N*	*N*	*N*	*N*	0	*N*
Pakistan	1954	0·549	0·574	0·343	1·092	0	0	1·641*S*
	1955	0·527	0·343	*U*	0·998	0	0	1·526*S*
	1956	0·390	*U*	*U*	1·273	0	0	1·663*S*
	1957	*U*	*U*	*U*	1·230	0	0	—
Philippines	1954	0·12	*U*	*U*	*N*	0	0	0·12
	1955	0·13	*U*	*U*	*N*	0	0	0·13
	1956	0·15	*U*	*U*	*N*	0	0	0·15
	1957	0·19	*U*	*U*	*N*	0	0	0·19
Portuguese India	1954	0	*U*	*U*	0·014	0	*U*	*U*
	1955	0	*U*	*U*	0·004	0	*U*	*U*
	1956	0	*U*	*U*	*U*	*N*	*U*	*U*
	1957	0	*U*	*U*	*U*	*N*	*U*	*U*
Singapore *y*	1954	0	*U*	*U*	0·055 *EE*	*N, EE*	0·014 *x*	0·041
	1955	0	*U*	0·001	0·054 *EE*	*N, EE*	0·009 *x*	0·044
	1956	0	0·001	0·009	0·069 *EE*	0·003 *EE*	0·017 *x*	0·041
	1957	0	0·009	0·016	0·072 *EE*	0·001 *EE*	0·008 *x*	0·056

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5+6)
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Thailand	1954	0	0	0	0·084	0	*U*	0·084
	1955	0	0	0	0·037	0	*U*	0·037
	1956	0	0	0	0·009	0	*U*	0·009
	1957	0	0	0	0·016	0	*U*	0·016
Turkey	1954	5·7	*U*	*U*	—	—	—	3·5
	1955	5·4	*U*	*U*	—	—	—	3·3
	1956	5·8	*U*	*U*	—	—	—	3·5
	1957	6·2	*U*	*U*	—	—	—	3·7
USSR: See end of table								
Viet-Nam	1954	*0·987*	—	—	—	—	—	—
	s 1955	*N, s*	—	—	—	—	—	—
	s 1956	*0·002 s*	—	—	—	—	—	—
EUROPE—								
Austria	1954	0·18	*U*	*U*	3·86	0	0	4·04 *S*
	1955	0·171	*U*	*U*	4·111 *R*	0	0	4·282 *S*
	1956	0·166	*U*	*U*	4·399	0	0	4·565 *S*
	1957	0·152	*U*	*U*	4·577	0	0	4·729 *S*
	1958	*0·140*	—	—	—	—	—	—
Belgium	1954	29·249	3·074	2·813	3·725	5·681	0·061	27·493
	1955	29·979	2·813	0·445	3·634	7·051	0·069	28·861
	1956	29·555	0·445	0·249	4·787	4·463	0·050	30·025
	1957	29·202 *P*	0·249 *P*	1·547 *P*	5·102 *P*	3·962 *P*	0·039 *P*	29·005 *P*
	1958	*27·062*	*1·413 m*	*6·928 m*	—	—	—	—
Bulgaria	1954	*0·294*	—	—	—	—	—	—
	1955	*0·293*	—	—	—	—	—	—
	1956	*0·370*	—	—	—	—	—	—
	1957	*0·385*	—	—	—	—	—	—
	1958	*0·381*	—	—	—	—	—	—
Czechoslovakia	1954	*21·605*	—	—	4·4	0·4	*N*	—
	1955	*22·135*	—	—	4·1	0·5	*N*	—
	1956	*23·411*	—	—	3·5	0·6	*N*	—
	1957	*24·181*	—	—	2·3	0·7	*N*	—
	1958	*25·812*	—	—	—	—	—	—
Denmark	1954	0	1·238	1·167	4·380	0	*U*	*U*
	1955	0	1·167	1·978	5·096	0	*U*	*U*
	1956	0	1·978	1·683	3·333	0	*U*	*U*
	1957	0	1·683	1·784	3·137	0	*U*	*U*
	1958	—	1·784	*1·524*	—	—	—	—
Finland	1954	0	*U*	*U*	1·794	0	*U*	*U*
	1955	0	*U*	*U*	2·211	0	*U*	*U*
	1956	0	*U*	*U*	2·158	0	*U*	*U*
	1957	0	*U*	*U*	2·599	0	*U*	*U*

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) – (cols. 3+5 +6)
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
France	1954	54·40	5·79 *f*	7·87 *f*	11·25 *j*	2·85 *j*	*h*	60·72 *g*
	1955	55·33	7·87 *f*	6·05 *f*	10·78 *j*	5·84 *j*	*h*	62·09 *g*
	1956	55·13	6·05 *f*	4·61 *f*	16·66 *j*	2·19 *j*	*h*	71·04 *g*
	1957	56·80	4·61 *f*	4·69 *f*	18·13 *f*	2·01 *j*	*h*	72·84 *g*
	1958	*57·72*	4·69 *f*	*7·47 f*	—	—	—	—
Germany, East	1954	*2·648*	—	—	—	—	—	—
	1955	*2·667*	—	—	—	—	—	—
	1956	*2·743*	—	—	—	—	—	—
	1957	*2·753*	—	—	—	—	—	—
	1958	*2·903*	—	—	—	—	—	—
Germany, West	1954	128·035	5·041	4·411	8·323	17·956	0·204	118·828
	1955	130·728	4·411	6·137	15·746	14·819	0·212	129·717
	1956	134·407	6·137	7·717	18·037	14·465	0·262	136·137
	1957	133·156	7·717	10·026	21·018	15·032	0·244	136·589
	1958	*132·581*	*0·944 m*	*8·711 m*	—	—	—	—
Saar	1954	*16·818*	*0·542 m*	*0·827 m*	—	*9·048 B*	—	—
	1955	*17·329*	*0·827 m*	*0·240 m*	—	*9·773 B*	—	—
	1956	*17·090*	*0·240 m*	*0·109 m*	—	*8·363 B*	—	—
	1957	*16·455*	*0·109 m*	*0·188 m*	—	*7·624 B*	—	—
	1958	*16·422*	*0·188 m*	*0·905 m*	—	—	—	—
Hungary	1954	2·4	—	—	0·9	0·4	—	2·8
	1955	2·7	—	—	0·8	0·3	—	3·2
	1956	2·4	—	—	0·8	*N*	—	3·4
	1957	2·3	—	—	2·2	*N*	—	4·0
	1958	*2·626*	—	—	—	—	—	—
Iceland	1954	0	*U*	*U*	0·043	0	*U*	*U*
	1955	0	*U*	*U*	0·061	0	*U*	*U*
	1956	0	*U*	*U*	0·043	0	*U*	*U*
	1957	0	*U*	*U*	0·034	0	*U*	*U*
Ireland, Republic of	1954	0·205	0·302	0·236	1·737	0·011 *q*	*N, r*	1·999
	1955	0·201	0·236	0·123	1·828	0·003 *q*	0·001 *r*	2·138
	1956	0·240	0·123	0·099	1·435	0·008 *q*	0·002 *r*	1·689
	1957	0·252	0·099	0·097	1·217	0·017 *q*	0·001 *r*	1·453
	1958	*0·221*	0·097	*0·05 E*	—	—	—	—
Italy	1954	1·074	*C*	*C*	9·512	*N*	0·003 *E*	10·9
	1955	1·135	*C*	*C*	10·345 *R*	*N*	0·006	11·247
	1956	1·077	*C*	*C*	10·905	*N*	0·008	11·972
	1957	1·022	*C*	*C*	11·819	*N*	0·009	12·146
	1958	*0·724*	—	—	—	—	—	—
Luxembourg	1945	0	*U, N*	*U, N*	0·286	0	0	0·286
	1955	0	*U, N*	*U, N*	0·290	0	0	0·290
	1956	0	*U, N*	*U, N*	0·355	0	0	0·355
	1957	0	*U, N*	*U, N*	0·312	0	0	0·312

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

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0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Netherlands	1954	12·071	0·213 *m*	0·287 *m*	7·018 *SS*	1·051 *SS*	0·012	18·026 *S*
	1955	11·895	0·287 *m*	0·292 *m*	7·606 *SS*	0·917 *SS*	0·015	18·569 *S*
	1956	11·836	0·292 *m*	0·259 *m*	8·518 *SS*	0·954 *SS*	0·021	19·379 *S*
	1957	11·376	0·259 *m*	0·312 *m*	8·687 *SS*	0·988 *SS*	0·018	19·057 *S*
	1958	*11·880*	0·312 *m*	*0·746 m*	—	—	—	—
Norway	1954	0·332	0·535	0·389 *R*	0·632	0·136	*U*	0·974 *R*
	1955	0·302	0·389	0·383	0·717	0·128	*U*	0·897
	1956	0·340	0·383	0·351	0·583	0·161	*U*	0·794
	1957	0·351	0·351	0·314	0·510	0·215	*U*	0·683
	1958	*0·292*	—	—	—	—	—	—
Poland	1954	*91·619*	—	—	—	—	—	—
	1955	*94·476*	—	—	—	—	—	—
	1956	*95·149*	—	—	—	—	—	—
	1957	*94·095*	—	—	—	—	—	—
	1958	*94·982*	—	—	—	—	—	—
Portugal *PP*	1954	0·432 *e*	0·280	0·295	0·446	*N*	*U*	0·863
	1955	0·405 *e*	0·295	0·353	0·483	*N*	*U*	0·830
	1956	0·431 *e*	0·353	0·405	0·454	*N*	*U*	0·833
	1957	0·498 *e*	0·405	0·540	0·531	*N*	*U*	0·894
	1958	*0·567 e*	0·540	*0·605*	—	—	—	—
Roumania	1955	*0·172*	—	—	—	—	—	—
	1956	*0·180*	—	—	—	—	—	—
Spain	1954	12·602	—	+ 0·063 *FF*	0·965	0·012	0	13·618
	1955	12·625	—	+ 0·271 *FF*	0·557	0·088	0	13·365
	1956	13·029	—	+ 0·528 *FF*	0·364	0·120	0	13·801
	1957	13·930	—	— 0·434 *FF*	0·756	0·038	0	14·214
	1958	*14·432*	—	—	—	—	—	—
Sweden	1954	0·3	3·6	3·1	3·0	0·0	*U*	3·8
	1955	0·3	3·1	3·0	3·2	0·0	*U*	3·6
	1956	0·3	3·0	2·7	2·6	0·0	*U*	3·2
	1957	0·3	2·7	3·1	2·7	0·0	*U*	2·6
	1958	*0·316*	—	—	—	—	—	—
Switzerland	1954	0	*N*	*N*	1·9	0	0	1·9
	1955	0	*N*	*N*	1·89	0	0	1·89
	1956	0	*N*	*N*	2·33	0	0	2·33
	1957	0	*N*	*N*	2·49	0	0	2·49
United Kingdom	1954	227·91	19·83 *p, R*	17·11 *p, R*	3·04 *R*	14·02 *R*	2·53 *R*	217·12
	1955	225·65	17·11 *p*	20·87 *p*	11·70	12·18	2·23	219·18
	*WW*1956	226·02	20·87 *p*	21·33 *p*	5·33	8·52	1·62	220·75
	*WW*1957	227·59	21·33 *p*	27·78 *p*	2·91	6·99	1·24	215·82
	*WW*1958	*219*	27·78 *p*	*37·77 p*	—	—	—	—

TABLE 3—*continued*

COALS—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Bunker coal laden on vessels engaged in foreign trade	Total domestic consumption (cols. 1+2+4) − (cols. 3+5 +6)
0		1	2	3	4	5	6	7
Yugoslavia	1954	0·988 *R*	*0·029 m*	*0·012 m*	0·617	0·089	0·072 *R*	*U*
	1955	1·134	*0·012 m*	*0·011 m*	1·003	0·040	0·079	*U*
	1956	1·232	*0·011 m*	*0·008 m*	1·422	0·053	0·077	*U*
	1957	1·227	*0·008 m*	*0·021 m*	1·729	0·030	0·079	*U*
	1958	*1·204*	*0·021 m*	*0·017 m*	—	—	—	—
OCEANIA— Australia	*Y*1954	19·735	3·266	3·523	0·002	0·392	0·033	19·055
	*Y*1955	19·663	3·492	3·168	0·005	0·296	0·025	19·671
	*Y*1956	19·338	3·168	3·401	0·004	0·197	0·040	18·872
	*Y*1957	20·027	3·401	3·673	0·006	0·554	0·009	19·198
	*Y*1958	*20·688*	—	—	—	—	—	—
Netherlands New Guinea	1954–1957	0	0	0	0	0	0	0
New Zealand	1954	2·64	*U*	*U*	0	0	*U*	2·64
	1955	2·60	*U*	*U*	0·01	0	*U*	2·60
	1956	2·67	*U*	*U*	0·01	0	*U*	2·68
	1957	2·65	*U*	*U*	0·01	0	*U*	2·66
	1958	*2·84*	—	—	—	—	—	—
USSR	1954	*243·681*	—	—	—	—	—	—
	1955	*276·638*	—	—	—	—	—	—
	1956	*303·9*	—	—	—	—	—	—
	1957	*328·4*	—	—	—	—	—	—
	1958	*k*	—	—	—	—	—	—

TABLE 4

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of Country and year		Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4)—(cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
AFRICA—								
Basutoland	1957	0	0	0	0	0	0	0
Bechuanaland	1958	0	0	0	0	0	0	0
Swaziland	1958	0	0	0	0	0	0	0
Union of South Africa	1954–1957	0	0	0	0	0	0	0
AMERICA, NORTH—								
Canada	1954	1·920	*U*	*U*	0·003	*N,n*	*U*	*N*
	1955	2·081	*U*	*U*	0·001	*N,n*	*U*	*N*
	1956	2·124	*U*	*U*	0·002	*N,n*	*U*	*N*
	1957	2·040	*U*	*U*	0·002	*N,n*	*U*	*N*
	1958	*2·040*	—	—	—	—	—	—
Netherlands Antilles	1954–1957	0	0	0	0	0	0	0
Trinidad and Tobago	1954–1957	0	0	0	*N*	0	*N*	0
United States of America	1954	3·8	*U*	*U*	*U*	*U*	*U*	0·221
	1955	2·1	*U*	*U*	*U*	*U*	*U*	0·248
	1956	2·6	*U*	*U*	*U*	*U*	*U*	0·248
	1957	1·7	*U*	*U*	*U*	*U*	*U*	0·287
AMERICA, SOUTH—								
Brazil	1954–1957	0	0	0	0	0	0	0
Surinam	1954–1957	0	0	0	0	0	0	0
ASIA—								
Ceylon	1957	0	0	0	0	0	0	0
India	1954	0·030	*N*	*N*	0	0·030	*N*	0
	1955	0·030	*N*	*N*	0	0·028	0·001	0
	1956	0·026	*N*	*N*	0	0·025	0·001	0
Israel	*MM* 1954–1957	0	0	0	0	0	0	0
Japan	1954	1·444	0·010	0·011	0	0	1·443	*U*
	1955	1·368 *R*	0·011	0·007	0	0	1·372	*U*
	1956	1·520	0·007	0·016	0·001	0·001	1·511	*U*
	1957	1·662	0·016	0·005	0·005	*N*	1·678	*U*
	1958	*1·583*	—	—	—	—	—	—

TABLE 4—*continued*

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of Country and year		Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4)—(cols. 3+5)	Peat: Production
0		1	2	3	4	5	6	7
ASIA—*Continued*								
Malaya, Federation of *a*	1954	0·228	0·040	0·035	*N*	*N*	0·233	0
	1955	0·209	0·035	0·032	*N*	*N*	0·212	0
	1956	0·185	0·032	0·030	*N*	*N*	0·188	0
	1957	0·155	0·030	0·023	*N*	*N*	0·162	0
	1958	*0·067*	—	—	—	—	—	—
Pakistan	*MM* 1954–1957	0	0	0	0	0	0	0
Singapore	*MM* 1954–1957	*b*	*b*	*b*	*b*	*b*	*b*	—
Thailand	1954	*N*	*N*	*N*	0	0	*N*	0
	1955	0·031	*N*	*N*	0	0	0·031	0
	1956	0·067	*N*	*N*	0	0	0·067	0
	1957	0·076	*N*	*N*	0	0	0·076	0
Turkey	1954	2·1	*U*	*U*	0	0	2·1 *S*	0
	1955	2·4	*U*	*U*	—	—	—	*U*
	1956	3·0	*U*	*U*	—	—	—	*U*
	1957	3·6	*U*	*U*	—	—	—	*U*
EUROPE—								
Austria	1954	6·29	*U*	*U*	0·22	0·2	6·49	*N*
	1955	6·619 *R*	*U*	*U*	0·192	0·047	6·756	0·04 *E*
	1956	6·730	*U*	*U*	0·246	0·055	6·870	0·04 *E*
	1957	6·877	*U*	0·150	0·308	0·048	7·050	0·04 *E*
	1958	*6·494*	—	—	—	—	—	—
Belgium	1954	*N*	*U*	*U*	*N*	0	*U*	0·002
	1957	*N*	*U*	*U*	*N*	0	*U*	*N*
Bulgaria	1954	*8·632*	—	—	—	—	—	—
	1955	*9·758*	—	—	—	—	—	—
	1956	*10·447*	—	—	—	—	—	—
	1957	*11·50*	—	—	—	—	—	—
	1958	*12·348*	—	—	—	—	—	—
Czechoslovakia	1954	*37·860*	—	—	0	0·9	—	0·050
	1955	*40·751*	—	—	0	1·2	—	0·110
	1956	*46·299*	—	—	0	1·3	—	0·175
	1957	*51·016*	—	—	0	1·5	—	*D*
	1958	*56·838*	—	—	—	—	—	—
Denmark	1954	0·679	0·004	—	0·194	0	—	0·545
	1955	0·801	—	0·006	0·235	*U*	*U*	0·712
	1956	1·425	0·006	0·003	0·180	*U*	*U*	0·706
	1957	*D*	0·003	0·008	0·121	*U*	*U*	0·734

TABLE 4—*continued*

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of Country and year	Brown coal and lignite: Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4) —(cols. 3+5)	Peat: Production
0	1	2	3	4	5	6	7
EUROPE—*Continued*							
Finland *d* 1954	0	*U*	*U*	0·046 *R*	0	*U*	0·13 *R*
1955	0	*U*	*U*	0·033	0	*U*	0·14
1956	0	*U*	*U*	0·035	0	*U*	0·13
1957	0	*U*	*U*	0·025	0	*U*	0·16
France 1954	1·91	0·18 *e*	0·16 *e*	0	0·04	1·89	0·05 *k*
1955	2·05	0·16 *e*	0·09 *e*	0	0·23	1·89	0·03 *k*
1956	2·25	0·09 *e*	0·07 *e*	0	0·18	2·09	0·05 *k*
1957	2·29	0·07 *e*	0·20 *e*	0	0·12	2·04	0·02 *P*
1958	*2·32*	—	—	—	—	—	—
Germany, Eastern 1954	*181·913 q*	—	—	—	—	—	—
1955	*200·612 q*	—	—	—	—	—	—
1956	*205·866 q*	—	—	—	—	—	—
1957	*212·595 q*	—	—	—	—	—	—
1958	*214·969 q*	—	—	—	—	—	—
Germany, Western 1954	89·540	0·419	0·408	0·694	0·085	90·160	0·978
1955	92·153	0·408	0·479	0·898	0·025	92·955	0·988
1956	97·031	0·479	0·688	0·962	0·007	97·777	1·010
1957	98·669	0·688	0·767	0·899	0·010	99·479	1·072
1958	*94 A*	—	—	—	—	—	—
Greece 1954	*0·700*	—	—	—	—	—	—
1955	*0·782*	—	—	—	—	—	—
1956	*0·798*	—	—	—	—	—	—
1957	*0·998*	—	—	—	—	—	—
1958	*1·196*	—	—	—	—	—	—
Hungary 1954	19·1	—	—	*N,EE*	0·3 *EE*	18·9	—
1955	19·6	—	—	0 *EE*	0·2 *EE*	19·5	—
1956	18·2	—	—	0 *EE*	0·2 *EE*	18·2	—
1957	18·9	—	—	0·2 *EE*	*N,EE*	18·4	—
1958	*21·615*	—	—	—	—	—	—
Iceland *MM* 1954–1957	*N*	0	0	0	0	*N*	*N*
Ireland, Republic of 1954	0	0	0	*U*	0 *R*	*U*	2·744
1955	0	0	0	*U*	0	*U*	3·401
1956	0	0	0	*U*	0	*U*	3·376
1957	0	0	0	*U*	0	*U*	3·435
Italy 1954	0·644	*U*	*U*	0	0	0·765 *E*	*U*
1955	0·419 *R*	*U*	*U*	0	*N*	0·560 *E*	*U*
1956	0·402	*U*	*U*	0·006	*N*	0·410 *E*	*U*
1957	0·387	*U*	*U*	0·002	*N*	0·370 *E*	*U*
1958	*0·816*	—	—	—	—	—	—
Luxembourg *r*	0	0	0	0	0	0	0
MM 1954–1957	0	0	0	0	0	0	0

TABLE 4—*continued*

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of Country and year		Brown coal and lignite						Peat
		Production	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Total consumption (cols. 1+2+4)—(cols. 3+5)	Production
0		1	2	3	4	5	6	7
EUROPE—*Continued*								
Netherlands	1954	0·172	*U*	*U*	0·076 *SS*	0·002 *SS*	0·246 *S*	0·387
	1955	0·255	*U*	*U*	0·013 *SS*	0·011 *SS*	0·257 *S*	0·355
	1956	0·270	*U*	*U*	0	0·045 *SS*	0·225 *S*	0·32 *E*
	1957	0·288	*U*	*U*	0	0·064 *SS*	0·224 *S*	0·30 *E*
	1958	*0·255*	—	—	—	—	—	—
Norway	1954	0	0·001	0·002	0·007	0	0·006	0·795 *KK*
	1955	0	0·002	0·002	0·011	0	0·011	0·800 *KK*
	1956	0	0·002	0·005	0·017	0	0·014	0·800 *KK*
	1957	0	0·005	*N*	*N*	0	0·005	0·837 *KK*
Poland	1953	*5·633 R*	—	—	—	—	—	—
	1954	*5·909 R*	—	—	—	—	—	—
	1955	*6·045*	—	—	—	—	—	—
	1956	*6·183*	—	—	—	—	—	—
	1957	*5·955*	—	—	—	—	—	—
	1958	*7·539*	—	—	—	—	—	—
Portugal *M*	1954	0·065	0·032	0·029	0	0	0·068	*N*
	1955	0·088	0·029	0·037	0	0	0·080	*N*
	1956	0·163	0·037	0·039	0	0	0·161	*N*
	1957	0·181	0·039	0·028	0	0	0·192	*N*
	1958	*0·156*	—	—	—	—	—	—
Roumania	1953	*5·0 R*	—	—	—	—	—	—
	1954	*5·1 R*	—	—	—	—	—	—
	1955	*5·913*	—	—	—	—	—	—
	1956	*6·281*	—	—	—	—	—	—
Spain	1954	1·755	—	−0·030 *FF*	0	0	1·725	0
	1955	1·827	—	−0·054 *FF*	0	0	1·773	0
	1956	1·935	—	+0·070 *FF*	0	0	2·005	0
	1957	2·518	—	−0·075 *FF*	0	0	2·443	0
	1958	*2·653*	—	—	—	—	—	—
Sweden	1954	0	*N*	*N*	0·2	*N*	0·2	0·1
	1955	0	*N*	*N*	0·2	*N*	0·2	0·1
	1956	0	*N*	*N*	0·1	*N*	0·1	0·1
	1957	0	*N*	*N*	*N*	*N*	*N*	0·1
Switzerland	*MM* 1954–1957	*N*	*N*	*N*	*N*	0	*N*	*N*
U.K.	*MM* 1954–1957	0	*U*	*U*	0	0	*N*	*U*
Yugoslavia	1954	12·675	*C*	*C*	0	0·100 *R*	*U*	0
	1955	14·070	*C*	*C*	0	0·080	*U*	0
	1956	15·869	*C*	*C*	0	0·086	*U*	0
	1957	16·780	*C*	*C*	0	0·105	*U*	0
	1958	*17·781*	—	—	—	—	—	—

TABLE 4—*continued*

BROWN COAL AND LIGNITE AND PEAT—ANNUAL STATISTICS

(In millions of metric tons)

Name of Country and year	Brown coal and lignite: Production	Brown coal and lignite: Stocks: At beginning of year	Brown coal and lignite: Stocks: At end of year	Brown coal and lignite: Imports	Brown coal and lignite: Exports	Brown coal and lignite: Total consumption (cols. 1+2+4) −(cols. 3+5)	Peat: Production
0	1	2	3	4	5	6	7
OCEANIA—							
Australia *Y* 1955	9·823	*U*	*U*	0	0	9·823 *S*	0
Y 1956	10·550	*U*	*U*	0	0	10·550 *S*	0
Y 1957	10·945	*U*	*U*	0	0	10·945 *S*	0
Y 1958	*11·041*	—	—	—	—	—	—
Netherlands New Guinea *MM* 1954–1957	0	0	0	0	0	0	0
New Zealand *s* 1954	1·92	*U*	*U*	*U*	*U*	*U*	*U*
1955	1·86	*U*	*U*	*U*	*U*	*U*	*U*
1956	2·09	*U*	*U*	*U*	*U*	*U*	*U*
1957	1·81	*U*	*U*	*U*	*U*	*U*	*U*
1958	*1·889*	—	—	—	—	—	—
U.S.S.R. 1954	*103·428*	—	—	—	—	—	—
1955	*114·621*	—	—	—	—	—	—
1956	*125·5*	—	—	—	—	—	—
1957	*134·9*	—	—	—	—	—	—

TABLE 5

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—										
Algeria	1954	0·094	0·089	0·008	0·010	*N*	0	0·051	0·041	0·092
	1955	0·084	0·080	0·010	0·010	*N*	0	0·044	0·041	0·085
	1956	0·088	0·084	0·010	0·009	*N*	0	0·046	0·043	0·089
	1957	0·091	0·086	0·009	0·010	*N*	0	0·046	0·044	0·090
Basutoland	1957	0	0	0	0	*N*	0	*N*	*N*	*N*
Bechuanaland	1958	0	0	0	0	0	0	0	0	0
Egypt	1954	0·021	0·030	0·007	0·006	0·013	0	—	—	0·041
Southern Rhodesia	1954	*0·144 a*	—	—	—	—	—	—	—	—
	1955	*0·186 a*	—	—	—	—	—	—	—	—
	1956	*0·217 a*	—	—	—	—	—	—	—	—
Swaziland	1958	0	0	0	0	0	0	0	0	0
Union of South Africa	1954	1·64	2·21	*U*	*U*	*N*	*N*	*U*	*U*	*U*
	1955	1·66	2·47	*U*	*U*	*N*	*N*	*U*	*U*	*U*
	1956	1·74	2·62	*U*	*U*	*N*	*N*	*U*	*U*	*U*
	1957	2·11	2·82	*U*	*U*	*N*	*N*	*U*	*U*	*U*
AMERICA, NORTH—										
Canada	1954	3·095	4·232	*U*	*U*	0·233	0·099	0·269	2·699	2·968
	1955	3·655	4·967	*U*	*U*	0·330	0·102	0·241	3·474	3·715
	1956	3·920	5·378	*U*	*U*	0·454	0·112	0·231	3·669	3·900
	1957	3·735	5·189	*U*	*U*	0·590	0·104	0·155	3·614	3·769
Mexico	1954	*0·399 a*	—	—	—	—	—	—	—	—
	1955	*0·508 a*	—	—	—	—	—	—	—	—
	1956	*0·574 a*	—	—	—	—	—	—	—	—
Netherlands Antilles	*MM* 1954–1957	0	0	0	0	0	0	0	0	0
Trinidad and Tobago	*MM* 1954–1957	0	0	0	0	*N*	0	*U*	*U*	*U*
United States of America	1954	57·948	78·021	3·218	3·278	0·105	0·352 *R*	*U*	*U*	57·641*R*
	1955	72·804	97·743	3·278	2·232	0·115	0·481	*U*	*U*	73·484
	1956	71·956	96·427	2·232	2·971	0·119	0·595	*U*	*U*	70·741
	1957	73·358	98·347	2·971	4·078	0·107	0·746	*U*	*U*	71·612

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
	Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0	1	2	3	4	5	6	7	8	9
AMERICA, SOUTH—									
Brazil 1954	0·602 *A*	1·020	*N*	*N*	0·035	0	0	0·637	0·637
1955	0·642 *A*	1·177	*N*	*N*	0·005	0	0	0·647	0·647
1956	0·647 *A*	1·031	*N*	*N*	0	0	0	0·647	0·647
Chile 1953	*0·243 a*	—	—	—	—	—	—	—	—
1954	*0·265 a*	—	—	—	—	—	—	—	—
1955	*0·236 a*	—	—	—	—	—	—	—	—
1956	*0·235 a*	—	—	—	—	—	—	—	—
Surinam *MM* 1954–1957	*N*	*N*	*N*	*N*	0	0	0	*N*	*N*
Venezuela 1954	0	0	0	0	0	0	0	0	0
ASIA—									
Ceylon 1957	0	0	0	0	0	0	0	0	0
China—Taiwan 1954	*0·123 a*	—	—	—	—	—	—	—	—
1955	*0·132 a*	—	—	—	—	—	—	—	—
1956	*0·117 a*	—	—	—	—	—	—	—	—
India 1955	4·503	*U*	*U*	*U*	0	0·047	*U*	*U*	4·456 *S*
1956	4·411	*U*	*U*	*U*	0	0·038	*U*	*U*	4·373 *S*
1957	4·572	*U*	*U*	*U*	0	0·074	*U*	*U*	4·498 *S*
Israel 1954	0	0	*U*	*U*	0·003	0	0	0·003	0·003
1955	0	0	*U*	*U*	0·003	0	0	0·003	0·003
1956	0	0	*U*	*U*	0·002	0	0	0·002	0·002
1957	0	0	*U*	*U*	0·003	0	0	0·003	0·003
Japan 1954	6·596 *R*	9·603 *R*	0·332	0·329 *R*	*N*	0·001	*N,R*	6·598 *R*	6·598 *R*
1955	7·089	10·329	0·329	0·283	0	*N*	*N*	7·098	7·098
1956	8·240	11·977	0·283	0·350	*N*	*N*	*N*	8·159	8·159
1957	9·289	13·460	0·350	0·732	*N*	*N*	*N*	8·964	8·964
Malaya, Federation of *MM* 1954–1957	0	0	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Pakistan 1954	0	0	0	0	*U*	0	0	0	*U*
1955	0	0	0	0	0·063	0	0	0	0·063
1956	0	0	0	0	0·075	0	0	0	0·075
1957	0	0	0	0	0·083	0	0	0	0·083
Philippines 1954	0	0	0	0	3·97	0	0	3·97	3·97
1955	0	0	0	0	4·65	0	0	4·65	4·65
1956	0	0	0	0	7·66	0	0	7·66	7·66
1957	0	0	0	0	5·30	0	0	5·30	5·30

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
	Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0	1	2	3	4	5	6	7	8	9
ASIA—*Continued*									
Singapore *MM* 1954–1957	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*	*N*
Thailand 1954	0	0	0	0	0·004	0	0	0·004	0·004
1955	0	0	0	0	0·001	0	0	0·001	0·001
1956	0	0	0	0	0·001	0	0	0·001	0·001
1957	0	0	0	0	0·002	0	0	0·002	0·002
Turkey 1954	0·4	0·4	*U*	*U*	*N*	*N*	*U*	*U*	*U*
1955	0·4	0·4	*U*	*U*	*N*	*N*	*U*	*U*	*U*
1956	0·5	0·5	*U*	*U*	*N*	*N*	*U*	*U*	*U*
1957	0·5	0·5	*U*	*U*	*N*	*N*	*U*	*U*	*U*
EUROPE—									
Austria 1954	1·81	2·31	*N*	*N*	0·37	0	0·63	1·55	2·18
1955	1·885 *R*	2·370 *R*	*U*	*U*	0·425 *R*	0	0·635	1·679 *R*	2·314 *R*
1956	2·166	2·695	*U*	*U*	0·448	0	0·762	1·872	2·634
1957	2·257	2·815	*U*	*U*	0·549	0	0·725	2·023	2·748
Belgium 1954	6·147	7·960	0·201	0·127	0·083	0·888	0·180	5·236	5·416
1955	6·598	8·656	0·127	0·071	0·141	0·776	0·172	5·847	6·019
1956	7·270	9·584	0·072	0·087	0·137	0·926	0·217	6·249	6·466
1957	7·156 *P*	9·225 *P*	0·087 *P*	0·240 *P*	0·191 *P*	0·903 *P*	0·154 *P*	6·137 *P*	6·291 *P*
Czechoslovakia 1954	5·127*a,p*	7·70 *q*	—	—	*N*	1·133	—	—	—
1955	5·460*a,p*	7·65 *q*	—	—	*N*	1·198	—	—	—
1956	5·825*a,p*	8·15 *q*	—	—	*N*	1·256	—	—	—
1957	5·943*a*	8·30 *q*	—	—	*N*	1·159	—	—	—
Denmark 1954	0·539 *g*	*U*	0·525	0·251	2·2 *c*	0	*U*	*U*	*U*
1955	0·557 *g*	*U*	0·251	0·208	2·316 *c*	0	*U*	*U*	*U*
1956	0·523 *g*	*U*	0·208	0·431	2·267 *c*	0	*U*	*U*	*U*
1957	0·519 *g*	*U*	0·431	0·528	1·332 *c*	0	*U*	*U*	*U*
Finland 1954	0·109	0·144	*U*	*U*	0·480	0	*U*	*U*	*U*
1955	0·086	0·116	*U*	*U*	0·431	0	*U*	*U*	*U*
1956	0·100	0·126	*U*	*U*	0·515	0	*U*	*U*	*U*
1957	0·113	0·155	*U*	*U*	0·460	0	*U*	*U*	*U*
France *CC* 1954	10·68	13·90	0·26 *f*	0·26 *f*	3·82 *m*	0·13 *h*	1·94 *n*	12·69	14·37
1955	12·02	15·63	0·26 *f*	0·07 *f*	5·00 *m*	0·26 *h*	1·91 *n*	15·04	16·95
1956	13·44	17·47	0·07 *f*	0·05 *f*	5·23 *m*	0·12 *h*	2·33 *n*	16·24	18·57
1957	13·67	17·77	0·05 *f*	0·11 *f*	5·55 *m*	0·21 *h*	2·08 *n*	16·87	18·95
Germany, Western 1954	39·506	52·731	4·781 *R*	3·061 *R*	0·267	10·208	8·904	22·381	31·285
1955	45·679	60·491	3·061	1·328	0·409	11·586	10·072	26·163	36·235
1956	49·229	64·446	1·328	1·656	0·707	11·325	10·769	27·514	38·283
1957	50·792	66·701	1·656	3·036	0·443	10·701	10·904	28·250	39·154

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)-(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Saar	1954	*3·666 a*	—	—	—	—	—	—	—	—
	1955	*3·939 a*	—	—	—	—	—	—	—	—
	1956	*4·206 a*	—	—	—	—	—	—	—	—
Hungary	1954	0·4 *b*	—	—	—	1·1 *EE*	*N,EE*	—	—	1·5
	1955	0·4 *b*	—	—	—	1·2 *EE*	*N,EE*	0·1	1·5	1·6
	1956	0·5 *b*	—	—	—	1·1 *EE*	*N,EE*	—	—	1·5
	1957	0·7 *b*	—	—	—	1·1 *EE*	*N,EE*	0·1	1·5	1·6
Iceland	1954	0·001	0·001	*N*	*N*	0·001	0	0·001	0·001	0·002
	1955	0·001	0·001	*N*	*N*	0·002	0	0·001	0·002	0·003
	1956	0·001	0·001	*N*	*N*	0·003	0	0·001	0·003	0·004
	1957	0	0	*N*	*N*	0·002	0	*N*	0·002	0·002
Ireland, Republic of	1954	0·100	*U*	*U*	*U*	0·018	*U,d*	*U*	*U*	0·118 *S*
	1955	0·101	*U*	*U*	*U*	0·027	*U,d*	*U*	*U*	0·128 *S*
	1956	0·096	*U*	*U*	*U*	0·017	*U,d*	*U*	*U*	0·113 *S*
	1957	0·092	*U*	*U*	*U*	0·009	*U,d*	*U*	*U*	0·101 *S*
Italy	1954	3·650 *R*	4·941 *R*	*C*	*C*	0·042	0·053	1·280 *E*	2·488 *E*	3·768
	1955	3·947 *R*	5·291 *R*	*C*	*C*	0·067	0·072	1·170 *E*	2·802 *E*	3·972
	1956	4·400	5·808	*C*	*C*	0·037	0·106	1·220 *E*	3·140	4·360
	1957	4·607	6·139	*C*	*C*	0·130	0·103	1·330 *E*	3·088 *E*	4·418
Luxembourg	1954	0·031	0·045	*N*	*N*	3·113	0	0·068	3·076	3·144
	1955	0·034	0·046	*N*	*N*	3·532	0	0·070	3·496	3·566
	1956	0·036	0·052	*N*	*N*	3·643	0	0·072	3·607	3·679
	1957	0·034	0·050	*N*	*N*	3·867	0	0·071	3·820	3·901
Netherlands	1954	4·309 *R*	5·619	0·196	0·153	0·360*SS*	1·538*SS*	*U*	*U*	3·131*R,S*
	1955	4·769	6·315	0·153	0·124	0·435*SS*	1·933*SS*	*U*	*U*	3·271 *S*
	1956	5·001	6·517	0·124	0·142	0·437*SS*	2·049*SS*	*U*	*U*	3·389 *S*
	1957	4·902	6·335	0·142	0·275	0·501*SS*	2·049*SS*	*U*	*U*	3·354 *S*
Norway	1954	0·048	0·105	0·163	0·130	0·349	0	0·246	0·184	0·430
	1955	0·045	0·095	0·130	0·071	0·451	0	0·343	0·212	0·555
	1956	0·047	0·098	0·071	0·258	0·693 *e*	0	0·296	0·257	0·553
	1957	0·040	0·086	0·258	0·273	0·425 *e*	0	0·195	0·255	0·450
Poland	1954	*5·481 a*	—	—	—	—	—	—	—	—
	1955	*6·127 a*	—	—	—	—	—	—	—	—
	1956	*5·637 a*	—	—	—	—	—	—	—	—
Portugal *M*	1954	0·034 *R*	0·082 *R*	0·008 *R*	0·012 *R*	0 *R*	0	0·002 *R*	0·028 *R*	0·030 *R*
	1955	0·037	0·078	0·012	0·009	0	0	0·002	0·038	0·040
	1956	0·039	0·076	0·009	0·003	0	0	0·001	0·044	0·045
	1957	0·034	0·073	0·003	0·005	0	0	*N*	0·032	0·032

TABLE 5—*continued*

COKE (EXCLUDING PETROLEUM COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production: Quantity	Production: Estimated raw coal equivalent	Stocks: At beginning of year	Stocks: At end of year	Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6): For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Roumania	1955	*0·144 a*	—	—	—	—	—	—	—	—
	1956	*0·256 a*	—	—	—	—	—	—	—	—
Spain	1954	1·467	1·467	—	−0·011*FF*	0·130	0	0·058	1·528	1·586
	1955	1·703	1·703	—	−0·071*FF*	0·071	0·006	0·065	1·632	1·697
	1956	1·910	1·910	—	+0·034*FF*	0·003	0·096	0·086	1·765	1·951
	1957	2·136	2·136	—	−0·175*FF*	0	0·106	0·071	1·784	1·855
Sweden	1954	0·8	0·8	1·5	1·2	2·0	0·1	2·0	1·0	3·0
	1955	0·8	0·9	1·2	1·2	2·5	*N*	2·1	1·2	3·3
	1956	0·9	0·9	1·2	1·6	2·8	*N*	1·9	1·4	3·3
	1957	0·8	0·8	1·6	2·0	2·4	*N*	1·3	1·5	2·8
Switzerland	1954	0·45	*U*	*N*	*N*	0·66	0	*U*	*U*	1·11
	1955	0·47	*U*	*N*	*N*	0·63	0	*U*	*U*	1·10
	1956	0·51	*U*	*N*	*N*	0·73	0	*U*	*U*	1·24
	1957	0·51	*U*	*N*	*N*	0·73	0	*U*	*U*	1·24
United Kingdom	1954	30·66 *R*	54·91 *i,R*	2·69 *j,R*	2·43 *j,R*	0	1·21	3·33 *R*	26·38 *R*	29·71
	1955	31·33	55·96 *i*	2·43 *j*	2·02 *j*	0	1·25	3·57	26·92	30·49
	1956	32·87	58·40 *i*	2·02 *j*	3·01 *j*	0	1·70	3·38	26·80	30·18
	1957	33·04	58·25 *i*	3·01 *j*	5·16 *j*	0	1·89	3·03	25·97	29·00
Yugoslavia	1954	0·428 *R*	0·588 *R*	*C*	*C*	0·218 *R*	0	0	*U*	*U*
	1955	0·755	0·989	*C*	*C*	0·118	0	0	*U*	*U*
	1956	0·946	1·239	*C*	*C*	0·044	0	0	*U*	*U*
	1957	1·062	1·497	*C*	*C*	0·020	0	0	*U*	*U*
OCEANIA—										
Australia	*Y* 1955	3·534	5·793	*U*	*U*	0·006	0·022	*U*	*U*	*U*
	Y 1956	3·485	5·713	*U*	*U*	0·003	0·068	*U*	*U*	*U*
	Y 1957	*D*	*D*	*U*	*U*	0·008	0·131	*U*	*U*	*U*
Netherlands New Guinea	1954–1957	0	0	0	0	0	0	0	0	0
New Zealand	1957	0·080	0·273	*U*	*U*	0	0	*U*	*U*	*U*
U.S.S.R.	1954	*40·32*	—	—	—	—	—	—	—	—
	1955	*43·6*	—	—	—	—	—	—	—	—
	1956	*46·6*	—	—	—	—	—	—	—	—

TABLE 6

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
AFRICA—										
Algeria	1954	0·029	0·029	0·001	0·005	0·004	0	—	—	0·029
	1955	0·024	0·024	0·005	0·005	0·003	0	—	—	0·027
	1956	0·031	0·031	0·005	0·002	0·004	0	—	—	0·034
	1957	0·043	0·043	0·002	0·003	0·005	0	—	—	0·047
Basutoland	1957	0	0	0	0	*N*	0	*N*	*N*	*N*
Bechuanaland	1958	0	0	0	0	0	0	0	0	0
Egypt	1954	0	0	*U*	*U*	0·006	0	—	—	0·006 *S*
Swaziland	1958	0	0	0	0	0	0	0	0	0
Union of South Africa	1954–1957	0	0	0	0	*U*	0	*U*	*U*	*U*
AMERICA, NORTH—										
Canada	1954	0·754	0·754	*U*	*U*	*N*	*N*	0·130	0·627	0·757
	1955	0·595	0·595	*U*	*U*	*N*	*N*	0·120	0·475	0·595
	1956	0·682	0·682	*U*	*U*	*N*	*N*	0·117	0·563	0·680
	1957	0·358	0·358	*U*	*U*	*N*	*N*	0·097	0·260	0·357
Netherlands Antilles	1954–1957	0	0	0	0	0	0	0	0	0
Trinidad and Tobago	1954–1957	0	0	*U*	*U*	*U*	0	*U*	*U*	*U*
United States of America	1954	1·544	1·447	*U,N*	*U,N*	*N*	0·090	*U*	*U*	1·454
	1955	1·541	1·468	*U,N*	*U,N*	0	0·096	*U*	*U*	1·445
	1956	1·437	1·368	*U,N*	*U,N*	*N*	0·097	*U*	*U*	1·340
	1957	1·045	0·996	*U,N*	*U,N*	0·001	0·078	*U*	*U*	0·968
AMERICA, SOUTH—										
Brazil	1954–1956	0	0	0	0	0	0	0	0	0
Surinam	1954–1957	0	0	0	0	0	0	0	0	0
Venezuela	1954	0	0	0	0	0	0	0	0	0

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year	Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
	Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0	1	2	3	4	5	6	7	8	9
ASIA—									
Ceylon 1957	0	0	0	0	0	0	0	0	0
Israel 1954–1957	0	0	0	0	0	0	0	0	0
Japan 1954	2·417 *R*	2·075 *R*	*U*	*U*	0	0	1·202 *A*	1·215 *R*	2·417 *R*
1955	2·703	2·083	*U*	*U*	0	0	1·371 *A*	1·332	2·703
1956	2·999	2·307	*U*	*U*	0	0	1·539 *A*	1·460	2·999
1957	3·144	2·406	*U*	*U*	0	0	1·661 *A*	1·483	3·144
Malaya, Federation of 1954–1957	0	0	0	0	0	0	0	0	0
Pakistan 1954	0·003	0·002	0·001	0·002	0	0	0·002	*N*	0·002
1955	0·001	0·001	0·002	*N*	0	0	0·003	*N*	0·003
1956	0·006	0·006	*N*	*N*	0	0	0·006	*N*	0·006
Singapore 1954–1957	0	0	0	0	0	0	0	0	0
Thailand 1954–1957	0	0	0	0	0	0	0	0	0
EUROPE—									
Austria 1954	0·42	0·59	*U*	*U*	0·51	0	0·56	0·37	0·93
1955	0·011	0·020	*U*	*U*	0·571	0	0·494	0·088	0·582
1956	0·007	0·012	*U*	*U*	0·553	0	0·480	0·080	0·560
1957	0·012	0·022	*U*	*U*	0·614	0	0·573	0·053	0·626
Belgium 1954	1·378	1·310	0·012	0·012	0·040	0·325	0·512	0·581	1·093
1955	1·554	1·463	0·012	0·008	0·051	0·478	0·549	0·582	1·131
1956	1·827	1·705	0·007	0·006	0·072	0·642	0·681	0·577	1·258
P 1957	1·822	1·695	0·005	0·021	0·104	0·708	0·726	0·476	1·202
Czechoslovakia 1954	0·563 *b*	—	—	—	—	—	—	—	—
1955	0·655 *b*	—	—	—	—	—	—	—	—
1956	0·610 *b*	—	—	—	—	—	—	—	—
1957	0·641 *b*	—	—	—	—	—	—	—	—
Finland *MM* 1954–1957	0	0	0	0	*N*	0	*N*	*N*	*N*
France 1954	6·73	6·39	0·06 *k*	0·08 *k*	0·86 *i*	0·02 *a*	6·30 *d*	1·25	7·55
1955	6·70	6·38	0·08 *k*	0·04 *k*	0·93 *i*	0·04 *a*	6·40 *d*	1·23	7·63
1956	7·90	7·52	0·04 *k*	0·03 *k*	0·95 *i*	0·03 *a*	7·61 *d*	1·22	8·83
1957	8·29	7·88	0·03 *k*	0·04 *k*	1·39 *i*	0·02 *a*	8·40 *d*	1·25	9·65

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)–(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Germany, West—										
Patent fuel	1954	6·030	5·783	0·003	0·004	0·033	0·588	4·589	0·885	5·474
	1955	6·914	6·625	0·004	0·003	0·105	0·627	5·373	1·020	6·393
	1956	7·708	7·414	0·003	0·005	0·307	0·696	6·505	0·812	7·317
	1957	7·824	7·560	0·005	0·006	0·167	0·647	6·587	0·756	7·343
Brown coal briquettes and brown coal coke	1954	17·360	37·251	0·221	0·237	2·422	1·656	10·573	7·537	18·110
	1955	17·061	36·191	0·237	0·311	3·210	1·690	11·581	6·926	18·507
	1956	17·543	37·189	0·311	0·303	2·653	1·676	11·864	6·664	18·528
	1957	17·409	36·722	0·303	0·319	3·085	1·680	12·482	6·316	18·798
Hungary	1954	0·6 *u*	—	—	—	0·2 *EE*	*N,EE*	0·4	0·2	0·6
	1955	0·7 *u*	—	—	—	0·2 *EE*	0·2 *EE*	0·4	0·3	0·7
	1956	0·8 *u*	—	—	—	0·1 *EE*	*N,EE*	0·4	0·4	0·8
	1957	0·8 *u*	—	—	—	*N,EE*	—	0·5	0·2	0·7
Iceland	1954–1957	0	0	*N*	*N*	*N*	0	0	*N*	*N*
Ireland, Republic of	1954	0·042	*U*	*U*	*U*	0·77	*U*	*U*	*U*	0·81
	1955	0·236	*U*	*U*	*U*	0·82	*U*	*U*	*U*	1·06
	1956	0·253	*U*	*U*	*U*	0·59	*U*	*U*	*U*	0·84
	1957	0·570	*U*	*U*	*U*	0·34	*U*	*U*	*U*	0·91
Italy	1954	0·022	*U*	*U*	*U*	0·166	0	*U*	*U*	0·181 *E*
	1955	0·025	0·023	*U*	*U*	0·182	0	0·202 *E*	0·006 *E*	0·208
	1956	0·026	0·023	*U*	*U*	0·273	0	0·297 *E*	0·003 *E*	0·300
	1957	0·016	0·015	*U*	*U*	0·276	0	0·264 *E*	0·021 *E*	0·285
Luxembourg	1954	0	0	*U,N*	*U,N*	0·146	0	0·139	0·007	0·146
	1955	0	0	*U,N*	*U,N*	0·156	0	0·148	0·008	0·156
	1956	0	0	*U,N*	*U,N*	0·150	0	0·135	0·015	0·150
	1957	0	0	*U,N*	*U,N*	0·158	0	0·145	0·013	0·158
Netherlands	1954	1·001 *v*	1·083 *y*	*U*	*U*	0·577*SS*	0·155*SS*	*U*	*U*	1·423 *S*
	1955	1·061 *v*	1·160 *y*	*U*	*U*	0·801*SS*	0·218*SS*	*U*	*U*	1·644 *S*
	1956	1·111 *v*	1·184 *y*	*U*	*U*	0·767*SS*	0·238*SS*	*U*	*U*	1·640 *S*
	1957	1·224 *v*	1·307 *y*	*U*	*U*	0·629*SS*	0·340*SS*	*U*	*U*	1·513 *S*
Norway	1954–1957	0	0	—	—	*N*	0	—	—	—
Poland	1957	*0·664*	*0·631*	—	—	—	—	—	—	—
Portugal *M*	1954	0·093	0·084	0	0	0·003	0	0·024 *E*	0·072 *E*	0·096
	1955	0·096	0·088	0	0	0·006	0	0·026 *E*	0·076 *E*	0·102
	1956	0·102	0·092	0	0	0·007	0	0·027 *E*	0·082 *E*	0·109
	1957	0·090	0·083	0	0	0·003	0	0·021 *E*	0·072 *E*	0·093

TABLE 6—*continued*

MANUFACTURED FUEL (OTHER THAN COKE)—ANNUAL STATISTICS

(In millions of metric tons)

Name of country and year		Production		Stocks		Imports	Exports	Domestic consumption (cols. 1+3+5)-(cols. 4+6)		
		Quantity	Estimated raw coal equivalent	At beginning of year	At end of year			For household purposes	For other purposes	Total (cols. 7+8)
0		1	2	3	4	5	6	7	8	9
EUROPE—*Continued*										
Spain	1954	1·125	1·125	—	−0·022*FF*	0·007	0	0·114	0·996	1·110
	1955	1·167	1·167	—	+0·005*FF*	0·018	0	0·086	1·104	1·190
	1956	1·335	1·335	—	−0·007*FF*	*N*	0	0·140	1·188	1·328
	1957	1·382	1·382	—	−0·038*FF*	0	0	0·146	1·198	1·344
Switzerland	1954	*N*	—	*N*	*N*	0·25	0	*U*	*U*	0·25
	1955	*N*	*U*	*N*	*N*	0·26	0	*U*	*U*	0·26
	1956	*N*	*U*	*N*	*N*	0·27	0	*U*	*U*	0·27
	1957	*N*	*U*	*N*	*N*	0·26	0	*U*	*U*	0·26
United Kingdom	*WW* 1954	1·71	1·66 *R*	0·08 *R*	0·04	*N*	0·24 *R*	*U*	*U*	1·51
	WW 1955	1·71	1·68	0·04	0·02	*N*	0·27	*U*	*U*	1·46
	WW 1956	1·81	1·81	0·02	0·01	*N*	0·33	*U*	*U*	1·49
	WW 1957	2·14	2·15	0·01	0·24	*N*	0·21	*U*	*U*	1·70
Yugoslavia *h*	1954	0·014	0·015 *R*	*C*	*C*	0	0·002	*U*	*U*	*U*
	1955	0·039	0·042	*C*	*C*	0	*N*	*U*	*U*	*U*
	1956	0·025	0·027	*C*	*C*	0	*N*	*U*	*U*	*U*
	1957	0·007	0·008	*C*	*C*	0	0	*U*	*U*	*U*
OCEANIA—										
Australia *t*	1955	*C*	*C*	*C*	*C*	0·001	0·008	*U*	*U*	*U*
	1956	*C*	*C*	*C*	*C*	0·001	0·002	*U*	*U*	*U*
	1957	*C*	*C*	*C*	*C*	0·003	0·006	*U*	*U*	*U*
Netherlands New Guinea	1954–1957	0	0	0	0	0	0	0	0	0
New Zealand *z*	1954	0·01	0·03	*U*	*U*	0	0	*U*	*U*	*U*
	1955	0·01	0·03	*U*	*U*	0	0	*U*	*U*	*U*
	1956	0·02	0·03	*U*	*U*	0	0	*U*	*U*	*U*
	1957	0·02	0·03	*U*	*U*	0	0	*U*	*U*	*U*

STATISTICAL YEAR-BOOK

OF THE

WORLD POWER CONFERENCE

No. 9

Data on Resources and Annual statistics for 1954-1957, with a considerable number of statistics for 1958

EDITED, WITH INTRODUCTORY AND EXPLANATORY TEXTS

by

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SOLID FUELS
TABLES 2, 3 and 4

The following notes were sent to member countries as a guide to the information they should supply on coal, lignite and peat:

COAL, BROWN COAL AND LIGNITE
(TABLES 2 and 3)

On account of the varying characteristics of coal in the several countries and of the different bases of classification employed, it has been deemed inadvisable to attempt to segregate the higher ranking coals—anthracite, bituminous, sub-bituminous, etc.—or to define the limits which separate them from brown coal and lignite. It will, therefore, be the responsibility of each reporting country when submitting its statistics of coals to determine for itself the basis of classification to be used in distinguishing the two groups to be reported: *viz.* coals, brown coal and lignite. The statistics for coals are to be entered in Table 2 and those for brown coal and lignite in Table 3.

Measured Reserves—Coals, Brown Coal and Lignite
"Measured reserves" of coals and of brown coal and lignite shall mean the total amounts thereof occurring within the limits hereinafter prescribed and with respect to which there exist reliable data of thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

(*a*) Coals: Seams containing not less than 30 centimetres of coal and situated not more than 1,200 metres below the surface, including workable, submarine seams.

(*b*) Brown Coal and Lignite: Seams containing not less than 30 centimetres of brown coal or lignite and situated not more than 500 metres below the surface.

Indicated and Inferred Reserves
"Indicated and inferred reserves" of coals and of brown coal and lignite shall mean such reserves, in addition to the measured reserves, within the limits of thickness and depth of seams specified in the preceding paragraph, as may, from uncompleted investigations or from relation to measured reserves, be reasonably assumed to exist, but with respect to which only approximate estimates can be given.

Total Reserves
"Total reserves" shall mean the aggregate within the reporting country of the measured reserves and the indicated and inferred reserves.

Percentage Economically Recoverable
"Percentage economically recoverable" shall mean the proportion, expressed as a percentage, that it is considered to be of economic value.

PEAT (TABLE 4)

Peat: A mass of organic origin which has passed through a process of transformation and which contains when completely dehydrated not less than 50 per cent of organic matter.

Total Reserves (measured and indicated) of Peat
"Total reserves (measured and indicated) of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

As will be seen from the notes to the Tables (Section VII), not all member countries were able to supply information on the basis of the definitions prescribed, and other members could not supply information for the whole of their country. In referring to the Tables it is therefore necessary to consult the notes.

TABLE 2

COALS (In Millions of Metric Tons)

Name of country		Measured reserves: Date to which estimate refers	Measured reserves: Quantity	Measured reserves: Proportion economically recoverable (per cent)	Measured reserves: Average calorific value (kilocalories per kilogram)	Indicated and inferred reserves quantity	Total reserves (columns 3 plus 6) quantity
1		2	3	4	5	6	7
NORTH AMERICA—							
Canada		1960	42000	50	U	18000	60000
United States	(a)	1960	72000	50	U	1028000	1100000
CARIBBEAN AMERICA—							
Colombia		—	—	—	—	—	*12500*
Honduras		*1913*	—	—	—	—	*1*
Mexico		—	—	—	—	—	*2600*
Venezuela		1961	29·6	80	7630	312	342
OTHER AMERICA—							
Argentina		1960	374	66 E	6200	80	454
Brazil		1955	388	60	6330	1312	1700
Chile		1961	96	75	6900	84	180
Peru	(b)	—	—	—	—	—	*400*
WESTERN EUROPE—							
Austria		1960	2·0	100	6000	1·0	3·0
Belgium	(c)	1956	1557	100	7958	1868	3425
France	(d)	1959	U	U	U	U	4400
Germany, Fed. R.	(e)	1956	70200	53·4	7000	159700	229900
Ireland, Republic of	(f)	1961	13·5	U	3000	68	81·5
Italy	(g)	1960	675	75	3500	25	700
Netherlands	(h)	1956	2394	U	U	O	2394
Norway	(i)	1958–1960	24	75	7800	1800 A	1800 A
Portugal	(j)	1960	18	80	5000	11	29
Spain		1960	2784	95	7510	173	2957
Sweden	(k)	1961	60	70	4200	30	90
Switzerland		1961	N	N	U	N	N
United Kingdom		1960	127079	U	U	42300	169379
Yugoslavia		1956	22	—	—	215	237

TABLE 2—*continued*

COALS (In Millions of Metric Tons)

Name of country	Measured reserves: Date to which estimate refers	Measured reserves: Quantity	Measured reserves: Proportion economically recoverable (per cent)	Measured reserves: Average calorific value (kilocalories per kilogram)	Indicated and inferred reserves quantity	Total reserves (columns 3 plus 6) quantity
1	2	3	4	5	6	7
MIDDLE EAST—						
Turkey (l)	1961	489	60	over 6000	809	1298
FAR EAST—						
India (m)	1951–1961	U	U	U	U	57832
Indochina	1952	200	—	—	800	1000
Indonesia	1961	U	U	U	U	U
Japan	1961	5723	54·1	U	13525	19248
Korea, Republic of	*1949*	—	—	*5000*	*833*	*833*
North Borneo	1948–1952	4·9	60	3000–3500	18·4	23·3
Pakistan (n)	1959	165	70	6000	200	365
Philippines	1957	2·74	—	—	32·63	35·37
Sarawak	1961	0·264	U	8487	4·572	4·836
OCEANIA—						
Australia	1961	1791	53	6412	11053	12844
New Caledonia	1952	5	—	—	10	15
New Zealand	1959	45·5	40–50	U	98·5	144
AFRICA—						
Algeria	1957	9	—	—	11	20
Basutoland (o)	1947	N	U	U	N	N
Bechuanaland (p)	1961	506	100	2642	U	U
Congo (Léopoldville)	*1913*	—	—	—	—	*100*
Madagascar	1952	100	—	—	200	300
Morocco (q)	1960	14·8	100	7000	81	95·8
Nigeria (r)	1958	U	U	U	406	U
Rhodesia and Nyasaland, Federation of (s)	1960	1760	U	U	4853	6613
South Africa, Repub. of (t)	1960	21443	100	5000	41912	63355
Swaziland (u)	1961	2022	90	U	3000	5022
Tanganyika (v)	1955	300	60	7000	100	400

TABLE 2—*continued*

COALS (In Millions of Metric Tons)

Name of country	Measured reserves: Date to which estimate refers	Measured reserves: Quantity	Measured reserves: Proportion economically recoverable (per cent)	Measured reserves: Average calorific value (kilocalories per kilogram)	Indicated and inferred reserves quantity	Total reserves (columns 3 plus 6) quantity
1	2	3	4	5	6	7
COUNTRIES N.E.S.—						
Bulgaria (w)	*1959*	—	—	—	—	*33*
Czechoslovakia	—	—	—	—	—	6450
Hungary	1931	210	—	—	O	210
Poland	1956	75500	66	5800	59500	135000
Roumania	1932	78	—	—	U	U
U.S.S.R. (x)	1960	143688	near 80	5832	4486362	4630050
ASIA N.E.S.—						
China (Mainland)	*1913*	—	—	—	—	*1011000*

The following countries are reported as having no reserves (the date of the report is stated in parentheses after the name of the country):

CARIBBEAN AMERICA—
- Jamaica (1961)
- Netherlands Antilles
- Trinidad and Tobago (1960)

OTHER AMERICA—
- British Guiana (1961)
- Surinam (1961)

WESTERN EUROPE—
- Denmark (1960)
- Finland (1961)
- Greece (1961)
- Iceland (1961)
- Luxembourg (1960)
- Malta (1961)

MIDDLE EAST—
- Cyprus (1961)
- Israel (1960)
- United Arab Republic (Egypt) (1960)

FAR EAST—
- Brunei (1961)
- Ceylon (1957)
- Malaya, Federation of (1961)
- New Guinea (Netherlands) (1958)
- Singapore (1960)
- Thailand (1957)

OCEANIA—
- British Solomon Islands (1961)
- Fiji (1961)
- Nauru (1961)
- New Guinea (Australian) (1961)
- Papua (1961)

AFRICA—
- Ghana (1960)
- Ifni (1961)
- Kenya and Uganda (1961)
- Rio Muni and Fernando Póo (1961)
- Sahara (Spanish) (1961)

For notes see Section VII

TABLE 3
BROWN COAL AND LIGNITE
(In Millions of Metric Tons)

Name of country		Measured reserves: Date to which estimate refers	Measured reserves: Quantity	Measured reserves: Proportion economically recoverable (per cent)	Measured reserves: Average calorific value (kilocalories per kilogram)	Indicated and inferred reserves quantity	Total reserves (columns 3 plus 6) quantity
1		2	3	4	5	6	7
NORTH AMERICA—							
Canada		1960	12250	50	U	11850	24100
United States	(a)	1960	9400	50	U	396600	406000
CARIBBEAN AMERICA—							
Venezuela	(b)	1961	U	U	U	U	U
OTHER AMERICA—							
Argentina	(c)	1960	U	U	U	U	U
Brazil		1955	1·7	U	U	U	U
Chile		1954	355	70	5000	5020	5375
Honduras		*1913*	—	—	—	—	*4*
WESTERN EUROPE—							
Austria		1960	212	100	3500	39	251
Denmark	(d)	1960	70	100	1900	N	70 A
France	(e)	1959	100	60	1970	U	U
		1959	U	U	5000	U	U
Germany, Fed. R.	(f)	1960	62665	14·7	2000	U	U
Greece		1952–1961	908	75	1500	667	1575
Italy		1960	135	75	1600	55	190
Netherlands		1957	2·5	U	U	O	2·5
Portugal		1960	28	50	3800	6	34
Spain		1960	500	90 A	4500	280	780
United Kingdom		1961	N	U	U	N	N
Yugoslavia		1956	7206	—	—	14200	21406
MIDDLE EAST—							
Turkey	(g)	1960	438	80	2000–6000	444	882

TABLE 3—*continued*

BROWN COAL AND LIGNITE

(In Millions of Metric Tons)

Name of country	Measured reserves: Date to which estimate refers	Measured reserves: Quantity	Measured reserves: Proportion economically recoverable (per cent)	Measured reserves: Average calorific value (kilocalories per kilogram)	Indicated and inferred reserves quantity	Total reserves (columns 3 plus 6) quantity
1	2	3	4	5	6	7
FAR EAST—						
Afghanistan	*1956*	—	—	—	*U*	*U*
Burma	*1951*	—	—	—	—	*265*
India	1951	U	U	U	U	2020
Indonesia (h)	1961	D	D	D	D	D
Japan	1955	238	58·9	U	1495	1733
Korea, Republic of	*1951*	—	—	*4200*	—	*5*
Malaya, Federation of (i)	1961	N	U	U	N	N
Pakistan	1960	41	70	5000	100	141
Philippines	—	U	—	—	—	U
Sarawak	1961	U	U	U	U	U
Thailand	1957	14 A	—	—	21 A	35 A
OCEANIA—						
Australia	1961	39954	52	2071	57036	96990
New Zealand	1959	65	40–50	U	1008	1073
AFRICA—						
Basutoland (j)	1947	N	U	U	N	U
Nigeria (k)	1962	U	U	U	73·2	U
COUNTRIES N.E.S.— (l)						
Bulgaria (m)	*1959*	—	—	—	—	*3800*
Czechoslovakia	—	—	—	—	—	12500
Hungary	1931	1500	—	—	O	1500
Poland	1956	U	—	2000	U	33000
Roumania	1932	2839	—	—	U	U
U.S.S.R. (n)	1960	56820	near 80	3076	1292810	1349630
ASIA N.E.S.—						
China (Mainland) (o)	*1956*	—	—	—	—	*700*

The following countries are reported as having no reserves (the date of the report is stated in parentheses after the name of the country):

CARIBBEAN AMERICA—
- Jamaica (1961)
- Netherlands Antilles
- Trinidad and Tobago (1960)

OTHER AMERICA—
- British Guiana (1961)
- Surinam (1961)

WESTERN EUROPE—
- Finland (1961)
- Iceland (1961)
- Ireland, Republic of (1961)
- Luxembourg (1960)
- Malta (1961)
- Norway (1961)
- Sweden
- Switzerland (1961)

MIDDLE EAST—
- Cyprus (1961)
- Israel (1958–1960)
- United Arab Republic (Egypt) (1960)

FAR EAST—
- Brunei (1961)
- Ceylon (1961)
- Indochina (1952)
- New Guinea (Netherlands) (1958)
- North Borneo
- Singapore (1960)

OCEANIA—
- British Solomon Islands (1961)
- Fiji Islands (1961)
- Nauru (1961)

OCEANIA (*continued*)—
- New Caledonia (1952)
- New Guinea (Australian) (1961)
- Papua (1961)

AFRICA—
- Bechuanaland (1961)
- Ghana (1960)
- Ifni (1961)
- Kenya and Uganda (1961)
- Madagascar
- Morocco (1961)
- Nyasaland (1933)
- Rio Muni and Fernando Póo (1961)
- Sahara (Spanish) (1961)
- South Africa, Republic of (1960)
- Swaziland (1971)

For notes see Section VII

TABLE 4

PEAT (In Millions of Metric Tons)

Name of country		Total reserves (measured and indicated)	
		Date to which estimate refers	Quantity
1		2	3
NORTH AMERICA—			
Canada		1926	200
United States	(a)	1922	12544
OTHER AMERICA—			
Argentina		1960	110
British Guiana		1961	N
Chile		1961	U
WESTERN EUROPE—			
Austria		1961	25 E
Belgium		—	N
Denmark		1960	100–150
Finland		1961	30000 A
France		1961	U
Germany, Fed. R.	(b)	1961	250
Iceland		1961	2000 A
Ireland, Republic of	(c)	1961	3500
Italy		1960	N
Netherlands	(d)	1955	12·8
Norway	(e)	1961	50
Portugal		1960	U
Sweden		1952	9400
United Kingdom		1961	1100–1900
FAR EAST—			
Japan	(f)	1955–1961	240
Korea, Republic of		—	*163*
Malaya, Fed. of	(g)	1961	786
North Borneo		1953	19
Pakistan	(h)	1958	152
Philippines		—	U

TABLE 4—*continued*

PEAT (In Millions of Metric Tons)

Name of country		Total reserves (measured and indicated)	
		Date to which estimate refers	Quantity
1		2	3
FAR EAST—*continued*			
Sarawak		1961	U
OCEANIA—			
Australia		1961	N
New Zealand	(i)	1961	U
AFRICA—			
Basutoland		1960	N
Rhodesia and Nyasaland		1961	U
Tanganyika		1934	U
COUNTRIES N.E.S.—			
Hungary		1931	120
Poland		1935	6000
Roumania	(j)	1932	67·6
U.S.S.R.		1957	158000
ASIA N.E.S.—			
China (Mainland)	(k)	—	*U*

The following countries are reported as having no reserves (the date of the report is stated in parentheses after the name of the country):

CARIBBEAN AMERICA—
British Honduras (1961)
Jamaica (1961)
Netherlands Antilles
Trinidad and Tobago (1960)
Venezuela (1961)

OTHER AMERICA—
Brazil
Surinam (1961)

WESTERN EUROPE—
Greece (1961)
Luxembourg (1960)
Malta (1961)
Spain (1961)
Switzerland (1961)

MIDDLE EAST—
Cyprus (1961)
Israel (1958–1960)
Turkey
United Arab Republic (Egypt)

FAR EAST—
Brunei (1961)
Ceylon (1961)
India (1953)
Indochina (1952)
Indonesia
Netherlands New Guinea (1958)
Singapore (1960)

OCEANIA—
British Solomon Islands (1961)
Fiji Islands (1961)
Nauru (1961)
New Caledonia (1952)
New Guinea (Australian) (1961)
Papua (1961)

AFRICA—
Bechuanaland Protectorate (1961)
Ghana (1960)
Ifni (1961)
Madagascar
Morocco (1960)
Nigeria (1962)
Rio Muni and Fernando Póo
Sahara (Spanish) (1961)
South Africa, Republic of (1960)
Swaziland (1961)

For notes see Section VII

WORLD POWER CONFERENCE
SURVEY OF
ENERGY RESOURCES, 1962

WITH A PREFACE, INTRODUCTION AND SUMMARY BY

ALBERT PARKER, C.B.E., D.Sc.

Chairman, Consultative Panel on Survey of Energy Resources

Published by

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"Measured reserves" of coals and of brown coal and lignite shall mean the total amounts thereof occurring within the limits herinafter prescribed and with respect to which there exist reliable data of thickness and extent of seams. For the purpose of these statistics, the respective limits of thickness and depth of seams shall be as follows:

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"Total reserves (measured and indicated) of peat" shall, for the purposes of these statistics, mean the aggregate within the reporting country, computed at 25 per cent moisture, of all peat occurring in bogs having a thickness in the natural state of not less than 50 centimetres, and for which there is either definite knowledge or an approximate estimate of the area and thickness of such bogs.

As will be seen from the notes to the Tables (Section VII), not all member countries were able to supply information on the basis of the definitions prescribed, and other members could not supply information for the whole of their country. In referring to the Tables it is therefore necessary to consult the notes.

COMBUSTIBLES SOLIDES
TABLEAUX 2, 3 et 4

Les notes suivantes ont été envoyées aux pays-membres afin de leur servir de guide pour les renseignements qu'ils devaient fournir sur les charbons, le lignite et la tourbe.

CHARBONS (TABLEAUX 2 et 3)

Etant donné les caractéristiques variables des charbons dans les divers pays et les différentes bases de classification utilisées, il a été jugé inopportun de tenter de mettre à part les charbons de qualité supérieure—anthracite, bitumineux, sous-bitumineux, etc.—ou de définir les limites qui les séparent de la houille brune et du lignite. C'est donc à chacun des pays rapporteurs qu'incombe la responsabilité de déterminer lui-même, en établissant ses statistiques de charbons, la base de classification à utiliser pour distinguer les deux groupes faisant l'objet de ses statistiques, c'est-à-dire d'une part les charbons, et d'autre part la houille brune et le lignite. Les statistiques des charbons doivent être portées au tableau 2, celles de la houille brune et du lignite au tableau 3.

Réserves mesurées—Charbons, houille brune et lignite
Par « réserves mesurées » de charbons, de houille brune et de lignite, on entend les quantités totales de ces charbons qui se présentent dans les limites prescrites ci-après et au sujet desquelles il existe des renseignements dignes de foi quant à l'épaisseur et à l'extension des gisements. Aux fins de ces statistiques les limites respectives d'épaisseur et de profondeur des gisements seront les suivantes:

a) charbons: gisements contenant un minimum de 30 centimètres de charbon qui sont situés à une profondeur maximum de 1.200 mètres au-dessous du niveau du sol y compris les gisements sous-marins exploitables;

b) houille brune et lignite: gisements contenant un minimum de 30 centimètres de houille brune ou de lignite, situés à une profondeur maximum de 500 mètres au-dessous du niveau du sol.

Réserves indiquées et présumées
Par « réserves indiquées et présumées » de charbons d'une part, de houille brune et de lignite d'autre part, on entend les réserves qui, indépendamment des réserves mesurées, se situent entre les limites d'épaisseur et de profondeur des gisements spécifiés au paragraphe ci-dessus, et dont on pourra raisonnablement (par suite de recherches incomplètes ou en les comparant aux réserves mesurées) supposer l'existence, mais dont on ne pourra établir que des estimations approximatives.

Réserves totales
Par « réserves totales » on entend l'ensemble des réserves mesurées, et des réserves indiquées et présumées à l'intérieur du pays rapporteur.

Pourcentage économiquement récupérable
Par « pourcentage économiquement récupérable » on entend la proportion de ces réserves, exprimée en pourcentage, qui est jugée avoir une valeur économique.

TOURBE (TABLEAU 4)

Tourbe
Masse d'origine organique qui a subi un processes de transformation et qui, une fois totalement déshydratée, contient un minimum de 50% de matières organiques.

Réserves totales (mesurées et indiquées) de tourbe
Par « réserves totales (mesurées et indiquées) de tourbe » on entend, en ce qui concerne la présente statistique, les ressources globales, à l'intérieur du pays rapporteur, estimées à un taux d'humidité de 25%, de toutes les tourbes qui se forment dans les tourbières ayant, dans leur état naturel, une épaisseur minimum de 50 centimètres, et au sujet desquelles on possède soit des connaissances précises, soit une estimation approximative de leur superficie et de leur épaisseur.

Ainsi qu'on le verra par les Notes concernant les tableaux (section VII), tous les pays membres n'ont pas pu fournir des informations sur la base des définitions prescrites, et d'autres membres n'ont pu en donner pour l'ensemble de leur pays. Il est donc nécessaire de consulter les Notes en se référant aux tableaux.

TABLE 2. TABLEAU 2

COALS (in millions of metric tons). CHARBONS (en millions de tonnes métriques)

Name of country Nom du pays	Measured reserves Réserves mesurées: Date to which estimate refers Date du relevé	Measured reserves Réserves mesurées: Quantity Quantité	Measured reserves Réserves mesurées: Proportion economically exploitable (per cent) Proportion économiquement récupérable (pour cent)	Measured reserves Réserves mesurées: Average calorific value (kilocalories per kilogram) Valeur calorifique moyenne (kilocalories) par kilogramme)	Indicated and inferred reserves (quantity) Réserves indiquées et présumées (quantité)	Total reserves (columns 3 plus 6) (quantity) Réserves totales (colonnes 3 plus 6) (quantité)	Average annual production (quantity) Production annuelle moyenne (quantité)
1	2	3	4	5	6	7	8
AFRICA—							
Algeria	1957	9	—	—	11	20	0·04
Botswana (a)	1961	506	100	2642	U	U	—
Congo (Kinshasa) (b)	1956	*5*	—	—	*68*	*73*	0·10
Lesotho (c)	1947	N	U	U	N	N	—
Malagasy	1963	*60*	—	—	U	U	—
Malawi	1957	*14*	—	—	—	—	—
Morocco (d)	1960	14·8	100	7000	81·0	95·8	0·41
Mozambique	1963	—	—	—	—	*700*	0·25
Nigeria	1961	—	—	—	350	—	0·67
Rhodesia	1960	1760	U	U	4853	6613	3·10
South Africa, Repub. of (e)	1959	36873	79	5601	35592	72465	45·27
Swaziland (f)	1961	2022	90	U	3000	5022	—
Tanzania (g)	1967	309	50–67	6700	61	370	—
United Arab Republic	1965	—	—	—	—	*25*	0·02
Zambia (h)	1967	85	60	6200	30	115	—
AMERICA—NORTH—							
Canada	1966	42600	49	6280	18400	61000	8·33
Greenland (i)	1967	*2·0*	—	—	—	—	0·03
Honduras	1913	—	—	—	—	*1*	—
Mexico	1966	182	60–90	6388	3284	3466	1·15
United States (j)	1960	72000	50	U	1028000	1100000	453·48
AMERICA—SOUTH—							
Argentina (k)	1966	374	66	6200	76	450	0·30
Brazil	1966	3175	50–60	5500	7500	10675	1·66
Chile	1966	95·5	75	7600	122·0	217·5	1·56

TABLE 2 (continued). TABLEAU 2 (suite)

COALS (in millions of metric tons). CHARBONS (en millions de tonnes métriques)

Name of country Nom du pays		Measured reserves Réserves mesurées Date to which estimate refers Date du relevé	Quantity Quantité	Proportion economically exploitable (per cent) Proportion économiquement récupérable (pour cent)	Average calorific value (kilocalories per kilogram) Valeur calorifique moyenne (kilocalories) par kilogramme)	Indicated and inferred reserves (quantity) Réserves indiquées et présumées (quantité)	Total reserves (columns 3 plus 6) (quantity) Réserves totales (colonnes 3 plus 6) (quantité)	Average annual production (quantity) Production annuelle moyenne (quantité)
1		2	3	4	5	6	7	8
AMERICA—SOUTH—*continued*								
Colombia		—	—	—	—	—	*12 500*	3·13
Peru	(l)	1966	211	—	6100–6500	2 123	2 334	0·11
Venezuela		1961	39·9	75	7 680	12·9	52·8	0·04
ASIA—								
Afghanistan		1965	—	—	—	—	*85*	0·12
Burma		1960	*13*	—	—	*8*	*21*	0·01
China (Mainland)	(m)	1913	—	—	—	—	*1 011 000*	302·86
China (Taiwan)		1965	175	80	U	85	260	4·96
India	(n)	1966	12 710	U	3 200–8 200	93 550	106 260	65·19
Indonesia		1962	500	U	4 500–7 500	345	845	0·44
Iran		1961	—	—	—	—	*1000*	0·24
Japan		1961	5 723	54	U	13 525	19 248	50·84
Korea, Republic of		1962	*85*	—	—	*1100*	*1185*	9·58
Malaysia		—	U	U	U	U	U	—
Pakistan	(o)	1966	784	20	9 000–12 000	877	1 661	0·86
Philippines		1966	N	N	N	N	N	0·12
Thailand		1967	N	N	U	N	N	—
Vietnam		1952	200	—	—	800	1 000	0·08
ASIA—EUROPE—								
Turkey		1957	205	65	6 400	1 130	1 335	4·33
U.S.S.R.	(p)	1966	145 123	50	5 200	3 976 480	4 121 603	210·57
EUROPE—								
Austria		1966	0	—	—	2·5	2·5	0·09
Belgium		1964–1967	495	50	—	1 301	1 796	20·84
Bulgaria		1965	1 147	88	7 000	0	1 147	0·61
Czechoslovakia		1966	5 540	45	D	6 033	11 573	28·04

TABLE 2 (continued). TABLEAU 2 (suite)

COALS (in millions of metric tons). CHARBONS (en millions de tonnes métriques)

Name of country Nom du pays		Measured reserves Réserves mesurées Date to which estimate refers Date du relevé	Quantity Quantité	Proportion economically exploitable (per cent) Proportion économiquement récupérable (pour cent)	Average calorific value (kilocalories per kilogram) Valeur calorifique moyenne (kilocalories par kilogramme)	Indicated and inferred reserves (quantity) Réserves indiquées et présumées (quantité)	Total reserves (columns 3 plus 6) (quantity) Réserves totales (colonnes 3 plus 6) (quantité)	Average annual production (quantity) Production annuelle moyenne (quantité)
1		2	3	4	5	6	7	8
EUROPE—*continued*								
France	(q)	1966	U	U	U	U	2800	50·71
Germany, Fed. R.	(r)	1967	70000	U	7000	—	70000	140·32
Germany, Eastern		1956	—	—	—	—	*50*	2·34
Hungary		1966	D	D	5000	D	714	4·07
Ireland, Republic of		1967	22·1	80	5500–8500	26·3	48·4	0·21
Italy		1967	0·8	—	6000	N	0·8	0·48
Netherlands	(s)	1956	2394	U	U	O	2394	11·48
Norway	(t)	1967	16	75	7500	150	166	0·42
Poland	(u)	1967	32425	55	5600	13316	45741	116·44
Portugal	(v)	1960	15	U	5300	11	26	0·43
Roumania		1966	—	—	—	—	*590*	5·86
Spain		1960	2830	76	7000	D	D	12·76
Sweden	(w)	1967	60	0	4200	30	90	0·05
Switzerland		1967	N	—	—	—	N	—
United Kingdom	(x)	1967	12227	U	U	3273	15500	195·39
Yugoslavia		1967	9	100	7000	310	319	1·25
OCEANIA—								
Australia		1966–1967	3000	60	6600	13000	16000	28·33
New Caledonia		1952	5	—	—	10	15	—
New Zealand		1967	297	100	5556	533	830	0·68

The following countries are reported as having no reserves (the date of the report is stated in parentheses after the name of the country):

AFRICA—
- Ghana (1967)
- Ifni (1961)
- Kenya (1967)
- Rio Muni and Fernando Póo (1961)
- Sahara (Spanish) (1961)
- Sierra Leone (1967)
- Uganda (1967)

AMERICA—NORTH—
- British Honduras (1967)
- Costa Rica (1966)
- Jamaica (1967)
- Netherlands Antilles
- Trinidad and Tobago (1960)

AMERICA—SOUTH—
- Guyana (1967)
- Surinam (1961)

ASIA—
- Brunei (1967)
- Ceylon (1957)
- Israel (1966)
- Singapore (1960)

ASIA—EUROPE—
- Cyprus (1967)

EUROPE—
- Denmark (1967)
- Finland (1967)
- Greece (1961)
- Iceland (1967)
- Luxembourg (1967)
- Malta (1967)

OCEANIA—
- British Solomon Islands (1967)
- Fiji Islands (1967)
- Papua—New Guinea (Australian) (1966)

For notes see Section VII

TABLE 3. TABLEAU 3

BROWN COAL AND LIGNITE (in millions of metric tons)
HOUILLE BRUNE ET LIGNITE (en millions de tonnes métriques)

Name of country Nom du pays		Measured reserves Réserves mesurées			Indicated and inferred reserves (quantity) Réserves indiquées et présumées (quantité)	Total reserves (columns 3 plus 6) (quantity) Réserves totales (colonnes 3 plus 6) (quantité)	Average annual production (quantity) Production annuelle moyenne (quantité)
	Date to which estimate refers Date du relevé	Quantity Quantité	Proportion economically exploitable (per cent) Proportion économiquement récupérable (pour cent)	Average calorific value (kilocalories per kilogram) Valeur calorifique moyenne (kilocalories) par kilogramme)			
1	2	3	4	5	6	7	8
AFRICA—							
Lesotho (a)	1947	N	U	U	N	U	—
Malagasy (b)	1963	*18·3*	—	—	*14·1*	*32·4*	—
Nigeria	1962	U	U	U	73·2	U	—
Sierra Leone	1967	D	D	D	D	D	—
South Africa, Republic of (c)	1959	N	N	U	N	N	—
AMERICA—NORTH							
Canada	1960	12250	50	3700	11850	24100	0·59
Honduras	1913	—	—	—	—	*4*	—
Mexico	1966	N	60	4645	N	N	—
United States (d)	1960	9400	50	U	396600	406000	0·87
AMERICA—SOUTH—							
Chile	1966	355	70	5000	5010	5365	0·03
Peru (e)	1966	—	—	—	4630	4630	—
Venezuela	—	U	U	U	U	U	—
ASIA—							
Afghanistan	1956	—	—	—	*U*	*U*	—
Burma	1951	—	—	—	—	*265*	—
China Mainland (f)	1956	—	—	—	—	*700*	2·59
China (Taiwan)	1965	17·4	80	U	2·9	20·3	—
India (g)	1966	D	U	3859–6790	D	2063	0·49
Indonesia (h)	1949–1962	2000	U	5000	U	U	—
Japan	1955	238	60	U	1495	1733	0·24
Korea, Republic of	1962	*2*	—	—	*3*	*5*	0·01
Pakistan	1966	22	70	—	258	280	—

TABLE 3 (continued). TABLEAU 3 (suite)

BROWN COAL AND LIGNITE (in millions of metric tons)

HOUILLE BRUNE ET LIGNITE (en millions de tonnes métriques)

Name of country Nom du pays		Measured reserves Réserves mesurées Date to which estimate refers Date du relevé	Quantity Quantité	Proportion economically exploitable (per cent) Proportion économiquement récupérable (pour cent)	Average calorific value (kilocalories per kilogram) Valeur calorifique moyenne (kilocalories par kilogramme)	Indicated and inferred reserves (quantity) Réserves indiquées et présumées (quantité)	Total reserves (columns 3 plus 6) (quantity) Réserves totales (colonnes 3 plus 6) (quantité)	Average annual production (quantity) Production annuelle moyenne (quantité)
1		2	3	4	5	6	7	8
ASIA—*continued*								
Philippines		1965	74·5	D	4650–8316	13·5	88·0	—
Thailand		1967	235	U	3280–6000	N	U	0·04
ASIA—EUROPE								
Turkey		1957	251	70	3000–4000	1630	1881	0·95
U.S.S.R.	(i)	1966	104354	50	2900	1302026	1406380	212·26
EUROPE—								
Austria		1966	109	100	3500	34	143	2·88
Bulgaria		1965	1117	88·	1500–3500	—	1117	11·42
Czechoslovakia		1966	8234	47	D	1623	9857	44·42
Denmark	(j)	1967	50	100	1900	N	50	0·75
France	(k	1966 1967	U U	U U	5000 2100	U U	64 30	1·48
Germany, Fed. R.	(l)	1967	62000	15	1850	U	U	33·17
Germany, Eastern		1966	—	—	—	—	*30000*	76·25
Greece		1952–1961	908	75	1500	667	1575	1·35
Hungary		1966	D	D	2900	D	5679	13·54
Italy		1967	169	27–57	1200–3500	355	524	0·60
Poland	(m)	1967	6449	75	1600–3500	8413	14862	5·82
Portugal	(n)	1960	26	U	1650	U	U	0·05
Roumania		1966	—	—	—	—	*1367*	1·75
Spain		1960	780	U	4200	U	U	1·34
United Kingdom		1967	N	U	U	N	N	—
Yugoslavia		1966	11506	100	2500	15094	26600	13·86
OCEANIA—								
Australia	(o)	1966	48400	20	2200	47200	95600	6·50
New Zealand		1967	17	100	4167	369	386	1·42

The following countries are reported as having *no reserves* (the date of the report is stated in parentheses after the name of the country):

AFRICA—
- Botswana (1961)
- Ghana (1967)
- Ifni (1961)
- Kenya (1967)
- Malawi (1967)
- Morocco (1961)
- Rhodesia (1967)
- Rio Muni and Fernando Póo (1961)
- Sahara (Spanish) (1961)
- Swaziland (1961)
- Tanzania (1967) (p)
- Uganda (1967)
- United Arab Republic (1960)
- Zambia

AMERICA—NORTH—
- British Honduras (1967)
- Costa Rica (1966)
- Jamaica (1967)
- Netherlands Antilles
- Trinidad and Tobago (1960)

AMERICA—SOUTH—
- Argentina (1966)
- Brazil
- Guyana (1967)
- Surinam (1961)

ASIA—
- Brunei (1967)
- Ceylon (1967)
- Israel (1966)
- Malaysia
- Singapore (1960)
- Vietnam (1952)

ASIA—EUROPE—
- Cyprus (1967)

EUROPE—
- Finland (1967)
- Iceland (1967)
- Ireland, Republic of
- Luxembourg (1967)
- Malta (1967)
- Netherlands (1966)
- Norway
- Sweden (1967)
- Switzerland (1966)

OCEANIA—
- British Solomon Islands (1967)
- Fiji Islands (1967)
- New Caledonia (1952)
- Papua—New Guinea (Australian) (1966)

For notes see Section VII

TABLE 4. TABLEAU 4

PEAT (in millions of metric tons). TOURBE (en millions de tonnes métriques)

Name of country Nom du pays		Total Reserves (measured and indicated) Réserves totales (mesurées et indiquées)	
		Date to which estimate refers Date du relevé	Quantity Quantité
1		2	3
AFRICA—			
Lesotho		1960	N
Rhodesia		1961	U
South Africa, Republic of	(a)	1959	U
AMERICA—NORTH—			
Canada		1926	200
Cuba	(b)	1963	*U*
Mexico		1967	D
United States	(c)	1922	12 544
AMERICA—SOUTH—			
Argentina		1966	110
Chile	(d)	1967	U
Guyana		1961	N
Venezuela		—	U
ASIA—			
China (Mainland)		—	*U*
India		—	U
Indonesia		1962	U
Israel		—	U
Japan	(e)	1963	500
Korea, Republic of		—	*163*
Pakistan	(f)	1966	138·5
Philippines		1966	N
Thailand		1967	D
ASIA—EUROPE—			
U.S.S.R.	(g)	1967	125 592

TABLE 4 (continued). TABLEAU 4 (suite)

PEAT (in millions of metric tons). TOURBE (en millions de tonnes métriques)

Name of country Nom du pays		Total Reserves (measured and indicated) Réserves totales (mesurées et indiquées)	
		Date to which estimate refers Date du relevé	Quantity Quantité
1		2	3
EUROPE—			
Austria		1966	20 E
Bulgaria		1965	N
Denmark		1960	100–150
Finland	(h)	1953	1200
France		1967	N
Germany, Fed. R.	(i)	1967	U
Germany, East	(j)	1963	*U*
Hungary		1966	N
Iceland		1967	2000 A
Ireland, Republic of	(k)	1967	400
Netherlands	(l)	1955	12·8
Norway	(m)	1966	85
Poland		1967	24000
Portugal		—	N
Roumania	(n)	1932	67·6
Spain		—	U
Sweden		1952	9400
Switzerland		1966	N
United Kingdom	(o)	1968	1610 E
OCEANIA—			
Australia		1967	N
New Zealand	(p)	1967	U
Papua—New Guinea (Australian)		1967	10

The following countries are reported as having no reserves (the date of the report is stated in parentheses after the name of the country):

AFRICA—
- Botswana (1961)
- Ghana (1967)
- Ifni (1961)
- Malagasy
- Malawi (1967)
- Morocco (1960)
- Nigeria (1962)
- Rio Muni and Fernando Póo (1961)
- Sahara (Spanish) (1961)
- Sierra Leone (1967)
- Swaziland (1961)
- Tanzania (1967)
- United Arab Republic
- Zambia

AMERICA—NORTH—
- British Honduras (1967)
- Costa Rica (1966)
- Jamaica (1967)
- Netherlands Antilles
- Trinidad and Tobago (1960)

AMERICA—SOUTH—
- Brazil
- Peru
- Surinam (1961)

ASIA—
- Brunei (1967)
- Ceylon (1967)
- China (Taiwan)
- Malaysia
- Singapore (1960)
- Vietnam (1952)

ASIA—EUROPE—
- Cyprus (1967)
- Turkey (1957)

EUROPE—
- Belgium
- Czechoslovakia
- Greece (1961)
- Italy (1966)
- Luxembourg (1967)
- Malta (1967)
- Yugoslavia

OCEANIA—
- British Solomon Islands (1967)
- Fiji Islands (1967)
- New Caledonia (1952)

For notes see Section VII

WORLD POWER CONFERENCE SURVEY OF ENERGY RESOURCES, 1968

CONFERENCE MONDIALE DE L'ENERGIE ENQUETE SUR LES RESSOURCES ENERGETIQUES, 1968

WITH AN INTRODUCTION AND SUMMARY BY

AVEC INTRODUCTION ET SOMMAIRE PAR

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Chairman, Consultative Panel on Survey of Energy Resources

Président du Comité Consultatif de l'Enquête sur les Ressources Energétiques

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SURVEY OF ENERGY RESOURCES

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II

Fossil Fuel Overview
Etude Sur Les Combustibles Fossiles

Although there are obvious and important differences among the various fossil fuels, it appears desirable to provide a brief discussion of their common characteristics as regards formation, occurrence, acquisition and uses as an introduction to the more detailed discussions in the following three chapters on solid fossil fuels, crude oil and natural gas, and oil shale and bituminous sand, respectively. As their name implies, fossil fuels are, in all cases, the remnants of former plant and/or animal life. All fossil fuels also have the common characteristic of a high content of reduced carbon either as carbon compounds (fluid hydrocarbons, kerogen, volatile matter in coal) or as elemental carbon.

The principal interest in the current survey has been to assess the extent of fossil fuel and other energy resources as sources of energy. Until about 100 years ago this was almost exclusive use for fossil fuels. In the past century, however, they have also been used increasingly as a chemical raw material by industry for the production of coke, industrial carbon, petrochemicals and nitrogeneous fertilizer. Thus fossil fuel resources must be assessed with regard to both their fuel and their non-fuel uses.

Bien qu'il y ait des différences évidentes et importantes entre les divers combustibles fossiles, il semble souhaitable d'étudier rapidement leurs caractéristiques communes quant à la formation, leur présence, leur acquisition et leurs usages, cette étude rapide servant d'introduction aux études plus détaillées des trois chapitres suivants portant respectivement sur les combustibles fossiles solides, le pétrole brut et le gaz naturel, les schistes et les sables bitumineux. Comme leur nom l'indique, les combustibles fossiles sont, dans tous les cas, des vestiges de la vie végétale ou animale, ou bien de ces deux formes de vie, antérieures. Tous les combustibles fossiles ont pour caractéristique commune une forte teneur en carbone réduit, soit sous forme de composés du carbone (hydrocarbures liquides, kérogène, produits volatils du charbon), soit sous forme de carbone élémentaire.

Le principal intérêt de la présente enquête a été d'évaluer ce que représentent les combustibles fossiles et les autres ressources énergétiques en tant que sources d'énergie. Il y a encore environ 100 ans, c'était là l'utilisation presque exclusive des combustibles fossiles. Au siècle dernier, cependant, ces combustibles ont été aussi de plus en plus utilisés comme matière première chimique par l'industrie pour produire du coke, du carbone industriel, des produits chimiques dérivés du pétrole et des engrais azotés. Ainsi, les ressources en combustibles fossiles doivent être évaluées aussi bien du point de vue de leur utilisation comme combustible que pour d'autres utilisations.

For the remainder of this century the presently conventional fossil fuels are likely to remain the predominant source of commercial energy, especially for non-electrical energy. It is also highly likely that fossil fuels will remain the chief raw materials for the chemical industries that are now dependent on them.

In the longer term, full development of technology to obtain hydrocarbons from bituminous sands and oil shale on a large scale should permit greater use of these resources and thereby materially extend the overall supplies of all fossil fuels. Conversely, research and development on the utilization of alternative energy resources should lead to widespread use of nuclear breeders, fusion devices and solar, wind, and geothermal resources in the next century as supplements or alternatives to fossil fuels. Similarly, alternative raw materials may come into increasing use as substitutes for the fossil fuels in producing metallurgical reductants, petrochemicals and fertilizers.

Reduced Carbon Resources and Fossil Fuels

The vast bulk of reduced carbon in nature is thinly and widely disseminated in sedimentary rocks (principally in shales) formed over the last 500 million years since land life became abundant. The total amount of elemental and reduced carbon believed to exist below the earth's surface is of the order of 10,000 million megatonnes.[1] Ronov and Migdisov[2] have shown for the Russian and North American platforms that organic carbon in shales has almost negligible concentrations in Precambrian formations and that nearly all organic carbon is in Paleozoic, or younger, rocks. The total mass of sedimentary rock in the world is about 2 500 000 million megatonnes. Of this quantity, approximately 82% is shale and about 85% of all shale is post-Precambrian; thus the average concentration of carbon in organic-containing shales is about 0.7%.[3]

Pour les dernières années de notre siècle, les combustibles fossiles actuellement classiques resteront probablement la source principale de l'énergie industrielle, surtout pour l'énergie non-électrique. Il est aussi hautement probable que les combustibles fossiles demeureront une des principales matières premières pour les industries chimiques qui maintenant en dépendent.

A terme plus lointain, la mise au point définitive de technologies permettant d'obtenir des hydrocarbures à partir des sables bitumineux et des schistes bitumineux, sur une grande éxhelle, devrait permettre une plus grande utilisation de ces ressources et, par là même, étendre matériellement la contribution générale de tous les combustibles fossiles. Inversement, la recherche et le développement portant sur l'utilisation de ressources d'énergie de remplacement devraient conduire à généraliser l'usage an cours du siècle prochain, des surrégénérateurs, des dispositifs utilisant la fusion et l'énergie solaire, éolienne et géothermique, pour compléter ou remplacer les combustibles fossiles. De la même manière, l'utilisation de matières premières de remplacement pourra devenir de plus en plus importante et se substituer aux combustibles fossiles pour la production de réducteurs métallurgiques, de produits chimiques dérivés du pétrole et d'engrais.

Ressources en carbone réduit et en combustibles fossiles

La masse énorme de carbone réduit se trouvant dans la nature est disséminée par quantités faibles et éparses dans les roches sédimentaires (surtout dans les schistes) qui se sont formées au cours des 500 derniers millions d'années depuis que la vie s'est répandue avec abondance. On croit que la quantité totale de carbone élémentaire réduit se trouvant au-dessous de la surface de la terre est de l'ordre de 10 milliards de mégatonnes.[1] Ronov et Migdisov[2] ont démontré, pour les plateaux de Russie et d'Amérique du Nord, que les concentrations de carbone organique dans les schistes étaient presque négligeables dans les formations précambriennes et que presque tout le carbone organique se trouve dans les roches paléozoiques ou plus récentes. La masse totale des roches sédimentaires du monde est d'environ 2 500 000 millions de mégatonnes. Dans cette quantité, il y a environ 82% de schistes et environ 85% de la totalité du schiste est postcambrien; en conséquence, la concentration moyenne du carbone dans les schistes à teneur organique est d'environ 0.7%.[3]

The present survey indicates that total solid fossil fuel resources in the world (including peat) amount to about twelve million megatonnes of which 1.1 million megatonnes are now regarded as known reserves-on-place. Proved recoverable reserves of crude oil are 91 600 megatonnes and of natural gas about 52 400 cubic kilometres (37 400 megatonnes). Total world resources of oil and gas are poorly known.

Total resources of oil shales and bituminous sands are even less well known and more difficult to assess because they are grade type resources. The present survey gives a world total of 230 000 megatonnes of economically recoverable oil and kerogen. More than 95% of this value is in the United States and Canada which appears to indicate that exploration in other parts of the world are far behind. Hubbert[4] indicates that oil in all shales containing 10% or more kerogen is in the order of 2.3 million megatonnes; values for shales down to 4% and 2% kerogen may be as great at 44 and 240 million megatonnes, respectively.

The data given above are summarized in Table II-1 along with (1) current world demand for fossil fuels and (2) calculated values of the present resource (or reserve) to demand ratios. Total resources of solid fuels are at least 5 times as large as all crude oil, natural gas and high grade oil shale resources combined. Although the resource to demand ratios for fossil fuel resources appear relatively comforting, continuing growth in consumption can rapidly decrease these ratios in the future. The resource to demand ratios for oil shale are not shown because world production is still too small to give a significant value.

General Geology of Fossil Fuels

In the current survey the geology of energy resources, particularly fossil fuel resources, has been given appropriate consideration. Thus, rather extensive discussions of the geology of coal, oil, natural gas and oil shale have been provided below, and in the following three chapters.

L'étude actuelle indique que les ressources totales de combustibles fossiles solides y compris la tourbe se montent dans le monde (y compris la tourbe) à environ douze millions de mégatonnes sur lesquelles 1,1 million de mégatonnes sont actuellement considérées comme réserves connues in situ. Les réserves prouvées récupérables de pétrole brut sont de 91 600 mégatonnes et celles de gaz naturel d'environ 52 400 Kilomètres cubes (37400 mégatonnes). Les ressources mondiales totales de pétrole et de gaz sont mal connues.

Les ressources totales de schistes et de sables bitumineux sont encore moins connues et plus difficiles à évaluer car il s'agit de ressources de type à teneur variable. La présente étude donne un total mondial de 230 000 mégatonnes de pétrole et de kérogène économiquement récupérables. Plus de 95% de cette valeur se trouve aux Etats-Unis et au Canada, ce qui semble indiquer que la prospection dans les autres parties du monde est très en retard. Hubbert[4] indique que le pétrole de tous les schistes contenant 10% ou plus de kérogène est de l'ordre de 2,3 millions de mégatonnes; les valeurs pour les schistes n'ayant que 4% et 2% de kérogène peuvent s'élever respectivement à 44 et à 240 millions de mégatonnes.

Les données ci-dessus ont été résumées par le Tableau II-1 qui donne aussi, 1°, la demande actuelle mondiale de combustibles fossiles, et 2°, les ressources actuelles (ou réserves) comparées à la demande. Les ressources totales de combustibles fossiles sont au moins 5 fois plus grandes que toutes les ressources combinées de pétrole brut, de gaz naturel et de schiste bitumineux à forte teneur.

Bien que ces rapports ressources/demande concernant les combustibles fossiles semblent relativement rassurants, la continuelle croissance de la consommation peut rapidement faire diminuer dans l'avenir ces rapports. Les rapports ressources/demande pour le schiste bitumineux n'ont pas été indiqués car la production mondiale est encore trop faible pour donner une indication valable.

Géologie générale des combustibles fossiles

Dans la présente enquête, la géologie des ressources énergétiques, et notamment celle des ressources de combustibles fossiles, a fait l'objet de l'intérêt qu'elle méritait. C'est pourquoi on trouvera ci-dessous et dans trois chapitres suivants, des études assez complètes sur la géologie du charbon, du pétrole, du gaz naturel et du schiste bitumineux.

Table II-1. Summary of World Fossil Fuel Resources
Tableau II-1. Résumé des ressources mondiales en combustible fossile

Fuel *Combustible*	Total Resources (millions of (megatonnes) *Ressources totales (en millions de megatonnes)*	World Use, 1972 (megatonnes) *Utilisation mondiale en 1972 (en méga-tonnes)*	Resources to Demand Ratio *Rapport entre les ressources et les besoins*
Solid Fuels Resources*	11.0	2984	3686
Recoverable Reserves*	0.5		172
Petroleum			
Recoverable Reserves*	0.092	2408	38
Natural Gas			
Recoverable Reserves*	0.037	940	40
Oil Shale			
Recoverable Resources*	0.230		
Total Resources (Hubbert)			
⩾ 10% Kerogen	2.3		
⩾ 4% Kerogen	44.3		
⩾ 2% Kerogen	240.0		

*Data from current survey.

In order to obtain basic geological information on sedimentary formations, in which the fossil fuels occur almost exclusively, the new survey included, for the first time, a questionnaire soliciting such information from the reporting nations. A thorough discussion of the new questionnaire is given in the introductory section of Appendix 1. Appendix 1 provides (in Table 1C) relatively detailed geological descriptions of the sedimentary basins for those nations that reported such information. Many of the larger nations subdivided their total area for reporting purposes and some provided geographical descriptions of such subdivisions. The various subdivisions are shown graphically on World Map A and European Map A1 at the end of the book. Although world coverage of this geological data is far from complete, enough countries responded so that a great deal of data has been available in centralized form.

Geologists generally agree that all fossil fuels are derived from plants and/or animals that lived during the past 500 million years. Because reference must frequently be made to the various geological ages during which the progenitors of the fossil fuels lived, the standard geologic column is provided in Table II-2.

Pour obtenir les renseignements de base sur la géologie des formations sédimentaires où se trouvent presque exclusivement les combustibles fossiles, la présente enquête a utilisé pour la première fois un questionnaire demandant lesdits renseignements aux pays rapporteurs. On trouvera l'analyse complète du nouveau questionnaire dans la section d'introduction de l'Annexe 1. L'Annexe 1 donne (au Tableau 1C) des descriptions relativement détaillées de la géologie des bassins sédimentaires pour les pays qui ont communiqués ces renseignements. De nombreux pays plus importants ont dans leur réponse subdivisé leur surface totale et certains ont donné des descriptions géographiques de ces subdivisions. On voit ces diverses subdivisions sur la carte du monde A et sur la carte d'Europe A 1 à la fin de l'ouvrage. Bien que la couverture mondiale de ces données géographiques soit loin d'être complète, un nombre suffisant de pays ont répondu si bien qu'une grande quantité de données sont maintenant centralisées et disponibles.

Les géologues conviennent généralement que tous les combustibles fossiles proviennent soit de végétaux, soit d'animaux, soit encore de végétaux et d'animaux, qui ont vécu au cours des 500 derniers millions d'années. Comme on doit souvent se référer aux divers âges géologiques pendant lesquels les progéniteurs des combustibles fossiles ont vécu, on trouvera au Tableau II-3 la classique énumération des périodes géologiques.

Table II-2. Geological time scale
Tableau II-2. Périodes géologiques

Era *Ere*	System or Period (rocks) (time) *Système ou période (roches) (temps)*	Series or Epoch (rocks) (time) *Série ou époque (roches) (temps)*	Approximate age in millions of years (beginning of unit) *Age approché en millions d'années (début de la période)*
Cenozoic	Quaternary	Recent	0.01
		Pleistocene	2 to 3
	Tertiary	Pliocene	7
		Miocene	25
		Oligocene	40
		Eocene	60
		Paleocene	68 to 70
Mesozoic	Cretaceous (*chalk*)		135
	Jurassic (*Jura Mountains, France*)		180
	Triassic (*from three-fold division in Germany*)		225
Paleozoic	Permian (*Perm, a Russian province*)		270
	Carboniferous (*from abundance of coal*)		325
	Devonian (*Devonshire, England*)		400
	Silurian (*an acient British tribe, the Silures*)		440
	Ordovician (*an ancient British tribe, the Ordovices*)		500
	Cambrian (*from Cambria, the Roman name for Wales*)		550 to 600
Precambrian	Many local systems and series are recognized, but no well-established worldwide classification has yet been delineated.		3 500 or more

Adapted from J. Gilluly, A. C. Waters, and A. O. Woodford, *Principles of Geology*, 3rd edition, page 106, W. H. Freeman and Co., San Francisco (1968).

Peat, lignite, and coal were produced from plant debris in freshwater coastal swamps or upland lake areas in basins of low terrain. Conditions were most favorable for their formation in temperate and humid climates, and in submerged locations where the debris was rapidly covered with silt to preclude natural decay by bacteria to carbon dioxide. Thus coastal deltas were the most favorable areas for such formation. Newly buried material first became peat which was then slowly converted to solid fossil fuels of increasingly higher rank. Deep burial and lateration at higher pressures and temperatures accelerated the conversion process. Consequently, most anthracite coals are found in strata where mountain building processes

La tourbe, le lignite et le charbon ont trouvé leur origine dans des débris végétaux dans des marais-côtiers d'eau douce ou dans des lacs élevés formés dans des bassins de zones affaissées. Les conditions les plus favorables à leur formation étaient réunies dans des climats tempérés et humides et dans des emplacements submergés où les débris étaient rapidement recouverts de limon ce qui amorçait la dégénérescence naturelle en anhydrite carbonique par l'effet des bactéries. En conséquence, les deltas côtiers ont constitué les zones les plus favorables à de telles formations. Les matières nouvellement enterrées devinrent d'abord de la tourbe qui s'est ensuite lentement transformée en combustibles fossiles solides d'une qualité croissante. Un enfouissement profond et une altération sous des pressions et des températures plus fortes ont accéléré les processus de transformation. En conséquence, on trouve la plus grande partie des charbons d'anthracite dans (orogenies) have occurred. Since coal is not mobile like oil and gas, its occurrence is more wide spread, and local deposits often cover thousands of square kilometers. About two-thirds of the world's coal is derived from plants which grew in the Carboniferous Period about 280 to 350 million years ago. The remainder was formed mainly in later geological periods (Cretaceous and Tertiary), but very occasionally some anthracite coal, produced from algae, has been found to be about 1500 million years old.

Crude oil and natural gas are believed by most geologists to have been produced in a marine environment by the accumulation of dead plants and animals on the ocean floors where they are rapidly covered by inorganic debris which formed sea floor oozes. The actual process of conversion to oil and gas is not yet well understood. Because most marine life occurs on the continental shelves, the deep seas being a relative biological desert, the probability of finding oil deposits in the deeper parts of the ocean seems relatively low. Such a probability is further decreased by the fact that the deep sea floors are nowhere older than 200 million years, a consequence of the dynamics of plate tectonics.

Oil and gas deposits are more localized than coal deposits because their occurrence depends on special geological circumstances—the existence of a source rock, a permeable reservoir rock, and an overlying impermeable cap rock. Those rocks must then be in a structural setting so that the oil or gas is trapped and cannot escape to the surface. Examples of traps are domal uplifts of strata (anticlines), a termination of the reservoir against an impervious barrier such as a fault or salt dome, or a true "pinch-out" of the reservoir rock (stratigraphic trap). Where the covering rocks over an oil pool have been largely removed by erosion, much of the more volatile components of the crude oil slowly escaped to the atmosphere. Where such volatilization was limited an impervious asphalt cap may have formed over the pool; where it was complete the result would be a tar deposit.

les couches où se sont produit des processus de formation montagneuse (orogénie). Etant donné que le charbon n'est pas mobile comme le pétrole et le gaz, sa présence est plus dispersée et les gisements locaux couvrent souvent des milliers de kilomètres carrés. Environ deux tiers du charbon mondial proviennent de végétaux qui ont poussé pendant la période carbonifère il y a environ 280 à 350 millions d'années. Le reste s'est formé pendant des périodes géologiques plus tardives (Crétacée et tertiaire) mais ce n'est qu'exceptionnellement que l'on a trouvé du charbon d'anthracite, produit à partir d'algues, d'un age d'environ 1500 millions d'années.

Le plus grand nombre des géologues pensent que le pétrole brut et le gaz naturel ont pris naissance dans un environnement marin, par accumulation de végétaux et d'animaux morts déposés au fond de l'océan et ensuite rapidement recouverts de débris inorganiques qui formèrent les vases du fond de la mer. Nous ne comprenons pas encore bien le processus exact de la transformation en pétrole et en gaz. Comme la plus grande partie de la vie marine existe sur les plateaux continentaux, les mers profondes constituant pratiquement des déserts biologiques, il semble qu'il soit peu probable de trouver des gisements de pétrole dans les parties les plus profondes des océans. Une telle probabilité est encore diminuée par le fait que les fonds marins profonds ne sont nulle part plus vieux que 200 millions d'années, par suite de la dynamique de la tectonique des plaques.

Les gisements de pétrole et de gaz sont plus localisés que les gisements de charbon car leur formation dépend de circonstances géologiques spéciales: l'existence d'une roche mère originelle d'une roche réservoir perméable recouverte d'une roche couverture imperméable. Ces roches peuvent alors constituer une disposition structurelle telle que le pétrole ou le gaz est enfermé et ne peut peut s'échapper vers la surface. Nous trouvons des exemples de tels pièges avec les soulèvements en dômes des strates (anticlinaux), une queue de réservoir rencontrant une barrière étanche comme une faille ou un dôme de sel, ou le vrai "coïncement" d'une roche réservoir (piège statigraphique). Quand les roches de couverture au-dessus d'une nappe de pétrole ont été érodées en grande partie, une grande partie des composés les plus volatiles du pétrole brut s'est lentement échappée vers l'atmosphère. Quand cette volatilisation a été limitée, un couvercle étanche d'asphalte a pu se former au dessus de la nappe; quand elle a été complete, il en résulte un dépot d'asphalte.

The formation process for oil shales is also not well understood. Bradley[5] hypothesizes that the Green River oil shales were probably formed in freshwater lake sediments containing dead blue-green algae with a high lipid (fat) content. Oddly enough formation may have been under mildly oxidizing conditions where the presence of certain bactericides have prevented oxidation of lipids to carbon dioxide.

In some places oil and/or natural gas occur near or above coal seams and in some of these places the hydorcarbons may have orginated from the coals, e.g. many consider that the natural gas in the southern basin of the North Sea orginated in the underlying Coal Measures.

Reserves and Resources

The general discussion and tabulation on reserves and resources provided in the preceding introductory chapter has already provided an introduction to the basic concepts of reserves and resources and has reviewed the bases on which the resource questionnaires were prepared to obtain data from the reporting countries for this latest survey. Most of the definitions provided in the instructions for filling out the questionnaires are summarized in the introduction to each of the appendixes at the end of this report.

In order to illustrate more graphically the relationship between reserves and resources, McKelvey[6,7] has recently developed a diagram to clarify these concepts; a typical McKelvey diagram is shown in Fig. II-1. The total area of the diagram represents total resources, both discovered and suspected; the area at the upper left designates reserves-in-place. Total resources for oil or gas would include most material existing in pools to depths capable of being reached by drilling ($\sim$10 km); total solid fuels resources, however, would probably be limited to a minimum seam thickness of 20 to 30 cm and would thus exclude appreciable amounts of coal of no present or future economic interest in thinner seams.

The coordinates in the diagram are an abscissa representing degree of certainty, a geological criteria, versus cost of recovery, and economic and technological factor. Reserves are broken down

De la même manière, on ne comprend pas bien le processus de formation des schistes bitumineux. Bradley[5] suppose que les schistes bitumineux de la Green River se sont probablement formés dans des sédiments de lacs d'eau douce contenant des algues "bleu-vert" mortes avec une forte teneur en lipides (graisses). Ce qui est assez curieux, c'est que la formation a pu se faire en milieu légèrement oxydant où la presence de certains bactériacides a empêché l'oxydation des lipides en anhydride carbonique. Dans certains endroits le pétrole et/ou le gaz naturel se trouvent près ou au-dessus de couches de charbon et dans certains de ces endroits il se peut que les hydrocarbures soient provenus des charbons, ainsi, bien des gens pensent que le gaz naturel dans les bassins au sud de la Mer du Nord provient de gisements houillers sous-jacents.

Réserves et ressources

L'étude générale et les tableaux concernant les réserves et les ressources qu l'on a trouvées dans le chapitre d'introduction qui précède, ont déjà permis de se familiariser avec les concepts fondamentaux sur les réserves et ressources et de revoir les bases sur lesquelles les questionnaires sur les ressources ont été rédigés afin d'obtenir les informations des pays interrogés pour cette enquête. La plus grande partie des définitions données dans les instructions permettant de remplir les questionnaires est résumée dans l'introduction de chacune des annexes se trouvant à la fin du présent rapport.

Pour illustrer plus graphiquement la relation entre les reserves et les ressources, McKelvey[6,7] a dernièrement tracé un diagramme permettant d'éclaircir ces concepts; la Fig. II-1 représente un diagramme McKelvey type. La surface totale du diagramme représente les ressources totales, à savoir les ressources découvertes et les ressources supposées; la surface en haut et à gauche représente les réserves in situ. Les ressources totales de pétrole et de gaz comprennent la plus grande partie des matières existant dans des gisements d'une profondeur leur permettant d'être atteints par forage ($\sim$ 10 km); les ressources totales en combustible solide devraient probablement être limitées à une épaisseur minimale de veine de 20 à 30 cm ce qui, en conséquence, exclut d'importantes quantités de charbon qui, se présentant en veines moins épaisses, ne présentent aucun intérêt ni actuel, ni à venir.

Dans les coordonnées du diagramme les abscisses représentent le degré de certitude, un critère géologique, le prix d'exploitation, un facteur économique et technologique. Horizontalement, les réserves sont divisées

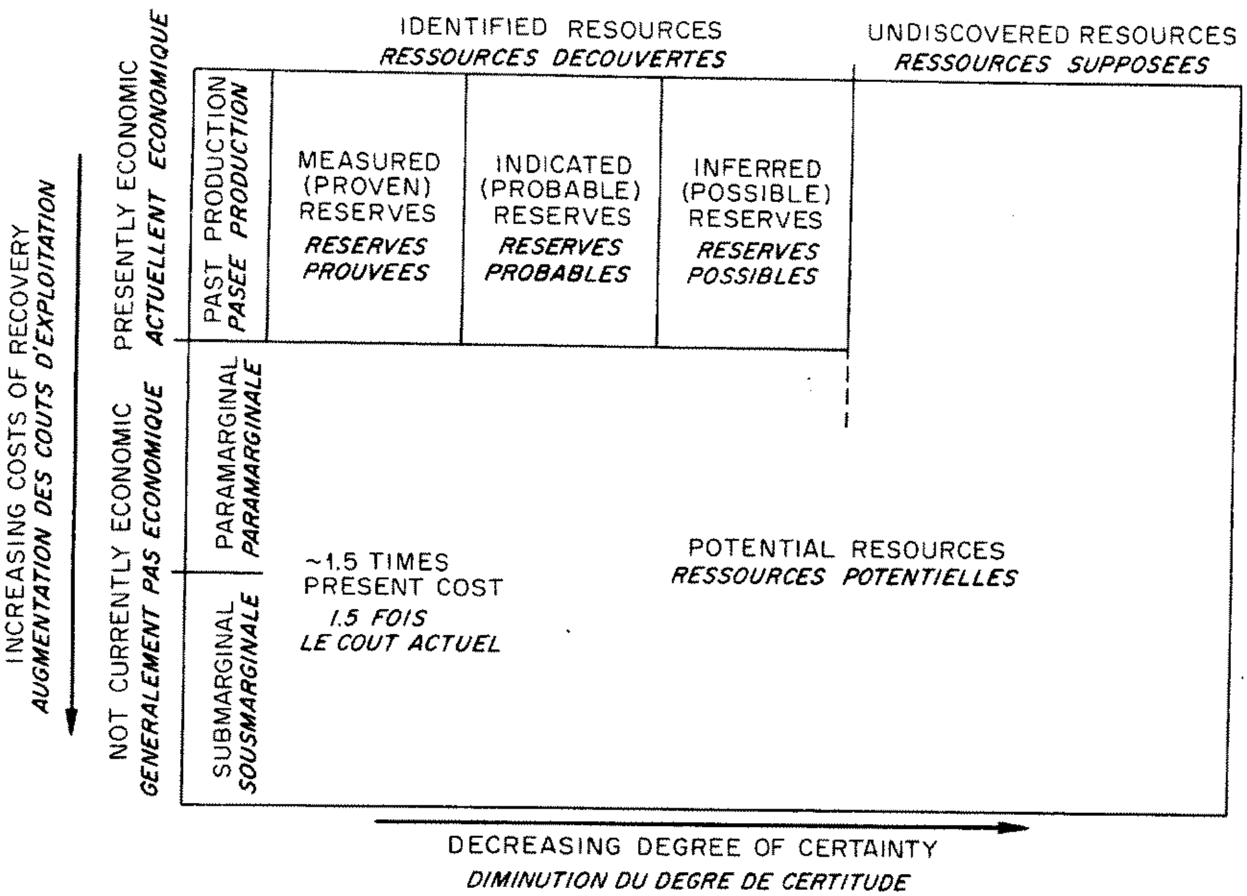

Figure II-1. Typical McKelvey diagram for mineral resources and reserves.

Figure II-1. Diagramme McKelvey type pour les ressources et réserves minérales

horizontally into three levels of certainty to represent measured, indicated, and inferred (or proven, probable, and possible) reserves. The horizontal base line for the reserves block represents the present maximum permissible recovery cost; materials below this line are now regarded as additional resources. In the present survey only the blocks representing measured reserves are synonomous with reserves-in-place and only fractions of the latter areas are considered recoverable reserves. When the area entitled "Past Production" in included, the total area of the diagram represents original resources or reserves.

The diagram represents only one point in time; as economic conditions change, the reserves-cost base line changes and as known reserves are depleted, more thorough measurement of indicated and inferred reserves will bring them into the measured reserve category, thus making this category

en trois niveaux de certitude afin de représenter les reserves mesurées, indiquées et présumées (prouvées, probables et possibles). La ligne de base horizontale des pavés de réserves représente le prix d'exploitation actuel maximum tolérable; les matières se trouvant en dessous de cette ligne sont actuellement considérées comme ressources additionnelles. Dans la présente étude, seul le pavé qui représente les réserves mesurées est synonyme de réserves in situ et seule une fraction de cette surface est considérée comme réserve récupérable. En incluant la surface représentant la production passée, la surface totale du diagramme représente les ressources originales ou les réserves originales.

Le diagramme ne représente qu'un point dans le temps; quand les conditions économiques se modifient, la ligne de base indiquant le prix des réserves se modifie aussi et au fur et à mesure que les réserves connues s'épuisent, une meilleure connaissance des réserves indiquées ou présumées les fait entrer dans la catégorie des réserves mesurées, rendant donc cette relatively constant over time until all resources approach depletion.

catégorie relativement constante dans le temps jusqu'au moment où toutes les ressources approcheront de l'épuisement.

The Various Uses of Fossil Fuels

Utilization of fossil fuels in both fuel and non-fuel uses has had a changing pattern over time. Over the first three quarters of this century, increasing use of crude oil and natural gas has been accomplished through a large decline in the relative position of coal. Since world oil and gas resources are considerably smaller than either solid fuel resources or ultimate oil shale resources, it seems very likely that at some point in the future, as oil and gas resources approach depletion, coal will recapture much of its former market and that use of oil shale will escalate rapidly. The timing and extent of this future trend will depend of course, to a great extent on the degree to which alternative non-fossil fuel energy resources are developed and utilized, and the extent to which alternative chemical raw materials become used by industry in lieu of fossil fuels. Much of the technology already exists for such future shifts, but actual implementations will depend more on competitive economic factors. For example, hydrogen (from hydrocarbons, water electrolysis or possibly from biological or inorganic chemical processes) has been demonstrated to be a satisfactory reductant in producing iron.[8] Carbon dioxide from the atmosphere or the calcining of near-infinite supplies of limestone could be used as the raw material for petrochemicals, starting with the reaction

$$CO_2 + 4H_2 \xrightarrow[350°C]{Ni} CH_4 + 2H_2O \left(\Delta H(298) = -164 \times 10^6 \text{ joules} \atop = -39\,220 \text{ kcal}\right)$$

These processes could ultimately relieve metallurgy and petrochemicals from dependence on fossil fuels. Both of these alternatives would require large uses of electricity and process heat, presumably from nuclear or other non-fossil fuel sources. Although the technologies for both alternatives are relatively well known, further large increases in

Utilisations diverses des combustibles fossiles

Le schéma d'utilisation des combustibles fossiles comme combustibles ou non, s'est modifié selon les époques. Pendant les trois premiers quarts de notre siècle, on a assisté à une augmentation de l'utilisation du pétrole brut et du gaz naturel qui a entraîné une importante diminution relative de l'utilisation du charbon. Etant donné que les ressources mondiales en pétrole et en gaz sont considérablement plus faibles que les ressources soit en combustible solide, soit en schiste bitumineux ultime, il semble vraisemblable que, à un moment donné dans l'avenir, quand les ressources en pétrole et en gaz approcheront du point d'épuisement, le charbon retrouvera en grande partie son marché original et l'utilisation des schistes bitumineux augmentera rapidement. Le calendrier et l'étendue de cette tendance future dépendront naturellement dans une grande mesure du degré de développement et d'utilisation des ressources énergétiques non fossiles de remplacement et de l'utilisation par l'industrie des matières chimiques brutes de remplacement à la place des combustibles fossiles. Pour ces transformations à venir, nous avons déjà en grande partie la technologie nécessaire, mais les réalisations effectives dépendront beaucoup des facteurs de concurrence économique. Pour en donner un exemple, on a prouvé que l'hydrogène – provenant d'hydrocarbures, de l'électrolyse de l'eau ou éventuellement de processus chimiques biologiques ou inorganiques – était un réducteur satisfaisant pour la production du fer[8]. On peut utiliser l'anhydride carbonique de l'atmosphère ou celui qui provient de la calcination des réserves presque infinies de calcaire, comme matière première pour l'industrie pétrochimique, en partant de la réaction

$$CO_2 + 4H_2 \xrightarrow[350°C]{Ni} CH_4 + 2H_2O$$

$$\left[\Delta H\,(298) = -164 \times 10^6 \text{ joules} \atop -\ 39\,220 \text{ kcal}\right]$$

Ces processus pourraient finalement dégager la métallurgie et la pétrochimie de leur dépendance vis-à-vis des combustibles fossiles. Pourtant, ces solutions de remplacement exigeront une forte dépense d'électricité et de chaleur, provenant vraisemblablement de sources nucléaires ou d'autres combustibles non-fossiles. Bien que l'on connaisse relativement bien les technologies pour ces deux

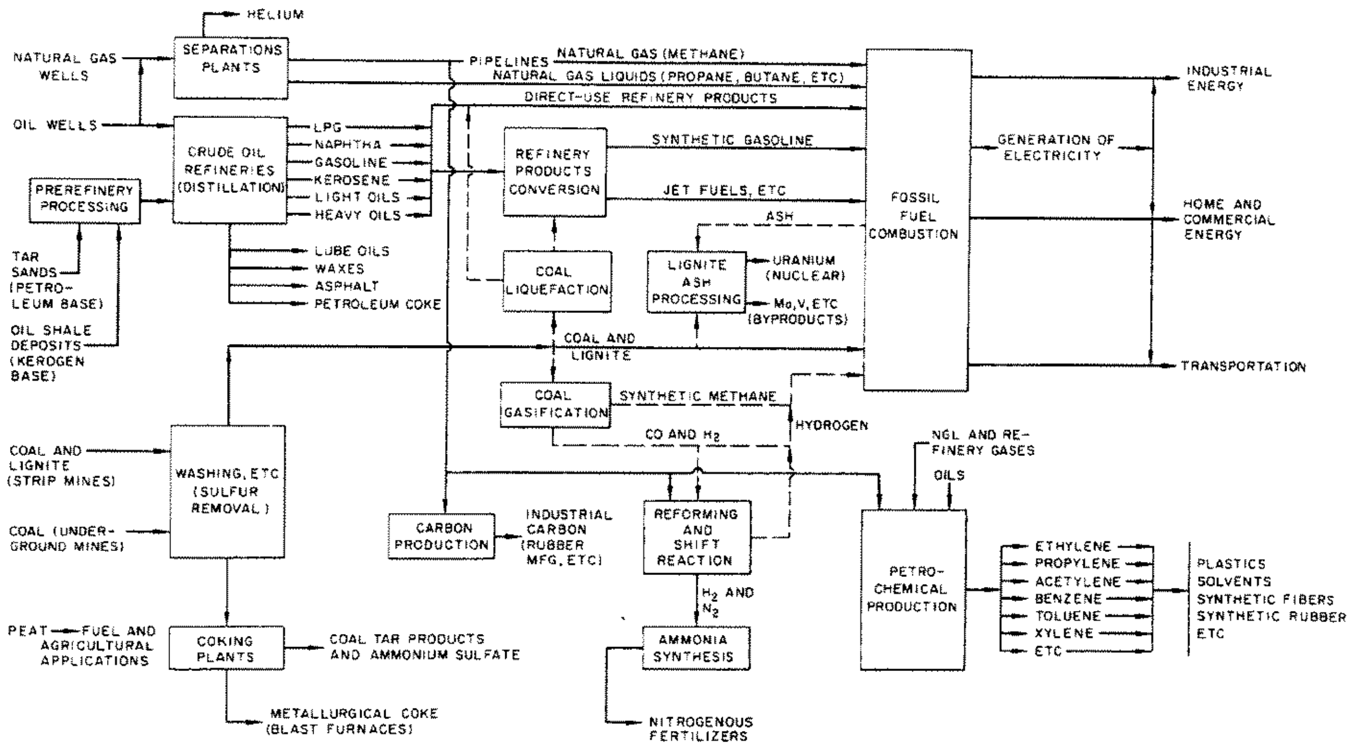

Figure II-2. Schematic fossil fuels flowsheet.
Figure II-2. Organigramme schématique des combustibles fossiles.

fossil fuel prices would have to occur for either to appear economic. It is unlikely, however, with the exception of hydrogen, that such alternatives can ever be economic substitutes for carbonaceous fuels in their major applications.

Fig. II-2 provides a schematic qualitative flowsheet of all the major operations and products involved in converting raw fossil fuels to the special fuels and non-fuel products used by modern society. Present practices and products are shown by full lines; near future options are indicated by dashed lines.

As shown in Fig. II-2 the acquisition and processing of crude oil and natural gas uses a highly complex technology, and is one of the major industries of the world. It involves three major activities: (1) the initial separation of the various components of crude oil and natural gas into a series of more usable fuels (gasoline, fuel oil, etc.)

solutions de remplacement, une forte augmentation des prix des combustibles fossiles est encore nécessaire pour que l'une ou l'autre devienne rentable. Il est peu vraisemblable, cependant, à l'exception de l'hydrogène, que lesdites solutions de remplacement puissent jamais devenir des succédanés économiques des combustibles carbonés, pour leurs principaux usages.

La Fig. II-2 représente un schéma qualitatif de toutes les opérations et productions principales impliquées dans la transformation des combustibles fossiles bruts en combustibles spéciaux et en produits non-combustibles utilisés par notre société moderne. Les méthodes et produits actuels sont indiqués par des traits pleins; les possibilités d'un avenir proche sont indiquées par des lignes de pointillés.

Comme le montre la figure II-2, l'extraction et le traitement du pétrole brut et du gaz naturel exigent une technologie des plus complexes, c'est une des principales industries du monde. Elle suppose trois activités principales: (1) la séparation initiale des divers composants du pétrole brut et du gaz naturel en toute une série de combustibles plus facilement utilisables (essence, mazout, etc. . . .) et de sous-and by-products (helium, waxes, asphalt, petroleum coke, etc.); (2) the conversion of various fuel fractions, where initial ratios are in market imbalance, to desired forms (i.e., fuel oils into gasoline); and (3) the processing of hydrocarbon fractions into chemical compounds suitable for use as raw material precursors for the petrochemical and nitrogeneous fertilizer industries.

Until early in this century coal technology was more advanced than oil and gas technology as a result of widespread use of coke in metallurgy, synthetic fuel gas by municipalities, and the use of the volatiles from coke making by the early synthetic organics and nitrogeneous fertilizer industries. In the last half century, however, the very rapid expansion of the refinery and petrochemicals industry associated with increasing use of oil and gas has largely eliminated the latter two uses of coal and the earlier technologies experienced little additional development until quite recently except for development of the Lurgi process for the liquefaction of coal in Germany as a wartime expedient.

A number of new processes are now being developed, however, which will enable coal to be converted to gaseous (methane and hydrogen) and liquid hydorcarbon fuels in the future. These newer processes will be far more sophisticated than the now nearly obsolete water and producer gas processess of 50 to 100 years ago.

As shown, the principal remaining non-fuel use of coal is for the production of metallurgical coke used chiefly in the iron and steel industry. In the future coal may again become a major resource for the petrochemical and fertilizer industries. However, experience has shown that coal is a much less desirable raw material in this use compared to natural gas and petroleum.

Finally, processes are also being developed to recover kerogen from oil shale and to convert it to usable fuels. Recovery of oil from shale has already reached commercialization in the USSR and the People's Republic of China. The last fossil fuel shown in Fig. II-2 is peat which has its major

produits (hélium, paraffines, bitume, coke de pétrole, etc. . . .); (2) la transformation des diverses fractions de combustibles, pour lesquelles les quantités relatives ainsi obtenues ne correspondent pas aux besoins du marché, en formes souhaitées (à savoir, mazout en essence); enfin (3), la transformation des fractions d'hydrocarbures en composés chimiques pouvant servir de matières premières de base pour les industries pétrochimiques et les fabrications d'engrais azotés.

Jusqu'au début de ce siècle, la technologie du charbon était plus avancée que la technologie du pétrole et du gaz, par suite de l'utilisation fort répandue du coke dans la métallurgie, du gaz de ville synthétique par les municipalités et de l'utilisation des matières volatiles provenant du coke dans les premières industries des engrais azotés et organiques de synthèse. Dans la seconde moitié du siècle, cependant, le développement très rapide de l'industrie du raffinage et de la pétrochimie, associé à l'utilisation croissante du pétrole et du gaz a éliminé en grande partie les deux derniers usages du charbon et les premières technologies n'ont connu qu'un faible développement supplémentaire jusqu'aux toutes dernières années, à l'exception du procédé Lurgi pour la liquéfaction du charbon qui servit d'expédient de guerre en Allemagne.

Un certain nombre de nouveaux procédés ont cependant maintenant été mis au point, pour permettre la conversion, dans l'avenir, du charbon en combustibles gazeux (méthane et hydrogène) et liquides (hydrocarbures). Ces procédés tout récents seront beaucoup plus compliqués que les procédés d'il y a 50 ou 100 ans, maintenant presque abandonnés, à partir d'eau et de gazogène.

Comme on l'a montré, la dernière utilisation importante du charbon comme non-combustible, concerne la production du coke métallurgique utilisé principalement dans l'industrie du fer et de l'acier. Dans l'avenir, le charbon peut redevenir une ressource importante pour l'industrie pétrochimique et pour l'industrie des engrais. L'expérience a cependant démontré que le charbon est une matière première bien moins intéressante pour cette utilisation par rapport au gaz naturel et au pétrole.

Enfin, on met aussi au point des procédés pour récupérer le kérogène des schistes bitumineux et pour le transformer en combustible utilisable. La récupération du pétrole provenant du schiste a déjà été industrialisée en URSS et dans la République Populaire de Chine. Le dernier combustible fossile indiqué à la Figure II-2 est la tourbe dont la prinworld use in agriculture. Only in the USSR and Ireland is it presently used extensively as a fuel; however, Finland currently has plans to use it in the future as a major commercial fuel.

cipale utilisation est agricole. Ce n'est qu'en URSS et en Irlande qu'on l'utilise actuellement intensivement comme combustible; il faut cependant remarquer que la Finlande prévoit actuellement de l'utiliser à l'avenir comme important combustible industriel.

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III

Solid Fuels
Combustibles Solides

Introduction

This chapter discusses both the solid fossil fuels of all gradations from peat through anthracite coal and solid wastes from agricultural, municipal, and industrial sources. Waste materials have been decreasing in use as fuel in the developing nations but may increase in use in the near future in the more highly developed countries as a solids pollution control measure. Although bituminous sands and oil shales are solids, discussion of these fossil fuel resources is the subject of Chapter V and will not be covered in the present chapter.

Location of Solid Fossil Fuel Resources

Map B at the end of the book indicates pictorially the locations of solid fossil fuel resources throughout the world. The map also shows national boundaries (in dashed lines) and national subdivision boundaries (in dotted lines) for those countries that have reported solid fossil fuel resource statistics in such detail. Subdivisions are numbered on the map; an index of names is provided to the left of the map. In most cases, the national subdivisions are different from those shown on the Regional Map (Map A).

A color code has been used to represent the spectrum of solid fossil fuel rankings as follows:

Introduction

Ce chapitre traite à la fois des combustibles solides de toutes sortes, de la tourbe à l'anthracite, et des déchets solides d'origine agricole, municipale et industrielle. Les déchets sont de moins en moins utilisés comme combustibles dans les pays en voie de développement, mais il est possible qu'on s'en serve davantage dans un proche avenir dans les pays plus développés pour réduire la pollution créée par les combustibles solides. Bien que les sables et les schistes bitumineux soient des solides, la question des ressources de ces combustibles solides fera l'objet du chapitre V et ne sera donc pas traitée dans le présent chapitre.

Emplacement des ressources en combustibles fossiles solides

La carte à la fin du livre montre les emplacements des ressources en combustibles solides dans le monde. Les frontières des pays y sont indiquées par des tirets et, quand les pays rapporteurs ont établi leurs statistiques sur les ressources en combustibles solides selon des subdivisions nationales, les limites de ces dernières sont montrées par des pointillés. Les subdivisions sont numérotées et à gauche de la carte se trouve la liste des noms. Dans la plupart des cas les subdivisions nationales sont différentes de celles qu'indique la carte des régions (carte A).

Un code de couleurs a été utilisé pour représenter les différents combustibles solides: anthracite (en anthracite (black), bituminous (red), subbituminous (purple), and brown coal and lignite (blue). In many cases it is difficult to show small anthracite deposits, particularly when associated with other ranks of coal. Thus, the map indicates only major anthracite resources. Peat regions are less well defined and are not shown. In many cases the coded deposit may be somewhat ambiguous for any or all of three reasons. First, standards for ranking solid fossil fuel vary among nations; for example, what might be good subbituminous coal in one country would be defined as lower grade bituminous in another. Second, where there are numerous seams in a deposit, the rank may vary with depth, especially in mountainous or formerly mountainous area, and particularly where there have been magmatic intrusions that accelerate anthracitization. Third, where a deposit covers a large area, there may be wide variation horizontally. Thus the rankings of the resources shown on the map are semiquantitative at best.

In general, the sizes of the dots marking smaller deposits have been made larger than the extent of the actual currently economic deposit, partly for greater visual clarity, but also because such deposits are often thin at the edges or, in many cases, have not been completely explored. In certain instances, fossil fuel seams near existing ocean shores actually continue at depth under the sea and in a few cases, at least, are mined out past the shore line. Such submarine extensions have not been shown.

The world solid fossil fuel map shows clearly that the great bulk of such resources are north of 30°N latitude and that the great preponderance of total geological resources are in three nations—the USSR (56%), the United States (19%), and the Peoples' Republic of China (∿8%). Large resources also exist in many of the nations of Europe and in Canada, India, South Africa, Australia, and Japan. The remaining 1% of solid fossil fuel resources is widely scattered throughout the world. Even though many nations have a very tiny fraction of total world resources, actual quantities may be very significant

noir), bitumineux (en rouge), subbitumineux (en pourpre), houille brune et lignite (en bleu). Très souvent il a été difficile de montrer de petits gisements d'anthracite, surtout quand ils sont associés à d'autres types de charbon. La carte n'indique donc que les gisements d'anthracite les plus importants. Comme les régions tourbeuses sont moins bien définies, on ne les a pas montrées. Dans beaucoup de cas le codage du gisement peut être d'une signification quelque peu ambiguë pour l'une on l'autre des trois raisons suivantes. Premièrement, les normes de détermination des combustibles solides varient selon les pays; par exemple, ce qui est considéré dans un pays comme du bon charbon subbitumineux sera défini ailleurs comme un bitumineux de qualité inférieure. Deuxièmement, lorsqu'il y a de nombreux filons dans un gisement, le type de charbon peut varier avec la profondeur surtout dans les régions montagneuses on des régions ayant été autrefois montagneuses, et particulièrement là où il y a eu des pénétrations magmatiques qui ont accéléré la formation d'anthracite. Troisièmement, quand un gisement s'étend sur une grande superficie il peut y avoir de larges variantes dans le plan horizontal. C'est pourquoi sur la carte la classification des resources est, au mieux, semi-quantitative.

En général les points représentants les gisements plus petits sont plus gros qu'ils ne devraient l'être pour montrer l'étendue du gisement dans son économie actuelle. Cela a été fait en partie pour parvenir à une meilleure impression visuelle, mais aussi parce que ces dépôts s'amenuisent souvent sur les bords, ou encore, dans beaucoup de cas, parce qu'ils n'ont pas été entièrement explorés. Dans certains cas les gisements de combustibles fossiles proches des bords de mer se continuent en profondeur sous la mer, et dans quelques cas, au moins, ils sont exploités au-delà de la côte. Ces extensions sous-marines n'ont pas été indiquées.

La carte des combustibles fossiles du monde montre clairement que la grande masse de ces ressources se trouve au nord de la latitude 30°N et que la plus grande partie de la totalité des ressources géologiques est située dans trois pays : l'URSS (56%), les Etats-Unis (19%) et la République Populaire de Chine (∿8%). On trouve aussi d'importants gisements de combustibles fossiles solides dans beaucoup de pays d'Europe et au Canada, dans l'Inde, en Afrique du Sud, en Australie et au Japon. Le reste, soit 1%, est éparpillé dans le reste du monde. Même si beaucoup de pays ne possèdent qu'une très petite fraction de la totalité des ressources mondiales, les quantités réelles peuvent être très importantes pour satisfaire une grande partie de for meeting a large part of domestic energy requirements for many decades.

The Geology of Coal

Coal consists primarily of carbon plus oxygen, nitrogen, hydrogen, and trace quantities of a number of metallic elements.[1] Geologically, coal is a sedimentary rock, and like many other sedimentary rocks, its features or characteristics can be used to define the environment in which it formed. The conditions conducive to coal formation are, therefore, considerably better known than are those for the formation of petroleum. In the coal itself and in the associated rocks, abundant internal features allow a fairly accurate reconstruction of the physiography and climate existing at the time the precursors of coal were accumulating. The geologic environment in which coal will occur, therefore, is well defined; hence exploration for coal is much less taxing than for other minable commodities. Nevertheless, a pressing problem in some nations is still that of finding coal with a thickness sufficient to allow economic recovery.

Coal is derived from the alteration of decaying plant debris, a fact well documented by the presence of plant remains in practically all types of coal. Obviously, therefore, an abundance of plants is requisite for the development of significant coal deposits. The paucity of coal in pre-Cambrian rocks is related to the absence of land plants in those ancient times. Such pre-Cambrian coals are probably derived from the alteration of algae.[2] Land plants first appeared in early Paleozoic time, about 450 million years ago. By the Carboniferous period (about 350 million years ago), plants were so abundant that true forests existed. Over 3000 Carboniferous species have been identified in the fossil record, mostly ferns and conifers; however, some flowering plants have been recognized. The combination of abundant flora and ideal physiographic and climatic conditions for the accumulation of plant debris resulted in the Carboniferous being one of the most important total-forming periods in the geologic record. Under appropriate conditions, coal formation has occurred in all geologic periods since then and is still going on.

leurs besoins domestiques en énergie pendant de nombreuses décennies.

La géologie du charbon

Le charbon est composé de carbone, d'oxygène, d'azote, d'hydrogène, et d'un certain nombre d'éléments métalliques sous forme de traces.[1] Du point de vue géologique c'est une roche sédimentaire et comme tant d'autres roches sédimentaires, ses propriétés et ses caractéristiques peuvent être utilisées pour définir l'environnement dans lequel il est formé. Les conditions favorables à la formation de charbon sont donc bien mieux connues que celles favorables à la formation de pétrole. Dans le charbon lui-même et dans les roches associées, d'abondantes caractéristiques internes permettent une reconstitution absolument exacte de la physiographie et du climat existant à l'époque où les éléments précurseurs du charbon s'accumulaient. L'environnement géologique favorable à la formation du charbon est donc connu, et il est bien moins coûteux de recherchez du charbon que de faire La prospection d'autres minéraux. Néanmoins le problème consiste toujours à trouver des couches de charbon d'une épaisseur suffisante pour permettre une extraction économique.

Le charbon provient de l'altération des végétaux en putréfaction, fait bien démontré par la présence de vestiges de plantes dans pratiquement tous les types de charbon. Il est donc évident qu'une abondance de plantes est indispensable pour le développement de gisements de charbon importants. La pénurie de charbon dans les roches précambriennes provient de l'absence de végétaux terrestres dans ces temps anciens. Les charbons précambriens proviennent probablement de la putréfaction d'algues.[2] La végétation terrestre est apparue pour la première fois au début de l'ère paléozoïque il y a environ 450 millions d'années. Pendant la période carbonifère (il y a environ 350 millions d'années) les plantes étaient si abondantes qu'il existait de véritables forêts. Plus de 3000 espèces de l'ère carbonifère ont été identifiées par l'étude des fossiles, surtout des fougères et des conifères; mais on a aussi reconnu quelques plantes à fleurs. La combinaison d'une flore abondante et de conditions physiographiques et climatiques idéales pour l'accumulation des vestiges de plantes ont fait de la période carbonifère l'une des plus importantes pour la formation du charbon dans l'histoire de la géologie. Dans des conditions appropriées la formation de charbon a eu lieu depuis lors dans toutes les périodes géologiques, et cela continue toujours.

An abundance of plant life in itself is no guarantee that coal will form. Dead vegetation must accumulate and subsequently be altered to coaly material. The conditions for optimum coal formation include a temperate to subtropical climate in an area of low relief. A climate of moderate temperature and high rainfall provides an environment for prolific forest growth without the extremely high bacterial decay rate found in true tropical areas. The low relief is necessary because the associated bodies of standing water provide a subaqueous site for accumulation of dead vegetation, thereby preventing atmospheric oxidation, and destruction, of the organic plant debris. Such ideal conditions are typically encountered in coastal swamp areas and in interior basin lowlands. Much Carboniferous coal developed in delta swamp areas not unlike the present Amazon or Mississippi deltas.

The conversion of the plant remains to coal involves the devolatilisation of the organic matter by loss of oxygen, nitrogen, and hydrogen and a resultant increase in fixed carbon. This process is primarily the result of subaqueous bacterial action. Protoplasm, cellulose, and starches of the plants are most easily attacked. The waxy and resinous substances, being more resistant, commonly appear as plant remains in the final coal product. Aiding the alteration, or coalification, process are the increased temperature and pressure resulting from addition of sediment over the coal-forming layer. The extent of alteration of vegetation defines the grade of coaly material produced.[3] Peat represents an incipient state, lignite a more advanced stage, of coalification. The most advanced stages of the process are represented by bituminous and anthracite coals, respectively. Coalification in an area of undisturbed strata ultimately yields bituminous coal. Anthracite results only from special conditions of pressure and heat which devolatilise the bituminous coal even more, yielding a product high in fixed carbon. Such special conditions are met where coal-bearing strata are intensely folded as in the Appalachian Mountains of eastern Pennsylvania (United States) and the Atlas Mountains of northern Morocco. The folding must be intense enough to devolatilise the bituminous coal but not so intense that the generated heat

L'abondance de la vie végétale en elle-même ne garantit pas la formation du charbon. Des végétations mortes doivent s'accumuler puis se transformer pour devenir du charbon. Les conditions optimales pour la formation du charbon comprennent un climat tempéré ou subtropical dans une région de faible relief. Un climat avec une témperature modérée et de fortes chutes de pluie procure l'environnement nécessaire à la prolifération de forêt denses sans arriver à la grande putréfaction bactérienne que l'on trouve dans les régions vraiment tropicales. Le faible relief est nécessaire parce que les éléments se trouvant dans les eaux stagnantes créent un site humide favorable à l'accumulation de végétation morte, empêchant ainsi l'oxydation atmosphérique et la destruction des vestiges de végétaux organiques. On rencontre ces conditions idéales typiques dans les régions de marais côtiers et à l'intérieur des bassins des terres basses. On trouve beaucoup de charbon de l'ère carbonifère dans les marais des deltas peu différents des deltas actuels de l'Amazone et du Mississipi.

La transformation des restes des plantes en charbon implique la volatilisation des matières organiques par perte d'oxygène, d'azote et d'hydrogène, et il en résulte un accroissement en carbone fixe. Ce procédé est tout d'abord le résultat de l'action bactériénne par voie aqueuse. Le protoplasme, la cellulose et l'amidon des plantes sont facilement attaqués. Les substances cireuses et résineuses étant plus résistantes apparaissent généralement comme des vestiges des plantes dans le produit final, le charbon. Le processus de latération, ou carbonisation, est favorisé par une température plus élevée et par la pression provenant de l'apport de sédiments sur la couche de formation du charbon. L'étendue de l'alternance de matières végétales et d'éléments inorganiques définit le type du charbon obtenu.[3] La tourbe représente un état naissant, le lignite un stade plus avancé de carbonisation. Les stades les plus avancés du processus sont répresentés par les charbons bitumineux et par les anthracites. La carbonisation dans une région de strates non perturbées donne finalement le charbon du type bitumineux. L'anthracite provient seulement de conditions spéciales de pression et de chaleur qui volatilisent encore plus le charbon bitumineux, donnant un produit riche en carbone fixe. Ces conditions spéciales se rencontrent quand les strates porteuses de charbon sont intensément plissées, comme dans les monts Appalaches de l'est de la Pennsylvanie (Etats-Unis) et les monts Atlas du nord du Maroc. Les plissements doivent être assez intenses pour volatiliser les bitumineux, mais pas assez pour que la chaleur produite détruise le destroys the coal or produces a super anthracite—a graphite-like, unburnable product.[4] Anthracite coal may also result from the action of heat on bituminous coal, the heat arising from nearby igneous intrusives or extrusives. Such heat-produced anthracites, however, are of minor importance.

Coals typically occur in successive layers. The layers alternate with beds of sandstone or shale or, rarely, limestone. Such layering arises from the fact that, in terms of geologic time, deltas are mobile and a given location may be raised or lowered with respect to sea level at frequent intervals. When above sea level, plants will flourish. When the land area is submerged, the dead vegetation accumulates and is buried by sediment brought in by rivers. The next emergence allows for a new growth of plants, and the cycle repeats itself. Such alternations produce many successive coal seams. Seams may range in thickness from a few millimeters up to many tens of metres, the thickest being a 130-metre thick seam in the Peoples' Republic of China.[5] At present, seams less than 0.3 metres thick are not likely to be commercially valuable.

Coal is known in all geologic periods from the Devonian to the present. In addition, some pre-Devonian occurrences have been reported, but such occurrences are minor. The most important coal-producing periods are the Carboniferous, Cretaceous, and Tertiary. Carboniferous coals are abundant in almost all parts of the world. Cretaceous coals occur extensively in North America and Europe. Lignite is prominent in the Tertiary beds of North America and Europe. In addition to the above-mentioned occurrences, significant coals occur in Permian beds in China, USSR, India, Australia, and South Africa. Triassic coals are found in Australia, Central Europe, and Eastern Asia. The Jurassic period yields coal in Alaska (United States), China, Australia, and Central Europe.

Coal Mining Technology

Of all of the world's solid mineral products, only two, crushed stone and sand and gravel are produced in greater quantities than coal.[6] Both of these are obtained almost exclusively from surface works,

charbon ou produise un super-anthracite, un produit semblable au graphite, non combustible.[4] L'action de la chaleur sur le charbon bitumineux peut aussi produire de l'anthracite, la chaleur provenant de la proximité de corps intrusifs ou extrusifs en ignition. Mais ces anthracites produits par la chaleur sont d'importance mineure.

Les charbons se trouvent généralement en couches successives. Les couches alternent avec des lits de grès ou de schistes, rarement de calcaires. Ces couches proviennent du fait que, en termes de géologie les deltas sont mobiles et un gisement donné peut être élevé ou abaissé par rapport au niveau de la mer, à intervalles fréquents. Quand elles sont au-dessus du niveau de la mer les plantes se développent. Quand la terre est inondée la végétation morte s'accumule et est ensevelie sous des sédiments apportés par les fleuves. La nouvelle émergence permet une nouvelle croissance des plantes et le cycle se répète. Ces alternances produisent beaucoup de couches successives de charbon. Celles-ci peuvent avoir des épaisseurs variant de quelques millimètres à beaucoup de dizaines de mètres, la plus épaisse étant une couche de 130 mètres dans la Republique Populaire de Chine.[5] A l'heure actuelle des couches de moins de 0.3 mètre d'épaisseur ne semblent pas avoir de valeur commerciale.

Le charbon a existé au cours de toutes les périodes géologiques depuis le Dévonien jusqu'à aujourd'hui. De plus on trouve quelques gisements prédévoniens, mais en fait ils sont petits. Les ères les plus importantes de production de charbon sont l'ère carbonifère, l'ère crétacée et l'ère tertiaire. Les charbons de l'ère carbonifère sont abondants dans presque toutes les parties du monde. Les charbons du Crétacé sont très abondants en Amérique du Nord et en Europe. Le lignite domine dans les couches tertiaires de l'Amérique du Nord et de l'Europe. En plus de ces gisements on trouve d'importantes quantités de charbon dans les couches du Permien en Chine, en URSS, en Inde, en Australie et en Afrique du Sud. Des charbons de l'ère triasique se rencontrent en Australie, en Europe centrale et en Asie orientale. L'ère jurassique a donné du charbon dans l'Alaska (Etats-Unis), en Chine, en Australie et en Europe centrale.

Technologie de l'extraction du charbon

Parmi tous les produits minéraux solides du monde, seuls deux, sables et graviers d'une part, pierres concassées d'autre part, existent en plus grandes quantités que le charbon.[6] On les obtient tous deux presque uniquement par des travaux en such as quarries and gravel pits. Thus, coal, which is still obtained principally from underground mines, is by far the world's largest underground mining activity and also the most dangerous. Because annual world demand is now in thousands of megatonnes the coal mining industry employs many thousands of miners and utilizes large and often highly complex equipment.

The acquisition and processing of coal involves the freeing of coal from seams, its loading and transport to surface processing facilities, if any, where it is washed and crushed, and its subsequent delivery to market areas. The technology used in various nations varies considerably, depending on relative cost of labor, policies of land protection, extent of resource depletion, and various other factors.

Although most of the world's coal is still mined underground, the United States, in 1971, for the first time, mined more coal above ground (53%) than below. Surface mining involves removal of soil and rock strata to expose the coal or lignite seam. The overburden, which may range up to 100 metres in thickness, is generally broken up with explosives and is then removed by power shovels, wheel excavators, or draglines. The maximum economic ratio of overburden to coal thickness is currently about 30:1 for coal and 20:1 for lignite. Once the overburden is removed, the exposed seam is cleaned with bulldozers or power brooms and the coal excavated and loaded into conveyors, trucks, or railcars. The machinery used in surface mining is very large by any standard. Power shovels up to 30 meters in height with 100-cubic-metre shovels and wheel excavators with capacities of 3000 cubic meters/hour are fairly common. Surface mining is relatively efficient; recovery of up to 80% of the coal is achieved. It is also capital rather than labor intensive.

Augering is used principally in surface mining to exploit relatively horizontal outcrop seams; however, it is also being used increasingly as a supporting activity in both surface mining and underground

surface comme les carrières de pierres et les sablières. Ainsi le charbon que l'on retire surtout des mines souterraines représente, et de loin, l'activité minière souterraine la plus importante du monde, et aussi la plus dangereuse. Comme la demande annuelle s'élève maintenant à des milliers de mégatonnes, l'industrie d'exploitation du charbon emploie des milliers de mineurs et utilise un équipement important et souvent très complexe.

La récupération du charbon et sa transformation implique l'extraction du charbon, son chargement et son transport jusqu'à des usines de transformation à la surface du sol, s'il y en a, pour le laver et le concasser, et enfin sa livraison aux divers marchés. La technologie utilisée dans les divers pays varie considérablement suivant le coût de la main d'oeuvre, les politiques de protection des sols, l'importance des ressources, leur épuisement et divers autres facteurs.

Bien que la plus grande partie du charbon dans le monde continue à être exploité sous terre, en 1971, pour la première fois, les Etats-Unis ont extrait plus de charbon en surface (53%) que sous terre. L'exploitation à ciel ouvert implique l'enlèvement de la terre ou des couches rocheuses pour faire apparaitre les gisements de charbon ou de lignite. La couverture, qui peut avoir jusqu'à 100 m d'épaisseur, est généralement attaquée avec des explosifs puis enlevée par des pelles mécaniques, des excavateurs à roues ou des draglines. Le rapport du volume maximal économique de la couverture et de l'épaisseur du gisement de charbon est généralement de 30/1 pour le charbon et de 20/1 pour le lignite. Une fois que la couverture à été enlevée, le gisement mis à découvert est nettoyé avec des bulldozers ou des excavateurs méchaniques, et le charbon est extrait et chargé sur des convoyeurs, des camions ou des wagonnets. Les machines utilisées pour l'exploitation à ciel ouvert sont très nombreuses pour chaque type d'exploitation. Des pelles mécaniques ayant jusqu'à 30 m de hauteur et pouvant contenir 100m^3, et des excavateurs à roues d'une puissance de 3000 m^3/heure sont très communs. L'exploitation à ciel ouvert est relativement efficace en ce sens qu'on arrive à récupérer jusqu'à 80% du charbon en place; c'est coûteux en investissements plutôt qu'en main d'oeuvre.

Les tarières sont utilisées principalement en exploitation à ciel ouvert pour atteindre des couches d'affleurement relativement horizontales; toutefois on les utilise aussi de plus en plus comme moyen auxiliaire à la fois dans l'exploitation à ciel ouvert et dans l'exploitation souterraine quand la limite mining where the maximum economic limit of overburden has been reached in the former application and/or where seams thin out in the latter. This method uses augering machinery from 0.6 to 1.5 metres in diameter to extract the coal at distances of up to 100 metres into the seam; about 50 to 60% of the coal can be removed. Both capital and labor costs are relatively low for augering; further, no blasting, overburden removal, or roof support is required.

Underground mining is much more demanding than either surface mining or augering. Methods of operation range from very simple manual techniques in some developing nations where labor is cheap to highly sophisticated techniques using complicated machinery, automated coal conveying systems, and extensive computerized control of the mine. Three types of mine access are employed: shaft, slope, and drift. Nearly all mines have two or more entries for ventilation requirements and for safety. Shaft mines use vertical shafts and elevators; shafts provide the least distance to subterranean coal seams but require the greatest expenditure of energy for moving men, equipment, and product. Slope mine entries vary from 15 to 20° from the horizontal, the upper limit for use of belt conveying systems. Drifts provide horizontal entry and are generally limited to outcrop seams where rail and truck handling as well as conveyors can be employed.

Three types of mine layout and exploitation are in general use: room and pillar, horizon, and longwall. In room and pillar mining, the coal is removed from two sets of advancing corridors approximately at right angles to each other; large pillars are left to support the overhead strata in mined areas. This method seldom permits recovery of more than half the coal in a mine and is used extensively in the United States and other nations with very large reserves. The horizon mining method, used extensively in continental Europe to exploit highly inclined and faulted coal seams, involves use of drift entries through solid rock. Shafts are then driven upward from drifts into the coal seams, which are generally mined by longwall methods. The longwall

économique de la couverture a été atteinte dans le premier cas, et/ou quand les gisements vont s'amincissant dans le second cas. Cette méthode utilise des tarières de 0, 60 à 1,5 m de diamètre pour extraire le charbon de gisements situés jusqu'a 100 m de profondeur; on peut ainsi extraire 50 à 60% de charbon. Les frais d'investissements et de main d'oeuvre sont relativement peu élevés pour ce genre de forage; de plus, on n'a pas besoin d'utiliser des explosifs, ni d'enlever la couverture, ni de soutenir le toit.

L'extraction souterraine exige beaucoup plus que l'exploitation à ciel ouvert ou par tarières. Les méthodes d'opération vont de techniques manuelles très simples dans certains pays en voie de développement où la main d'oeuvre est bon marché, à des techniques très élaborées utilisant des machines très compliquées, des réseaux de transport de charbon très automatisés et d'importants contrôles de la mine par ordinateurs. Trois types d'accès à la mine sont employés : puits, bures et galeries. Presque toutes les mines ont deux ou plusieurs entrées pour les besoins de ventilation et de sécurité. Les mines à puits utilisent des entrées verticales et des élévateurs verticaux; les puits permettent de réduire la distance jusqu'aux gisements souterrains de charbon, mais demandent la plus grande quantité d'énergie pour transporter les hommes, l'équipement et le produit. Les entrées des mines par des bures ont des pentes variant de 15° à 20° sur l'horizontale, limite extrême pour utiliser les systèmes de bandes convoyeuses. Les mines à galeries ont des entrées horizontales et sont généralement limitées aux gisements d'affleurement où l'on peut employer le rail et le camion, ainsi que des transporteurs.

Trois types de schémas et d'exploitation de mines sont utilisées généralement : chambres et piliers, étages horizontaux et grand front de taille. Dans l'exploitation par chambres et piliers le charbon est extrait de deux jeux de couloirs de pénétration approximativement à angle droit; on laisse de grands piliers pour soutenir la strate du dessus dans les zones déjà exploitées. Cette méthode permet rarement de récupérer plus de la moitié du charbon de la mine et est largement utilisée aux Etats-Unis et dans d'autres pays ayant de très vastes réserves. La méthode d'exploitation par étages horizontaux, largement utilisée en Europe continentale pour exploiter des gisements de charbon très inclinés et en mauvais état, demande d'utiliser des entrées à flanc de côteau dans des roches solides. Les puits sont alors dirigés vers le haut à partir des galeries pénétrant dans des couches de charbon situées plus haut qui sont généralement exploitées par des méthodes technique is used in Europe and other areas with heavily depleted, or originally small, resources to permit removal of as much coal as possible. Two parallel tunnels are constructed 100 to 200 metres apart and at right angles to the main tunnel. The longwall between the two tunnels is then mined forward away from the main tunnel and the mined-out area is either allowed to collapse in a controlled manner or is filled with rock to provide support. Where the room and pillar method is used, it may be feasible in the future to remove the remaining coal by longwall methods. In nations like England, where coal is highly depleted, some coastal mines are worked a kilometre or more out under the sea. Very stringent safety requirements are necessary in such cases to prevent roof collapse and inundation of the mine works.

Four general methods are practiced for removing the coal from the working faces of seams. These include manual methods, cyclic mining, continuous techniques, and hydraulic methods. In most of these methods, blasting is generally used to break up the coal. Manual techniques vary from the declining use of pick and shovel in softer seams and in developing nations to the use of automatic tools such as pneumatic picks and coal plows used extensively in Europe. The cyclic technique utilizes four sequential steps, usually on a 24-hour cycle: supporting the roof in the new area; slotting the seam face horizontally to about 1 metre; drilling, setting of explosives, and blasting to free and fragment the coal; and loading of conveyors, rail cars, or trucks to remove coal from the mine. Supporting the roof is important in all methods of underground coal mining and involves use of timber supports, rock bolting, and hydraulic jacks. "Explosives" used in coal mining include low-head low-fume conventional explosives or compressed air or liquid carbon dioxide cartridges. Continuous mining eliminates blasting and utilizes large heavy equipment that grinds out the coal from the seam face. The cyclic and continuous methods are used mainly in the United States. Finally, the hydraulic method, used principally in the USSR and People's Republic of China,

à grand front de taille. La technique de ces dernières est utilisée en Europe et dans d'autres régions dont les ressources viennent à épuisement ou ont toujours été faibles, pour extraire le plus de charbon possible. Deux tunnels sont construits, distants l'un de l'autre de 100 à 200 m, et à angle droit avec le tunnel principal. Le grand front de taille entre les deux tunnels est alors exploité en avancant à partir du tunnel principal et la région exploitée peut soit s'affaisser sous contrôle, soit être remplie de roches pour soutenir le toît. Là où l'on utilise la méthode chambres et piliers il sera possible dans l'avenir d'extraire le charbon restant par la méthode à grand front de taille. Dans les pays comme l'Angleterre où le charbon s'épuise beaucoup, certaines mines côtières sont exploitées à un ou plusieurs kilomètres sous la mer. Dans ce cas il est nécessaire de prendre des mesures de sécurité très strictes pour empêcher le toît de s'affaisser et les mines d'être inondées.

Quatre méthodes générales sont utilisées pour enlever le charbon des fronts de taille des gisements Elles comprennent des méthodes manuelles, l'extraction cyclique, l'extraction continue et les méthodes hydrauliques. Dans la plupart de ces méthodes on utilise généralement des explosifs pou broyer le charbon. Les méthodes manuelles consistent aussi bien dans l'emploi, de plus en plus rare, du pic et de la pelle pour attaquer les couches plus friables, dans les pays en voie de développement, que dans l'emploi d'outils automatiques tels que des pics pneumatiques et des charrues à charbon, ce qui est très répandu en Europe. La technique cyclique se fait en quatre phases successives, habituellement dans un cycle de 24 heures Ce sont : le soutien du toît de la nouvelle zone; le fendage du front de taille de la couche, horizontalement, à environ un mètre; le forage, la mise en plac d'explosifs et de détonateurs pour libérer et broyer le charbon; enfin le chargement sur convoyeurs, automotrices ou camions, pour transporter le charbon hors de la mine. Dans toutes les méthodes d'extraction du charbon il est bien recommandé de soutenir le toît, ce qui implique l'emploi de soutènements en bois, l'agrafage des roches et l'utilisation de vérins hydrauliques. Les explosifs employés dan l'extraction du charbon comprennent les explosifs classiques à faible charge et à faible production de fumée, ou les cartouches d'acide carbonique liquid ou à air comprimé. L'extraction continue n'utilise pas d'explosifs mais un équipement lourd et volumineux qui broie le charbon retiré du front de taille d la couche. La méthode cyclique et la méthode continue sout utilisées surtout aux Etats-Unis. Enfin l méthode hydraulique, employée surtout en URSS employs low-pressure water jets to sluice coal, loosened by blasting, out of the mine; when high-pressure jets are used, the coal is also dislodged from the seam and blasting is reduced or eliminated.

Many methods and combinations of methods are used to remove coal from the mine. In drift mines, small to large coal trains and coal trucks are still used extensively. In drift and slope mines, very efficient belt and chain conveyor systems are employed; these are often highly automated and equipped with extensive safety equipment and often convey men and equipment as well as coal. In cyclic systems, shuttle cars carry coal from the working face to coal cars or conveyor systems; continuous systems often use extensible conveyors that accept coal directly from the continuous mining machines. In shaft mines, coal brought to the shaft is raised to the surface in cages, buckets, or skips.

At the surface the coal is generally processed to remove impurities and to provide desired sizes. Originally, a rough sorting of rock from coal was done in the mine when the coal was loaded into cars; this practice was later replaced by a more careful hand sorting and sizing on belts and screens in surface facilities called tipples. Hand sorting is still practiced in less technically advanced nations, but automatic processing is being used increasingly in the more developed countries. Impurities are separated on the basis of differences in specific gravity in air or solution classifiers or by differences in wetting properties using froth flotation methods. Wet classification using sand, barytes, or magnetite slurries is the most used method. Flotation with oil-water emulsions requires prior grinding to 0.5-millimetre size.

Originally, coal was seldom consumed at any appreciable distance from where it was mined. However, by the year 1200, sea coal (coal dislodged along the eastern coast of England by waves and currents) was being carried in appreciable amounts by ship to Bruges in Belgium. Later, much of the coal mined near the east coast of England was delivered to London in coastal vessels. Most of the

et dans la République Populaire de Chine, se sert de jets d'eau à basse pression pour laver le charbon, libéré par des explosions, en dehors de la mine; quand on utilise des jets à haute pression le charbon est alors détaché de la souche, ce qui réduit ou élimine les explosions.

Beaucoup de méthodes et de combinaisons de méthodes sont employées pour extraire le charbon de la mine. Dans les mines à galeries on continue à utiliser beaucoup de petits ou grands wagonnets et camions. Dans les mines à galeries et en pente on se sert de convoyeurs à bandes et à chaînes très efficaces; ils sont souvent très automatisés et équipés d'importants systèmes de sécurité; souvent ils servent à transporter les hommes aussi bien que l'équipement et le charbon. Dans les méthodes cycliques les wagonnets faisant la navette transportent le charbon du front de la taille aux wagonnets à charbon et aux convoyeurs; les méthodes continues utilisent souvent de grands convoyeurs qui transportent le charbon directement à partir des machines d'extraction continue. Dans les mines à puits le charbon transporté aux puits est monté à la surface dans des cages, des godets ou des bennes.

A la surface on traite généralement le charbon pour en enlever les impuretés et lui donner les dimensions souhaitées. Autrefois on enlevait grosso modo les pierres du charbon dans la mine quand on le chargeait sur les wagonnets; plus tard on fit à la main d'une façon plus minutieuse le tri ainsi que le calibrage à l'aide de courroies et de cribles, à la surface, dans des installations appelées culbuteurs. Le triage à la main est encore pratiqué aujourd'hui dans les pays d'une technique moins avancée, mais le traitement automatique se fait de plus en plus dans les pays plus développés. La séparation des impuretés se fait en utilisant les différences de densité dans des trieurs à air ou à liquide, ou encore les différences des propriétés de mouillance, selon les méthodes de flottation par moussage. La méthode la plus employée est la classification par mouillance qui se sert de sable, de lait de baryte ou de magnétite. Pour la flottation par émulsions d'huile et d'eau il faut d'abord calibrer le charbon à 0,5 mm.

Autrefois le charbon était rarement utilisé loin de son lieu d'extraction. Mais vers l'année 1200 le charbon de mer (charbon entraîné le long de la côte est de l'Angleterre par des vagues et des courants) fut transporté en quantites assez importantes par bateaux à Bruges, en Belgique. Plus tard, la plus grande partie du charbon extrait près de la côte est de l'Angleterre fut livrée à Londres par des caboteurs. La plupart des voies ferrées existant dans le world's existing railroads were built in the last century and were then the major means of conveying coal to markets. Until relatively recently, they were also one of the principal consumers of coal. More recently, greater quantities of coal have been transported in large trucks and to a lesser extent by medium distance (2 to 20 kilometres) belt conveyors and slurry pipelines. In the United States and Europe, large amounts of coal are barged on inland waterways.

Because of the many dangers associated with underground coal mining, very strict safety standards have been established worldwide in this industry. About 50% of the injuries and deaths occuring in mines result from local collapse of working areas, 20% from accidents in conveyance equipment, and 30% from fires and explosions. Because the latter are the most spectacular and may cause many casualties, they always receive the greatest publicity. The greatest contributors to fires and explosions are airborne coal dust and methane, which is released from coal. Whitedamp (CO) and stinkdamp (H_2S) may result in injury or death because these gases are poisonous, and blackdamp (CO_2) and afterdamp (oxygen-deficient air) cause injury through suffocation. To minimize such dangers, modern coal mines are highly ventilated and great care is used to prevent mechanical or electrical sparking.

The Uses of Solid Fossil Fuels

Over the past century, coal has had three major uses: direct use as fuel (for space heating, transportation, industrial process heat, and generation of electricity); production of coke for use in producing pig iron; and production of gas for supply to homes and industry. The latter use has largely disappeared as the result of greatly increased use of petroleum and natural gas.

The consumption pattern for direct use of coal has changed considerably in this century. In 1900, the two main uses were for railroad (and ship) transportation fuel and for home, commercial, and industrial space heating. These uses are now largely

monde ont été construites au siècle dernièr et ont constitué le moyen le plus important de transport du charbon jusqu'aux marchés. Jusqu'à une date relativement récente les chemins de fer ont été auss l'un des principaux utilisateurs de charbon. Plus récemment, de plus grandes quantités de charbon ont été transportées dans de grands camions et, pour des distances moyennes (2 à 20 km) et en quantités moins importantes, par des convoyeurs à courroies et par pipelines sous forme de boue. Aux Etats-Uni et en Europe de grandes quantités de charbon sont transportées par chalands sur les voies d'eaux intérieures du pays.

A cause des nombreux dangers qu'implique l'exploitation des mines de charbon souterraines, des mesures de sécurité très strictes ont été établies partout dans le monde. Environ 50% des blessures et des décès survenant dans les mines proviennent d'affaissements locaux des zones de travail, 20% d'accidents sont dûs au matériel de transport et 30% aux incendies et aux explosions. Comme ces dernières causes sont les plus spectaculaires et peuvent provoquer beaucoup de morts et de blessés c'est d'elles dont on parle le plus. La présence de poussier de charbon dans l'air est la cause la plus fréquente des incendies et des explosions; vient ensuite le dégagement de méthane. L'oxyde de carbone (CO) qui se répand dans les mines de charbon et le gaz d'explosion de grisou (H_2S) peuvent provoquer des blessures ou la mort parce que ces gaz délétères, l'air vicié (CO_2) et les produits d'explosion du grisou (air manquant d'oxygène) provoquent la suffocation. Pour réduire des dangers les mines de charbon modernes sont très ventilées et l'on prend grand soin d'éviter les étincelles d'origine mécanique ou électrique.

Les utilisations des combustibles fossiles solides

Au siècle dernier le charbon a eu trois utilisations principales : utilisation directe en tant que combustible (pour chauffage des locaux, transport, emplois thermiques dans l'industrie et production d'électricité); production de coke pour obtenir de la fonte brute; et fabrication de gaz pour distributio aux foyers et dans l'industrie. Cette dernière utilisation a beaucoup diminué par suite de l'emploi accru de pétrole et de gaz naturel.

Le schéma de la consommation directe de charbon a changé considérablement au XXème siècle. En 1900 il servait surtout à deux usages: comme combustible pour les transports ferroviaires (et par bateau), et pour chauffer les habitations privées, les locaux commerciaux et industriels. A l'heure provided by oil and gas, and the two major uses of coal are currently for generation of electricity in central power stations and for use in industry, particularly the iron and steel industry. Use of anthracite coal as a clean home fuel has been decreasing throughout this century but may again increase if oil and gas become less readily available. At present, 13 to 14% of the coal mined throughout the world is used to make coke, and nearly all of the remainder is burned directly.

Production of coke involves the distillation of bituminous coal at high temperature in the absence of air. In this process all of the volatile materials in the coal are vaporized, leaving the carbon and ash as an incandescent solid residue that is cooled usually by water sprays to produce highly consolidated material. The resulting coke is then screened to produce lump coke and smaller (less than 1 centimetre) coke breeze. More than 90% of all produced is used in the production of pig iron. Most of the remainder is used elsewhere in the steel industry and in nonferrous metallurgical processes. About 341 megatonnes were produced worldwide in 1971 from about 450 megatonnes of coal. Output of major producing nations, plus their pig iron output in 1971,[6] is given in Table III-1.

The coke industry also sells several by-product materials from the volatiles driven off from the heated coal. The four initial products are coke-oven gas, ammonia, coal tar, and crude light oils. The bulk of the coke-oven gas is used internally, but small amounts are occasionally sold. Ammonia is processed to ammonium sulfate and to lesser amounts of diammonium phosphate, which are used as fertilizers. The coal tars are often processed to produce secondary materials such as tar acids, bases, naphthalenes, and pitch. The light oils are separated into benzene, toluene, xylene, and solvent naptha. The petrochemical industry has been so successful in producing similar products more cheaply that markets are limited for coal tar and light oil derivatives, and most of the primary by-products are now used only as fuel. Coke is still produced extensively from high-volatility bituminous coal from a single mine or area. The use of mixtures of high-, medium-, and low-volatile bituminous coal and limited quantities of anthracite to

actuelle pour ces usages on se sert surtout du pétrole et du gaz et les deux plus grandes utilisations du charbon sont à présent la production d'électricité dans les centrales énergétiques, et son emploi dans l'industrie, en particulier dans la sidérurgie. L'usage de l'anthracite comme combustible "propre" pour les habitations a diminué au cours du XXème siècle, mais il pourra s'accroître si le pétrole et le gaz deviennent moins facile à se procurer. A l'heure actuelle 13 à 14% du charbon extrait dans le monde est utilisé pour faire du coke, presque tout le reste est brûlé directement.

La production du coke implique la distillation du charbon bitumineux à haute température et sans air. Dans ce procédé tous les produits volatiles du charbon s'évaporent, laissant comme résidu solide, incandescent, le carbone et les cendres qui sont refroidis généralement par des pulvérisations d'eau pour produire une matière très consolidée. Le coke qui en résulte est alors criblé pour donner du coke en morceaux et du poussier de coke (moins d'un cm). Plus de 90% du coke produit est utilisé dans la production de fonte brute. Le reste sert surtout dans l'industrie de l'acier et pour la métallurgie des métaux non-ferreux. En 1971[7] on à produit dans le monde entier environ 340 mégatonnes de coke à partir d'environ 450 mégatonnes de charbon. On trouvera au tableau III-1 la liste des pays les plus importants pour leur production de coke et de fonte brute en 1971.[6]

Les cokeries donnent aussi plusieurs sous-produits provenant des éléments volatiles dégagés par le charbon distillé. Les quatre produits initiaux principaux sont le gaz de four à coke, l'ammoniac, le goudron de houille et les huiles légères brutes. La majeure partie du gaz de four à coke est utilisée sur place, mais parfois on en vend une petite partie. L'ammoniac est transformé en sulfate d'ammonium et, mais en plus petites quantités, en phosphate diammonique qui sert d'engrais. Les goudrons de houille sont souvent traités pour donner des produits secondaires tels que les huiles acides de goudron, des huiles basiques, de la naphtaline et du brai. Les huiles légères fournissent du benzène, du toluène, du xylène et du solvant naphta. L'industrie pétrochimique a si bien réussi à donner des produits similaires, moins chers, que les marchés sont limités aux goudrons de houille et aux dérivés des huiles légères, et la plupart des sous-produits primaires sont maintenant utilisés comme combustibles. Le coke est toujours produit en grandes quantités à partir du charbon bitumineux très volatile provenant d'une unique mine ou bassin. Toutefois on utilise de plus en plus les mélanges de charbon bitumineux

Table III-1. World Production of Coke and Pig Iron, 1971
Tableau III-1. Production mondiale de coke et de fonte brute en 1971

Country *Pays*	Production (Megatonnes) *Production en mégatonnes*		Percent of World Coke *Pourcentage de coke par rapport à la production mondiale*
	Coke[1] *Coke*	Pig Iron[2] *Fonte brute*	
USSR	78.3	88.3	22.9
United States	55.8	74.8	16.3
Germany, F.R. of	37.5	29.8	11.0
Japan	36.9	72.8	10.8
China, P.R. of	19.5	27.2	5.7
United Kingdom	16.8	15.3	4.9
Poland	15.5	7.3	4.5
France	12.5	17.9	3.7
India	9.0	6.6	2.5
Czechoslovakia	8.6	8.0	2.6
Italy	7.1	8.5	2.1
Belgium & Luxembourg	6.8	15.0	2.0
Canada	4.6	7.9	1.3
Australia	4.4	6.1	1.3
Spain	4.1	4.8	1.2
South Africa	3.6	4.0	1.1
Germany, D.R. of	2.3	2.0	0.7
North Korea	2.3	2.5	0.7
Total	325.6	398.8	95.3

[1] U.N.J Series, *World Energy Supplies*
[2] *Minerals Yearbook, 1971*, U.S. Bureau of Mines

produce coke with improved physical properties is increasing.

As noted earlier, a major use of coal in the 19th and early 20th centuries was municipal production of illuminating and heating gas. These processes involved the reaction of heated coke or coal with steam to produce a mixture of combustible carbon monoxide and hydrogen called water gas; when air was admitted with the steam, producer gas which also contained nitrogen was made. In some cases upgraded water gas was made by adding petroleum or the volatile hydrocarbons from coke making to the carbon monoxide-hydrogen water-gas mixture.

In the last several years there has been a resurgence of interest in using coal to produce gaseous (and liquid) fuels. However, the new interest is directed toward development of new technology to produce methane (SNG) for supplementing supplies of higher cost and less readily available natural

très volatiles, moyennement volatiles ou peu volatiles ainsi que des quantités limitées d'anthracite pour produire du coke ayant des propriétés physiques meilleures.

Ainsi qu'on l'a dit plus haut, au XIXème siècle et au début du XXème, le charbon était utilisé surtout pour la production municipale de gaz d'éclairage et de chauffage.*

Ces dernières années il y a eu un renouveau d'intérêt pour utiliser le charbon en vue de produire des combustibles gazeux (et liquides). Mais ce nouvel intérêt est orienté vers le développement d'une nouvelle technologie pour produire du méthane (GNS) pour compléter les approvisionnements de gaz naturel, plus coûteux et moins facile-

* Ces procédés impliquaient la réaction du coke ou du charbon chauffé avec de la vapeur pour produire un mélange d'oxyde de carbone combustible et d'hydrogène appelé gaz à l'eau; quand l'air était entré avec la vapeur il y avait production de gaz pauvre contenant aussi de l'azote. Dans quelques cas le gaz à l'eau enrichi était fabriqué en ajoutant des hydrocarbures volatiles provenant de la fabrication du coke au mélange oxyde de carbone-hydrogène-gaz à l'eau.

gas rather than for producing water gas or producer gas. There has also been considerable interest in producing hydrogen from coal.

The earliest liquid fuel produced from coal was coal oil, a by-product of coke making. Before and during World War II the Germans developed the Fischer-Tropsch method for producing synthetic motor fuel. This process and later the Lurgi process are now used in South Africa to minimize importation of crude oil, and there is interest in the United States and elsewhere in building plants for making oil from coal. Newer methods are now under development.

As noted previously, peat is used extensively as a fuel only in Ireland and the USSR, although its use is increasing in Finland. It does, however, have extensive use in agriculture as a soil conditioner and plant nutrient in a number of other nations. On a worldwide basis, about twice as much peat is used agriculturally as is used for fuel. World production and use in 1971 was about 195 megatonnes.[6]

Historical Development of the Consumption of Solid Fossil Fuels

Coal has been used as a fuel for at least 2000 years, first in China and probably concurrently in the Roman Empire. Modern usage dates from the period 1000 to 1200 A.D., first in Europe, much later in Northern America, and more recently in the rest of the world, especially in Japan, India, Australia, and South Africa. In colder climates where there has always been a need for fuel for comfort heating in winter, wood met this need in most parts of the world. Such use resulted in rapid deforestation, mainly in China, the plains of northern Europe, and much of the eastern United States. Although the need for fuel was less extensive in warmer regions, it was not absent; and wood, dung, and agricultural wastes were also used extensively as fuel in tropical and subtropical areas.

From about 1000 to 1200, coal was used locally on a modest scale in Europe for heating and in metallurgy in lieu of charcoal. After 1200, coal mining increased most rapidly in England, Scotland,

ment disponible, plutôt que pour produire du gaz à l'eau ou du gaz pauvre. Il existe aussi un intérêt considérable pour la production d'hydrogène à partir du charbon.

Le premier combustible liquide produit à partir du charbon a été l'huile lourde, un sous-produit de la fabrication du coke. Avant et pendant la seconde guerre mondiale, les Allemends ont développé le procédé Fischer-Tropsch pour produire du combustible synthétique pour moteurs. Ce procédé, et plus tard le procédé Lurgi, est maintenant utilisé en Afrique du Sud pour réduire les importations de pétrole brut, et on s'intéresse aux Etats-Unis et ailleurs à la construction d'installations pour faire de l'huile à partir du charbon. De nouveaux procédés sont maintenant en cours de développement.

Comme on l'a dit plus haut, la tourbe est très utilisée comme combustible seulement en Irlande et en URSS, bien que son emploi augmente en Finlande. Toutefois dans un certain nombres d'autres pays on s'en sert beaucoup pour l'agriculture pour conditionner les sols et nourrir les plantes. Du point de vue mondial on utilise la tourbe deux fois plus dans l'agriculture que comme combustible. La production et l'utilisation dans le monde en 1971 ont été d'environ 195 mégatonnes.[6]

Historique de l'utilisation des combustibles fossiles solides

On a utilisé le charbon comme combustible depuis au moins 2000 ans, d'abord en Chine et probablement en même temps dans l'empire romain. Depuis l'an 1000 à 1200 de notre ère on s'en est servi d'abord en Europe, beaucoup plus tard en Amérique du Nord, et plus récemment dans le reste du monde, surtout au Japon, en Inde, en Australie et en Afrique du Sud. Dans les climats plus froids où l'on a toujours eu besoin de combustible pour se chauffer l'hiver, on s'est servi de bois dans la plupart des pays du monde. Cela a conduit à une dévastation rapide des forêts, surtout en Chine, dans les plaines du nord de l'Europe et dans la plus grande partie de l'est des Etats-Unis. Bien que le besoin de combustible était moins aigu dans les régions plus chaudes, il existait malgré tout, et le bois, le fumier et les déchets agricoles étaient en grande partie utilisés comme combustibles dans les régions tropicales et subtropicales.

De l'an 1000 à l'an 1200 on a utilisé le charbon, localement, à petite échelle, en Europe, pour le chauffage, et dans la métallurgie en guise de charbon de bois. Après 1200 l'extraction du charbon a augmenté très rapidement en Angleterre, en Ecosse et and continental Europe. The industry grew rather steadily thereafter as the demand for coal as a fuel for brick, glass, and ironmaking increased; by about 1550, England was by far the world's major producer and was then mining about 200 000 tonnes annually. Use for home heating was also increasing as a result of both deforestation and urbanization. As the Industrial Revolution developed, principally in England, in the 18th century, the stage was set for rapidly expanding use of coal in home and industry.

Until the mid-18th century, coal mining was almost exclusively a surface or near-surface activity. Coal was mined either from outcrops or from holes a few metres deep. As demand increased and surface outcrops were depleted, the industry moved underground to significant depths because near-surface strata were insufficiently strong to provide any modicum of safety. Only in the past 30 to 40 years has surface mining been resumed on a large scale as the result of recent technological advances in earth-moving equipment.

Hubbert[8] indicates that world consumption of solid fossil fuels in the modern era has historically increased at roughly 2% per year from about 1000 A.D. until 1860; during this long period, 500 to 7000 megatonnes were consumed worldwide. World consumption from 1860-1914 increased at an average rate of 4.4% per year, from 1915-1945 at 0.75% per year, and from 1946 to the present at about 3.6% per year. Darmstadter[9] has indicated that for the period 1950-1965 growth in solid-fuel production has been 2.9% per year on a mass basis but only 2.4% per year on an energy content basis because of increased world production of lignite and brown coal. United Nations data[7] indicate a further decline in growth rate from 2.0% per year for the period 1961-1970 to 1.2% per year from 1965-1970.

Thus, during the past millenium, the world has consumed approximately 130 000 megatonnes of solid fossil fuels. If, as is commonly assumed, losses and materials left in mines (e.g., as supports) are equal to the quantities consumed, about 260 000 megatonnes have already been withdrawn from the original total resource base. However, much of the 130 000 megatonne "loss" is undoubtedly still avail-

dans l'Europe continentale. Ensuite cette industrie s'est accrue d'une façon plutôt régulière parce que la demande en charbon pour la fabrication des briques, du verre et pour la sidérurgie augmentait; vers 1550 l'Angleterre était de loin le plus grand producteur de charbon du monde, elle extrayait environ 200 000 tonnes par an. Par suite de la dévastation des forêts et de l'urbanisation on utilisait aussi davantage de charbon pour chauffer les maisons. Quand eut lieu au XVIIIème siècle la révolution industrielle, surtout en Angleterre, l'essor fut donné pour un développement rapide de l'utilisation du charbon dans les habitations comme dans l'industrie.

Jusqu'au milieu du XVIIIème siècle l'extraction du charbon avait lieu presqu'uniquement à la surface du sol ou près de cette surface. Cela se faisait aux affleurements ou en creusant des trous de quelques mètres de profondeur. Comme la demande s'accroissait et que le charbon d'affleurement s'épuisait, l'extraction se fit plus profondément dans la terre car les strates se trouvant près de la surface n'étaient pas assez solides pour garantir la sécurité. Ce n'est qu'il y a 30 à 40 ans que l'on a recommencé l'extraction à ciel ouvert grâce aux progrès de la technologie en ce qui concerne les moyens de terrassements.

Hubbert[8] dit que la consommation mondiale de combustibles fossiles solides de l'ère moderne a augmenté d'environ 2% par an depuis environ l'an 1000 jusqu'à 1860; pendant cette longue période on a consommé dans le monde 500 à 7000 mégatonnes. La consommation mondiale a augmenté de 1860 à 1914 d'une moyenne de 4,4% par an, de 1914 à 1945 de 0,75% par an, et de 1946 à aujourd'hui d'environ 3,6% par an. Darmstadter[9] dit que de 1950 à 1966 la production de combustibles solides s'est accrue de 2,9% par an en masse, mais seulement de 2,4% par an au point de vue teneur en énergie, à cause de la production mondiale accrue de lignite et de houille brune. Les statistiques des Nations Unies[7] indiquent un autre déclin du taux de croissance allant de 2% l'an pour la période 1961-1970 à 1,2% l'an pour 1965-1970.

Ainsi pendant le dernier millénaire le monde a consommé approximativement 130 000 mégatonnes de combustibles fossiles solides. Si, ainsi qu'on le suppose généralement, les pertes et le matériel abandonné dans les mines (par exemple, pour servir de supports) sont égaux aux quantités consommées, 260 000 mégatonnes ont déjà été retirées du total original des ressources. Mais sans aucun doute une grande partie des 130 000 mégatonnes de "pertes"

Table III-2. Comparison of Coal and Lignite Production in 1925 and 1971
Tableau III-2. Comparaison des productions de charbon et de lignite en 1925 et en 1971

Nation *Pays*	Annual Production (Megatonnes) *Production annuelle en mégatonnes*	
	1925[1]	1971[2]
United States	528	510
Germany	286	482*
United Kingdom	247	147
France	48	35
Japan	32	34
Czechoslovakia	31	113
Poland	29	180
Belgium	23	12
China	24	410
USSR	22	620
India	21	73
Australia	15	73
South Africa	12	61
Canada	12	18
Spain	7	14
Hungary	6	28
Yugoslavia	4	31
Romania	3	22
Bulgaria	1	28
Turkey	<1	32
Korea	<1	32**
Greece	<1	11
Total	1348	3029
World Total	1381	3069

*Includes East and West Germany
**Includes North and South Korea

[1] J. Darmstadter, et al, *Energy in the World Economy*
[2] *Mineral Yearbook, 1971*, U.S. Bureau of Mines

able and may be partly recovered in the future as solid-fuel prices increase and recovery technology advances.

About two-thirds of all solid fossil fuels ever consumed have been mined in the period from 1925 to the present. In the pre-1925 period, three nations—the United States, the United Kingdom, and Germany— accounted for about 80% of all coal and lignite mined to that date. As indicated in Table III-2, the 1925 production in these nations accounted for 76% for world production,[9] and they were the only nations producing more than 100 megatonnes annually. In 1925 an additional 14 nations, half of which were in Europe, were producing 10 megatonnes or more annually.

existe toujours et peut être récupérée en partie dans l'avenir à la suite de l'augmentation des prix des combustibles solides et grâce aux progrès de la technologie d'extraction.

Environ deux tiers de tous les combustibles fossiles solides consommés ont été extraits entre 1925 et aujourd'hui. Avant 1925 trois pays—les Etats-Unis, le Royaume-Uni et l'Allemagne—ont extrait 80% de la totalité du charbon et du lignite. Comme le montre le tableau III-2 la production de ces pays en 1925 a représenté 76% de la production mondiale[9] et ce sont les seuls pays qui ont produit plus de 100 mégatonnes par an. En 1925, quatorze autres pays, dont la moitié se trouvent en Europe, ont produit 10 mégatonnes ou davantage par an.

By 1971, eight nations were producing over 100 megatonnes/year and 23 were annually mining 10 or more megatonnes. Production from these 31 nations accounted for 98% of world production. In the period since 1925, the greatest gains in production were made by the USSR, Peoples' Republic of China, the countries of eastern Europe, India, Australia, and South Africa. Moderate gains or slight losses in production occurred in the United States, Canada, Germany, Japan, and Spain; and large decreases have been experienced in western Europe, particularly in the United Kingdom, France, and Belgium. Static or decreasing national production has been attributable to two factors: (1) depletion of resources and (2) very large increases in the use of domestic or imported oil and natural gas; the degree of importance of these two factors varies significantly from nation to nation.

Characteristics and Specifications of Solid Fossil Fuels

The wide variety in the characteristics of the various solid fossil fuels and their geological attributes has led to the development of detailed specifications on their description, acquisition and use. Unlike crude oil and natural gas, where common standards are relatively uniform throughout the world, standards for solid fossil fuels vary considerably from one nation or region to another. Common world standards for oil are the result of the very large world trade in petroleum. Except in Europe, international trade in peat, lignite, and the various types of coal is relatively small, and regional standards have generally sufficed. Differences in solid fossil fuel standards are also the result of varying economic factors in exploitation of such resources in different geographical locations.

The two geological structural characteristics that determine whether or not a solid fossil fuel seam is of economic interest in a particular country or area are seam thickness and depth of the deposit. Further, undisturbed, nearly horizontal beds are generally more desirable than steeply dipping and/or highly faulted seams. Few beds less than 0.3 metre thick are of economic value anywhere in the world, and deposits more than 1000 metres deep are not generally exploited. Fortunately, on a worldwide

En 1971 huit pays ont produit plus de 100 mégatonnes par an et 23 pays ont extrait 10 mégatonnes ou davantage par an. La production de ces 31 pays a représenté 98% de la production mondiale. Depuis 1925 la production a augmenté surtout en URSS, dans la République Populaire de Chine, dans les pays de l'Europe de l'Est, en Inde, en Australie et en Afrique du Sud. Des augmentations modérées ou de légères diminutions de la production ont eu lieu aux Etats-Unis, au Canada, en Allemagne, au Japon et en Espagne, et de grandes diminutions ont été constatées dans l'Europe occidentale, surtout au Royaume-Uni, en France et en Belgique. On attribue la production nationale statique ou décroissante à deux facteurs : l'épuisement des ressources, et de très grandes augmentations de l'utilisation de pétrole et de gaz naturel du pays ou importés. Le degré d'importance de ces deux facteurs varie beaucoup d'un pays à l'autre.

Caractéristiques et spécifications des combustibles fossiles solides

La grande variété des caractéristiques des divers combustibles fossiles solides et de leurs traits géologiques ont amené à donner des spécifications détaillées pour leur description, leur obtention et leur utilisation. Contrairement au pétrole brut et au gaz naturel dont les normes générales sont relativement uniformes dans le monde entier, les normes des combustibles fossiles solides varient considérablement d'un pays ou d'une région à l'autre. Des normes mondiales communes pour le pétrole brut sont le résultat du très grand commerce mondial du pétrole. Sauf en Europe, le commerce international de la tourbe, du lignite et des divers types de charbon est relativement petit et les normes régionales suffisent généralement. Les différences entre les normes des combustibles fossiles solides proviennent aussi des divers facteurs économiques de l'exploitation de ces ressources dans les différents lieux géographiques.

Les deux caractéristiques de structure géologique qui déterminent si un gisement de combustibles fossiles solides est ou n'est pas économiquement intéressant dans un certain pays ou dans une certaine région, sont l'épaisseur du gisement et sa profondeur dans la terre. En outre, des couches presqu'horizontales non fracturées sont généralement plus souhaitables que des veines très inclinées et/ou des veines en très mauvais état. Peu de gisements de moins de 0,3 m d'épaisseur ont une valeur économique partout dans le monde et ceux se trouvant à plus de 1000 m de profondeur ne sont généralement pas exploités. Heureusement, dans le monde basis coal is more prevalent near the surface, and geological exploration indicates that the large preponderance of all coal is at a depth less than 1200 metres. Thick, flat (horizontal), near-surface beds of coal and lignite are most prized because they can be surface mined. Resource location is also of importance. Deposits near major energy markets are favored since transportation of coal is relatively costly. However, this factor can be overcome to some degree through construction of large coal-burning electric power station complexes at the mines and use of advanced methods for the transmission of the electricity produced.

Actual minimum seam thicknesses and maximum depths currently regarded as economically exploitable in the various reporting nations and their subdivisions are reported in Appendix 2, and Table III-12 at the end of this chapter.

Five major solid fossil fuel ranks—peat, lignite (and brown coal), subbituminous, bituminous, and anthracite—are recognized throughout the world. The continuous gradations from the lowest (peat) to the highest (anthracite) rank make assignments of unambiguous ranking to marginal samples difficult, and because national definitions of rank vary, there is, in reality, no worldwide standard. All solid fossil fuels are generally characterized according to total or fixed carbon, volatile matter, moisture, and ash content; total sulfur contamination; and unit heat content. National and regional standards differ according to where the limits are set on the above characteristics between ranks and on the basis of measurements, e.g., ash and moisture containing or free. Significant quantities of solid fossil fuels are also used for nonfuel purposes, and special standards are imposed for such uses. For example, agglomerating or caking qualities are measured for bituminous coals to determine their cokemaking qualities for use by the iron and steel industry. Such standards are less severe than formerly because of increased use of coal blending. Nitrogen content, porosity, and other characteristics of peat are a measure of its suitability for use in agriculture, the chief use of this material.

le charbon existe le plus souvent près de la surface et l'exploration géologique indique que le charbon se trouve surtout à une profondeur inférieure à 1200 m. Les gisements de charbon et de lignite épais, plats (horizontaux) et près de la surface sont les plus recherchés car on peut les exploiter à ciel ouvert. L'emplacement de la ressource est aussi d'importance. Les gisements se trouvant près des grands marchés d'énergie sont préférables car le transport du charbon revient relativement cher. Mais on peut remédier en quelque sorte à ce facteur par la construction à proximité des mines de grandes centrales électriques brûlant du charbon, et en utilisant des méthodes avancées pour le transport de l'électricité produite.

On trouvera à l'annexe 2 et au tableau III-12 à la fin de ce chapitre les épaisseurs minima réelles des gisements et leurs profondeurs maxima considérées généralement comme économiquement exploitables, pour chacun des divers pays rapporteurs et selon les subdivisions nationales qu'ils ont données.

On connait dans le monde cinq types principaux de combustibles fossiles solides : la tourbe, le lignite (et la houille brune), les subbitumineux, les bitumineux et les anthracites. Les classifications nombreuses, du type inférieur (tourbe) au type supérieur (anthracite), rendent difficile l'attribution à un type bien caractérisé d'échantillons marginaux et, comme les définitions nationales de types varient, il n'y a en réalité pas de normes mondiales. Tous les combustibles fossiles solides sont géneralement caractérisés selon le carbone total ou fixe, les matières volatiles, l'humidité et la teneur en cendres, la teneur totale en soufre, et le pouvoir calorifique. Les normes nationales et régionales diffèrent selon les limites fixées par les caractéristiques, mentionnées plus haut, des types, et sur la base des mesures, par exemple ayant des cendres et de l'humidité ou n'en ayant pas. Des quantités importantes de combustibles fossiles solides sont aussi utilisées sans servir pour cela de combustible, et alors des normes spéciales leur sont imposées. Par exemple les qualités d'agglomération ou d'agglutination sont mesurées pour les charbons bitumineux afin de déterminer leurs propensions à faire du coke pour la sidérugie. Ces normes sont moins impératives qu'autrefois à cause de l'emploi accru de mélanges de charbons. La teneur en azote, la porosité et les autres caractéristiques de la tourbe permettent de savoir si elle peut servir dans l'agriculture qui constitute l'utilisation principale de la tourbe.

Definitions of rank by carbon, volatile matter, and ash and moisture content for those nations reporting such data are provided in Table 2A of Appendix 2; in addition, further definitions based on heat content and other characteristics are given in the notes of Table 2C of Appendix 2. In the United States and Canada and in a number of other developed nations, the standards defined by the American Society for Testing and Materials (ASTM)[10] are widely used. These standards are summarized in the first seven columns of Table III-3; only the italicized values are parts of the standards.

The ASTM classification divides solid fossil fuels not only into four classes (excluding peat) but further subdivides each class into two to five groups. Anthracitic and high-ranking bituminous coals are specified according to fixed carbon and (by difference) volatile matter content, whereas high-volatile bituminous coals, subbituminous coal, and lignite are specified according to heat content. When solid fuels are specified on a carbon and volatile matter basis, analysis is made on an ash- and moisture-free basis; however, heat content for lower ranking fuels is specified for naturally moist, ash-free fuel. Fixed carbon content decreases and volatile matter increases as rank decreases. Heat content is greatest for bituminous coals and decreases thereafter.

As an illustration of how standards differ from one nation or region to another, Table III-4 provides data from Hodgkins[11] on Russian coals. In general the same classes and groups of coals are recognized. However, total rather than fixed carbon is measured, volatile matter is designated both as total volatiles and hydrogen content, and heat values are on a moisture- and ash-free basis, versus the moist but ash-free basis used in the ASTM standards. Table III-4 also provides ranges of as-mined and dried coal moisture content and ranges of ash and sulfur content. All data for anthracite and bituminous coals are for Donets basin coal, the Russian standard for these ranks. Data on subbituminous coal and lignite are from four other major coal basins.

The parenthesized values in Table III-3 are additional data from Averitt[12] supplied to supplement

Les définitions des types selon les teneurs en carbone, en matières volatiles, en cendres et en humidité des pays rapporteurs sont données au tableau 2A de l'annexe 2; d'autres définitions basées sur le pouvoir calorifique et d'autres caractéristiques sont indiquées dans les notes du tableau 2C de l'annexe 2. Aux Etats-Unis et au Canada, ainsi que dans un certain nombre d'autres pays développés on utilise beaucoup les normes définies par l'American Society for Testing and Materials (ASTM)[10]. Ces normes sont indiquées au tableau III-3; seuls les chiffres en italiques suivent ces normes.

La classification ASTM répartit les combustibles fossiles solides en quatre classes (à l'exception de la tourbe), et chaque classe est divisée en deux à cinq groupes. Les anthracites et les charbons de qualité élevée sont répartis selon leur teneur en carbone fixe et (par différence) en matières volatiles, tandis que les charbons bitumineux très volatiles, les subbitumineux et les lignites, sont répartis selon leur pouvoir calorifique. Quand les combustibles solides sont répartis d'après leur teneur en carbone et en matières volatiles, l'analyse est faite sans tenir compte des cendres et de l'humidité; toutefois le pouvoir calorifique pour les combustibles de types inférieurs est spécifié pour des combustibles n'ayant ni humidité naturelle ni cendres. La teneur en carbone fixe diminue et les matières volatiles augmentent quand la qualité diminue. Le pouvoir calorifique atteint son maximum dans les charbons bitumineux et décroît ensuite.

Pour illustrer comment les normes diffèrent d'un pays ou d'une région à l'autre le tableau III-4 fournit les données de Hodgkins[11] sur les charbons russes. En général on retrouve les mêmes classes et groupes de charbon. Toutefois c'est le total plutôt que le carbone fixe qui est mesuré; les matières volatiles sont indiquées à la fois quant au total des matières volatiles et quant à la teneur en hydrogène, et les pouvoirs calorifiques sont donnés sans tenir compte des cendres, ou bien en fonction de l'humidité mais sans tenir compte des cendres selon les normes ASTM. Le tableau III-4 donne aussi la teneur en humidité de charbon à l'extraction et de charbon sec; ainsi que les teneurs en cendres et en soufre. Tous les chiffres concernent les anthracites et les charbons bitumineux du bassin houiller du Donets selon la norme russe. Les chiffres concernant les bitumineux et le lignite sont ceux des quatre autres principaux bassins houillers.

Les chiffres entre parenthèses du tableau III-3 sont des données supplémentaires d'Averitt[12]

Table III-3. American Society for Testing and Materials Specifications for Solid Fuels, excluding Peat

Tableau III-3. Spécifications de l'American Society for Testing and Materials pour les combustibles solides, à l'exception de la tourbe

Class	Group Name	Group Symbol	Fixed Carbon Dry[1] %	Fixed Carbon Moist[2] %	Volatile Dry[1] %	Matter Moist[2] %	Natural Moisture[4] %	Heating Values Dry Basis[1] (kcal/kg)	Heating Values Dry Basis[1] (MJ/kg)	Heating Values Moist Basis[2] (kcal/kg)	Heating Values Moist Basis[2] (MJ/kg)
I Anthracite	1. Meta-anthracite	ma	>98	>92	<2	<2	6	7740	32.4	7500	31.4
	2. Anthracite	an	92–98	89–95	2–8	2–8	3	8000	35.5	8000	35.5
	3. Semianthracite	sa	86–92	81–89	8–14	8–15	3	8300	34.7	8275	34.6
II Bituminous	1. Low-volatile	lvb	78–86	73–81	14–22	13–21	5	8741	36.6	8550	35.8
	2. Medium volatile	mvb	69–78	65–73	22–31	21–29	7	8640	36.2	8275	34.6
	3. High-volatile A	hvAb	<69	58–65	>31	>30	5	8160	34.2	>7775	>32.5
	4. High-volatile B	hvBb	57	53	57	40	7	6750–8160	28.3–34.2	7220–7775	30.2–32.5
	5. High-volatile C	hvCb	54	45	54	40	16	7410–8375	31.0–35.1	6387–7220	26.7–30.2
								6765–7410	28.3–31.0	5832–6387	24.4–26.7
III Subbituminous	1. Subbituminous A	subA	55	45	55	38	18	6880–7540	28.8–31.6	5832–6837	24.4–26.7
	2. Subbituminous B	subB	56	43	56	35	24	6540–7230	27.4–30.3	5276–5832	22.1–24.4
	3. Subbituminous C	subC	53	37	53	36	30	5990–6860	25.1–28.7	4610–5276	19.3–22.1
IV Lignite	1. Lignite A	ligA	52	32	52	35	38	4830–6360	20.2–26.6	3500–4610	14.7–19.3
	2. Lignite B	ligB	52	26	52	32	50	<5250	<22.0	<3500	<14.7

[1] Dry, mineral matter free basis

[2] Naturally moist, mineral matter free basis

[3] *High volatile C Bituminous coal with heating values between 5830 to 6390 kcal/kg is always agglomerating. All other bituminous coals are commonly agglomerating. Anthracite and subbituminous coal and lignite are non-agglomerating*

[4] P. Averitt, *Coal Resources of the United States* (Ref. 12)

Table III-4. Typical Characteristics of Russian Solid Fossil Fuels, excluding Peat[1]

Tableau III-4. Caractéristiques typiques des combustibles fossiles solides russes, à l'exclusion de la tourbe

Class	Group Name	Group Symbol	Total Carbon %	Volatile Matter %	Hydrogen %	Heating Values kcal/kg	Heating Values MJ/kg	Moisture Content As Mined	Moisture Content Dry	Ash Content %	Sulfur Content %
Anthracite	Anthracite	A	89.4–96.4	2–7	1.2–3.0	7950–8350	33.3–35.0	3.5–9.0	2	7.0–19.0	1.0–5.0
	Semianthracite	T	88.0–92.4	8–15	3.8–4.6	8300–8650	34.7–36.2	3.0–6.5	0.4–1.8	4.3–25.0	0.9–6.0
Bituminous	Dry Steam	PS	87.1–91.2	13–18	3.9–5.1	8300–8700	34.7–36.4	3.0–6.5	0.8	5.0–20.0	0.8–3.6
	Coking	K	86.7–90.7	18–26	4.0–5.4	8450–8750	35.4–36.6	3.0–12.0	1.0	5.0–21.0	0.9–4.9
	Fatty Steam	Pzh	82.4–87.0	24–35	4.5–5.5	8250–8600	34.5–36.0	3.0–8.0	0.4–2.1	2.0–31.0	1.0–6.0
	Gassy	G	78.4–82.9	35–44	5.0–5.8	7650–8400	32.0–35.2	3.0–12.0	1.0–4.8	3.0–32.0	1.3–7.5
	Dry Long Flame	D	74.0–79.2	40–46	5.1–5.7	7400–7900	31.0–33.1	9.5–21.0	3.1–7.5	6.0–27.0	1.4–6.0
	Dnepr Basin	B	57.3–69.0	41–60	5.2–6.6	4380–6921	18.3–29.0	50.5–55.6		14.5–27.9	1.0–5.6
Subbituminous and Lignite	Kansk-Achinsk	B	67.0–75.0	45–50	1.6–9.6	6500–6800	27.2–28.5	32.0–42.0	12.0–25.0	7.0–20.0	0.8
	Moscow Basin	B	69.2–79.4	48–86	5.5–10.2	>4060	>17.0	7.9–31.8		5.7–40.9	1.0–4.5
	Irkutsk Basin	B	69.0–77.0	50–55	6.5–7.0	7000–7200	29.3–30.1	25.0–28.0	12.0	12.0–45.0	1.0–2.0

[1] From S. A. Hodgkins, *Soviet Power: Energy Resources, Production and Potential* (Ref 11)

the ASTM scheme and to improve the ease of comparison with Russian standards. This is particularly pertinent in comparing heat values.

In addition to the standards used for establishing the rank of solid fossil fuels, designation of grade or purity is also of considerable importance. Standards for these characteristics, which include amount of moisture, ash and sulfur content, and density, are even less well established. The densities of lignite, subbituminous, and bituminous coals vary from 1.14 to 1.51 grams/cm^3 and average about 1.3: the density of anthracite varies from 1.3 to 1.7 grams/cm^3 and averages 1.47. Sulfur content of mined coals varies from 0.3 to 7.7% and averages 1.9%; because of increasingly stringent sulphur dioxide emission standards on the use of coal, low sulfur coals are in increasing demand. The ash content of coal mined in the United States has varied from 2.5 to 32.6% and now averages about 9.8%. Only a small amount of coal containing over 20% ash is now mined. Finally, the natural moisture content of solid fossil fuels varies from 3 to 7% for anthracite and most bituminous coals and then increases uniformly to an average of about 50% in Lignite B.

Peat occurs in bogs in poorly drained areas in regions of relatively cool climate and high humidity. Reclamation is usually accomplished by draining the bogs to remove the bulk of free-standing water and removing the peat by manual or mechanized methods. The recovered peat is then air dried. When completely dried, it usually contains not less than 50% organic matter and 25% or less moisture. Because peat contains about 2% nitrogen and has high porosity, it is of value as a low grade fertilizer and/or soil conditioner as well as a low grade fuel.

Chemical analysis of coal and lignite is seldom conducted or reported because of the limited need for this information in the normal uses of coal. Table III-5[13] compares the average composition for 14 elements in plants with that in an average bituminous coal and indicates whether the various elements are enriched or depleted in the coal-forming process. The elements in coal ash appar-

fournies pour compléter le schéma ASTM et pouvoir faire une meilleure comparaison avec les normes russes. Ils servent en particulier à comparer les pouvoirs calorifiques.

En plus des normes utilisées pour établir les types des combustibles fossiles solides, leur désignation selon la pureté est aussi d'une importance considérable. Les normes pour ces caractéristiques, qui englobent la quantité d'humidité, les teneurs en cendres et en soufre et la densité sont cependant moins bien établies. Les densités des lignites, des charbons subbitumineux et bitumineux varient de 1,14 à 1,51 gr/cm^3, soit une moyenne d'environ 1,3; la densité de l'anthracite varie de 1,3 à 1,7 gr/cm^3, soit une moyenne de 1,47. La teneur en soufre des charbons extraits des houillères varie de 0,3 à 7,7%, soit une moyenne de 1,9%; à cause des normes toujours plus rigoureuses des émissions d'anhydride sulfureux dans l'utilisation du charbon, les charbons à faible teneur en soufre sont de plus en plus demandés. La teneur en cendres du charbon extrait aux Etats-Unis a varié de 2,5 à 32,6% et atteint maintenant une moyenne de 9.8%. On n'extrait maintenant qu'une petite quantité de charbon contenant plus de 20% de cendres. Enfin, la teneur en humidité naturelle des combustibles fossiles solides varie de 3 à 7% pour l'anthracite et les charbons les plus bitumineux, et elle augmente d'une façon uniforme pour atteindre une moyenne d'environ 50% de lignite B.

On trouve de la tourbe dans des marécages, dans des régions peu drainées, avec un climat relativement froid et beaucoup d'humidité. La récupération se fait habituellement en drainant les marécages pour enlever la masse de l'eau libre stagnante ainsi que la tourbe par des méthodes manuelles ou mécanisées. La tourbe récupérée est alors séchée à l'air. Quand elle est tout à fait sèche elle contient généralement encore 50% de matières organiques et 25% ou moins d'humidité. Parce que la tourbe contient environ 2% d'azote et a une porosité élevée, c'est un bon engrais bien que de qualité inférieure et/ou un facteur de conditionnement du sol ainsi qu'un combustible de qualité inférieure.

On fait rarement l'analyse chimique du charbon et du lignite, et les pays rapporteurs en ont peu parlé parce que cette information est peu nécessaire pour les utilisations normales du charbon. Le tableau III-5[13] compare la composition moyenne de 14 éléments constitutifs des plantes à celle d'un charbon bitumineux moyen, et il indique si les divers éléments augmentent ou diminuent dans le processus de formation du charbon. Les éléments

Table III-5. Average Analysis of Typical Plant Material, and Bituminous Coal Containing 7.3% Ash

Tableau III-5. Analyse moyenne des vestiges typiques de plantes, et du charbon bitumineux contenant 7,3 % de cendres

Element *Elément*	Original Plant Material % *Vestiges de plantes à l'origine %*	Average Bituminous Coal % *Charbon moyennement bitumineux %*
Carbon	45.0	80.0
Oxygen	43.0	5.0
Hydrogen	5.5	5.0
Nitrogen	2.1	1.5
Sulfur	0.1	1.0
Phosphorus	0.2	0.2
Subtotal	95.9	92.7
Potassium	1.80	3.20
Chlorine	0.60	0.30
Silicon	0.55	1.00
Calcium	0.38	0.67
Magnesium	0.18	0.20
Sodium	0.14	0.25
Iron	0.03	0.05
Aluminum	0.02	0.03
Other	0.40	1.50
Subtotal	4.10	7.30

Source of data: H. J. M. Bowen, *Trace Elements in Biochemistry*

ently come partly from the original plant material and partly from addition of occluded rock material or absorbed elements.

Table III-6[13] compares the trace element content of coals with the average content in shales and igneous rocks. Only those elements with greater concentration in coal than in ordinary rocks are listed. This information is important for two reasons: (1) it indicates those elements for which coal or coal ash may become a resource in the future, and (2) it points out certain toxic elements such as beryllium which, because they are more concentrated, may cause additional pollution problems.

trouvés dans les cendres de charbon proviennent apparemment en partie de l'élément ayant constitué la plante et en partie de l'addition de matières rocheuses ou d'éléments absorbés.

Le tableau III-6[13] compare la teneur en éléments sous forme de traces dans les charbons avec la teneur moyenne dans les schistes et les roches ignées. Il n'y figure que les éléments avec de plus grandes concentrations dans le charbon que dans les roches ordinaires. Ces informations sont importantes pour deux raisons : 1°) elles indiquent les éléments qui peuvent faire du charbon une ressource pour l'avenir, et 2°) elles montrent la présence de certains éléments toxiques tels que le beryllium qui, parce qu'ils sont plus concentrés, causent des problèmes supplémentaires de pollution.

Table III-6. Average Trace Elements Content of Coal and Rocks

Tableau III-6. Tenneur moyenne des éléments contenus sous forme de traces dans le charbon et les roches

Element *Elément*	Coal, ppm *Charbon (ppm)*	Shale, ppm *Schistes (ppm)*	Igneous Rock ppm *Roches ignées (ppm)*
Arsenic	25	13	1.8
Barium	1–3000	580	425
Beryllium	0.1–1000	3	2.8
Boron	100–1000	100	10
Copper	300	45	55
Germanium	25–3000	1.6	5.4
Gold	≤0.125	0.005	0.004
Iodine	6	2.2	0.5
Lanthanum	≤1000	20	30
Molybdenum	10	2.6	1.5
Platinum	≤0.035		0.005
Selenium	≤7	0.6	0.05
Strontium	1000	300	375
Tin	10	6	2
Uranium	1–200	3.7	2.7
Zirconium	≤250	160	165

Source of Data: H. J. M. Bowen, *Trace Elements in Biochemistry*

Solid Fossil Fuel Resources and Present Production

Of all the world's nonrenewable mineral commodities, the resources of few are as well understood and readily estimated as those of the solid fuels. This is because the geology of coal is relatively simple and uniform over wide areas and the deposits are generally near the earth's surface. Consequently, data on coal resources are more universally accepted among the experts than those of other fuels and are less subject to revision from one time to another. At the same time, the amounts are relatively changeable for currently exploitable reserves of the solid fossil fuels. In this category there are extensive revisions in reported values because of shifts in the relative economics of competitive fuels, advances in mining and transport technology, variations in the imposition of environmental controls, movements of population and markets, and various other factors.

In this section current world estimates of both resources and reserves and of recent annual pro-

Ressources en combustibles fossiles solides et production actuelle

De tous les produits minéraux pouvant s'épuiser dans le monde, peu de ressources sont aussi bien connues et facilement évaluées que celles des combustibles solides. C'est parce que la géologie du charbon est relativement simple et uniforme sur de vastes régions, et que les gisements sont généralement près de la surface du sol. En conséquence les experts du monde entier acceptent plus facilement les chiffres des ressources en charbon que ceux des autres combustibles, et on est moins souvent obligé de les réviser. Parallèlement les quantités des réserves, couramment exploitables, des combustibles fossiles solides sont relativement variables. Dans cette catégorie il y a des révisions importantes des chiffres figurant dans les rapports à cause des changements dans l'économie relative de combustibles à prix compétitifs, à cause des progrès de la technologie de l'extraction et du transport, à cause des conditions variables imposées pour l'environnement, à cause des mouvements des populations et des marchés et en raison de divers autres facteurs.

Dans cette section nous étudierons les estimations mondiales actuelles des ressources et des réserves, et de la production annuelle récente des duction of the solid fossil fuels are discussed, based on reports obtained from 59 countries, of which 49 indicated the existence of economic or near-economic resources and reserve of solid fuels. Data for about 25 other nations having solid fuel resources are also included from the 1968 WEC report or from later references.

Essentially all new data obtained by return of the questionnaires from the various reporting nations are tabulated in the tables, references, and notes of Appendix 2. In a few instances where very detailed information was supplied, a certain amount of consolidation was necessary in preparing these tabulations. The data in Appendix 2 for reporting nations and their geographical subdivisions, when used, include data on total and recoverable reserves and additional resources of the several ranks of solid fossil fuels. Information on the maximum depths of deposits and minimum seam thicknesses currently considered economically exploitable is also included along with the fraction of reserves which is of coking quality, the fraction capable of being surface mined, semiquantitative designation of sulfur content and heat value, and data on recent annual production. Further discussion of these characteristics of solid fuels is provided in the introduction to Appendix 2. In the absence of official resource and production data from the Peoples' Republic of China, which has very substantial resources, estimates have been obtained from the German Institute of Economic Research in West Berlin. Official national replies plus the aforementioned independent estimate on China represent new data for about 98% of the solid fuel resources of the world.

The data of Appendix 2 are summarized in Table III-12 at the end of this chapter, where national resource and reserve totals for the various ranks of solid fuels are tabulated for reporting countries. Data for other countries, and supplementary data for reporting countries, are also included in Table III-12 with appropriate references to source materials. The 1968 WEC report was used as the source of this additional data except where more recent data were available from other references. In Appendix 2 only national totals are provided; in Table III-12, regional, continental, and world totals have been determined and presented.

combustibles fossiles solides selon les renseignements envoyés par 59 pays, dont 49 ont indiqué l'existence de ressources et de réserves de combustibles solides économiques ou presque économiques. On y a inclus aussi les chiffres fournis par 25 autres pays ayant d'importantes ressources en combustibles pour l'enquête de 1968 de la CME ou pour d'autres études faites par la suite.

Toutes les nouvelles informations obtenues grâce aux divers pays ayant répondu au questionnaire sont indiquées dans les tableaux, les références et les notes de l'annexe 2. Dans certains cas des renseignements très détaillés ont été fournis et il a fallu faire des synthèses pour préparer ces tableaux. Les informations données à l'annexe 2 pour les pays rapporteurs et leurs subdivisions géographiques, lorsqu'elles sont utilisées, comprennent des chiffres sur les réserves totales et récupérables et sur les ressources additionnelles des divers pays de combustibles fossiles solides. On y a compris aussi les informations sur les profondeurs maxima des gisements et les épaisseurs minima des veines considérées communément comme économiquement exploitables, ainsi que la fraction des réserves de qualité cokéfiable et la fraction pouvant être exploitée à ciel ouvert, la désignation semi-quantitative de la teneur en soufre et du pouvoir calorifique, et les chiffres de la production annuelle récente. Dans l'introduction de l'annexe 2 on trouve d'autres commentaires sur ces caractéristiques des combustibles solides. En l'absence de chiffres officiels des ressources et de la production de la part de la République Populaire de Chine, qui a des ressources très importantes, nous avons obtenu des estimations détaillées par l'Institut Allemand de Recherche Economique de Berlin Ouest. Les réponses officielles des pays ainsi que les chiffres sur la Chine obtenus par voies indirectes représentent les dernières estimations pour environ 98% des ressources en combustibles solides du monde.

Les chiffres de l'annexe 2 sont résumés dans le tableau III-12 à la fin de ce chapitre où figurent les totaux des ressources et des réserves nationales pour les divers types de combustibles solides des pays rapporteurs. Les chiffres des autres pays et les chiffres supplémentaires des pays rapporteurs sont aussi compris dans le tableau III-12 avec indication des sources de renseignements. L'enquête 1968 a été utilisée comme source de ces chiffres supplémentaires sauf quand des chiffres plus récents ont été fournis par d'autres sources. A l'annexe 2 on ne donne que les totaux par pays et dans le tableau III-12 les totaux régionaux, continentaux et mondiaux.

In Table III-12 the reported minimum seam thicknesses and maximum depths of presently economically exploitable deposits are also listed. As indicated, all resource data from the 1968 WEC report are on the basis of 0.3-metre thickness and 1200-metre depth for higher ranking fuels (anthracite, bituminous, and subbituminous coal), 0.3-metre thickness and 500-metre depth for lower ranking fuels (brown coal and lignite), and 0.5-metre seam thickness for peat.

The approximate total energy contents of all solid fuels are given in Table III-12 in both gigacalories (millions of kilocalories) and gigajoules (GJ). These data were determined for reported or estimated recoverable reserves. In those instances where the recoverable fractions of total reserves were not reported in the present survey, the percentage recoverable as reported in the 1968 WEC report was used; when no data were available, 50% of total reserves was assumed recoverable. In the current survey, high (H), medium (M), and low (L) unit heat contents were requested only semiquantitatively as follows:

H = greater than 30 MJ/kg (>7167 kcal/kg)
M = 20 to 30 MJ/kg (4778 to 7167 kcal/kg)
L = less than 20 MJ/kg (<4778 kcal/kg)

Thus, total energy reported in Table III-12 for each nation and rank of solid fuel was based on unit heat contents given in the 1968 WEC report (or in a few cases in the current survey) or on the following approximate values:

AN 33.5 MJ/kg (8000 kcal/kg)
BT 29.3 MJ/kg (7000 kcal/kg)
SB 25.1 MJ/kg (6000 kcal/kg)
(HC) 29.3 MJ/kg (7000 kcal/kg)
BC 14.7 MJ/kg (3500 kcal/kg)
LN 14.7 MJ/kg (3500 kcal/kg)
P 8.4 MJ/kg (2000 kcal/kg)
(LC) 14.7 MJ/kg (3500 kcal/kg)

modified, where necessary to meet the new high-medium-low- heat content categorization.

Finally, Table III-12 provides values of recent annual production, either from the reports of the

Dans le tableau III-12 sont indiquées aussi les épaisseurs minima et les profondeurs minima des veines appartenant à des gisements considérés actuellement comme économiquement exploitables. Tous les chiffres des ressources provenant de l'enquête 1968 de la CME ont pour base 0,3 m d'épaisseur et 1200 m de profondeur pour les combustibles de qualité supérieure (anthracite, charbon bitumineux et subbitumineux), 0,3 m d'epaisseur et 500 m de profondeur pour les combustibles de qualité inférieure (houille brune et lignite) et 0,5 m d'épaisseur pour la tourbe.

Les totaux approximatifs de la teneur en énergie de tous les combustibles solides sont donnés au tableau III-12 à la fois en gigacalories (millions de kcal) et en GJ (gigajoules). Ces chiffres ont été déterminés pour les réserves indiquées ou les réserves estimées récupérables. Dans les cas où la fraction récupérable des réserves totales n'a pas été fournie pour la présente enquête, on a donné le pourcentage récupérable de l'enquête de la CME de 1968; quand aucun chiffre n'a été fourni on a supposé que 50% des réserves totales sont récupérables. Dans la présente enquête, les pouvoirs calorifiques élevés (H), moyens (M) et bas (L) n'ont été demandés que d'une façon semi-quantitative, comme suit :

H = plus grand que 30 MJ/kg (>7167 kcal/kg)
M = 20 à 30 MJ/kg (4770 à 7167 kcal/kg)
L = moins de 20 MJ/kg (<4778 kcal/kg)

Ainsi l'énergie totale indiquée dans le tableau III-12 pour chaque pays et pour chaque type de combustible solide a été basée sur les pouvoirs calorifiques donnés pour l'enquête 1968 de la CME (ou dans peu de cas pour la présente enquête), quand on les connaissait, ou en utilisant les valeurs approximatives suivantes :

AN 33,5 MJ/kg (8000 kcal/kg)
BC 14,7 MJ/kg (3500 kcal/kg)
BT 29,3 MJ/kg (7000 kcal/kg)
LN 14,7 MJ/kg (3500 kcal/kg)
SB 25,1 MJ/kg (6000 kcal/kg)
P 8,4 MJ/kg (2000 kcal/kg)
(HC) 29,3 MJ/kg (7000 kcal/kg)
(LC) 14,7 MJ/kg (3500 kcal/kg)

modifiées si nécessaire pour correspondre à la nouvelle classification élevés, moyens et bas.

Enfin le tableau III-12 donne les chiffres de production de l'année la plus récente connue, tels qu'ils ont été indiqués soit par les pays rapporteurs, various nations or from "Mineral Yearbook, 1971" which gives data for that year.

Data on peat resources and production are reported separately in Table III-12A. In the 1968 WEC survey, data on peat resources were specifically solicited from the various nations; in the current survey, the request for data on peat was less specific than in earlier surveys and fewer nations reported on this resource.

In Table III-12 and III-12A, only those nations are listed for which quantitative data on resources and/or annual production are available. Nations reporting negligible (N) resources or for which data is unknown (U) or no known resources exist (0) are listed at the end of each table. In particular, annual production estimates are available for North Korea, North Vietnam, Mongolia, and Albania, but resource data are not available for these nations.

World Summary

The results of the present survey (including estimates from other sources for nonreporting countries) indicate that current estimates of known world resources of solid fossil fuels now total 10.8 million megatonnes. The current survey also shows that there are 1.4 million megatonnes in total economic reserves, of which 0.6 million megatonnes are now considered to be recoverable under conditions of present technology and prizes. These data are summarized in Table III-7 by continents and nations with major resources.

The vast bulk of all solid fuel resources exists in areas above 30°N latitude, principally in three countries—the USSR, the United States, and the Peoples' Republic of China—which together account for nearly 90% of world resources; each of these nations has total geological resources of more than 1 million megatonnes. More than half of the world's remaining resources are in Europe, and the small remainder is in Africa, Latin America, Oceania, and the rest of Asia, particularly in Canada, India, South Africa, and Australia. Inspection of the solid fuel resources map (Map B) at the end of the book starkly illustrates these facts.

soit selon le "Mineral Yearbook, 1971" qui donne les chiffres pour cette anneé-là.

Les chiffres sur les ressources et la production de tourbe sont donnés séparément au tableau III-12A. Pour l'enquête 1968 de la CME on avait insisté auprès des divers pays pour connaître les chiffres de leurs ressources en tourbe; pour la présente enquête on a moins insisté sur cette question que dans les précédentes enquêtes et peu de pays ont donné leurs ressources en tourbe.

Dans les tableaux III-12 et III-12A il n'est question que des pays qui ont donné des chiffres sur leurs ressources et/ou leur production annuelle. A la fin de chaque tableau on trouvera la liste des pays qui ont répondu que ces ressources étaient négligeables (N) ou inconnues (U) ou qu'ils n'ont pas de ressources connues (O). Par exemple pour la Corée du Nord, le Vietnam du Nord, la Mongolie et l'Albanie il y a des estimations de la production annuelle, mais pas de chiffres sur les ressources.

Apercu de la situation mondiale

Les résultats de la présente enquête (y compris les estimations provenant d'autres sources pour les pays non-rapporteurs) montrent que les estimations actuelles des ressources mondiales connues en combustibles fossiles solides atteignent maintenant un total de 10,8 millions de mégatonnes (10,8 x 10^{12} tonnes). La présente enquête montre aussi qu'il y a 1,4 x 10^{12} tonnes de réserves économiques au total, dont 0,6 x 10^{12} tonnes sont maintenant considérées comme récupérables dans l'état actuel de la technologie et des prix. Ces informations sont données au tableau III-7 par continents et par pays ayant les ressources les plus importantes.

La plus grande quantité des ressources en combustibles solides se trouve dans des régions au-delà de 30°N de latitude, surtout dans trois pays—l'URSS, les Etats-Unis et la République Populaire de Chine—qui représentent ensemble plus de 85% des ressources mondiales; chacun de ces trois pays ont des ressources géologiques atteignant un total de plus de 1 x 10^{12} tonnes. Des estimations plus anciennes montrent que le Canada peut aussi avoir plus de 1 x 10^{12} tonnes de charbon en ressources géologiques. Plus de la moitié des autres ressources du monde se trouve en Europe, et le reste en Afrique, en Amérique Latine, en Océanie, dans les autres pays d'Asie surtout en Inde, en Afrique du Sud et en Australie. La carte des ressources en combustibles solides qui se trouve à la fin du livre (carte B) illustre bien ces faits.

Table III-7. Summary of 1974 WEC Survey of Solid Fossil Fuel Resources by Continents, and Nations with Major Resources[1] (All quantities in Megatonnes)
Tableau III-7. Résumé de l'enquête de la CME de 1974 sur les ressources en combustibles fossiles solides par continents et par pays (quantités en mégatonnes) ayant les plus grandes ressources

Country or Continent *Pays ou continent*	Reserves *Réserves*		Total Resources *Ressources totales*
	Recoverable *récupérables*	Total *totales*	
USSR	136,600	273,200	5,713,600
China, P.R. of	80,000	300,000	1,000,000
Rest of Asia	17,549	40,479	108,053
United States	181,781	363,562	2,924,503
Canada	5,537	9,034	108,777
Latin America	2,803	9,201	32,928
Europe	126,775	319,807	607,521
Africa	15,628	30,291	58,844
Oceania	24,518	74,699	199,654
World Total	591,191	1,402,274	10,753,880

[1] Excludes Peat-see Table III-12A

In the remainder of this section, solid fuel resources and production for the various nations are discussed under three headings: (1) the major resource-rich nations, (2) Europe, and (3) the rest of the world.

The Major Resource-Rich Nations

As already noted, nearly 90% of the world's total geological resources of solid fossil fuels exist in the USSR, the United States, and the Peoples' Republic of China. These nations are also the world's main producers and consumers of coals even though the United States and the USSR are also among the largest consumers of domestic and imported oil and gas. Canada also has very large geological resources of which only a small part are presently regarded as economic.

USSR. Slightly more than half of the world's resources of solid fossil fuels occurs in the USSR in numerous deposits throughout the country. Total resources are reported to be 5 713 600 megatonnes of which 273 200 megatonnes are now regarded as proven reserves. Recoverable reserves were not given but are assumed to be 50% of total reserves (1968 WEC), a total of about 136 000 megatonnes. About 70% of total resources and 60% of reserves are high-rank solid fuels. No data were reported on peat; however, the 1968 WEC survey listed a total

Nous allons maintenant étudier les ressources et la production en combustibles solides pour les div(pays sous trois titres : 1°) ressources principales d(pays riches, 2°) Europe, et 3°) reste du monde.

Ressources principales des pays riches

Comme déjà dit, au moins 90% de la totalité de ressources mondiales géologiques en combustibles fossiles solides se trouvent en URSS, aux Etats-Ur et dans la République Populaire de Chine. Ces pa sont aussi les principaux producteurs et consomm teurs de charbon du monde, même si les Etats-Un et l'URSS sont aussi parmi les plus grands consommateurs de pétrole et de gaz importés ou don tiques. Le Canada aussi a de très grandes réserves géologiques dont seulement une petite partie est actuellement considérée comme économique.

URSS. Plus de la moitié des resources mondia en combustibles fossiles solides se trouve dans les nombreux gisements de l'URSS. Ses ressources totales sont de 5 713 600 mégatonnes dont 273 mégatonnes sont maintenant considérées comme réserves prouvées. Les réserves récupérables n'o1 pas été indiquées, mais on suppose qu'elles repré sentent 50% des réserves totales (CME 1968) qu sont de 136 000 mégatonnes. Environ 70% des sources totales et 60% des réserves consistent en combustibles solides de qualités élevées. Aucun information n'a été donnée sur la tourbe; mais of 125 600 million tonnes in measured, indicated, and inferred reserves which is about 60% of total world reserves. The USSR is also the world's largest producer of peat for both fuel and agricultural uses.

Melnikov[14] reports that total geological resources in the USSR are 8 670 000 megatonnes. However, Strishkov[15] states that total resources should be revised downward to 6 800 000 megatonnes. Melnikov also states that total known reserves to a depth of 1200 metres may be rated not as 468 000 megatonnes but as 2 000 000 to 2 200 000 megatonnes which indicates that the new data are relatively conservative. His reserve estimates are based on the results of extensive recent exploration in the Don, Kuznetsk, Pechora, Intinski, Kansk-Achinsk, and other coal basins. Many of these deposits are in near-polar regions, far distant from population and industrial centers, and may not be used for a long time; however, extensive plans are being considered for very large coal-fired power station complexes (Kansk-Achinsk and Irsha-Borodinski basins) which will deliver electricity over long distances to major energy markets.

About 20% of geological resources are reported by Melnikov[14] to be in European USSR including the Urals area; the remaining 80% are in Asiatic USSR. About 47% of resources are at depths to 600 metres, 33% between 600 and 1200 metres, and 20% at depths greater than 1200 metres. About 12% of reserves are anthracite and lean coal, 22% are coking coals, 25% other bituminous coals (gas and long-flame coals), 5% subbituminous coal, and 36% brown coals and lignites. Geological resources in the largest coal basins of European and Asiatic USSR are as follows:[14]

European Basins

Pechora	344 500 megatonnes
Donets	240 600 megatonnes
Kama	30 320 megatonnes
Moscow	24 310 megatonnes

Asiatic Basins

Lena	2 647 000 megatonnes
Tunguska	1 745 000 megatonnes
Kansk-Achinsk	1 220 000 megatonnes
Kuznetsk	905 300 megatonnes
Taimyr	583 500 megatonnes

quête de la CME de 1968 donnait un total de 124,6 milliards de tonnes de réserves mesurées, indiquées et présumées, ce qui represente environ 60% des reserves mondiales totales. L'URRS est aussi le plus grand producteur de monde en tourbe untilisée comme combustible et pour l'agriculture.

Melnikov[14] dit que les ressources géologiques totales de l'URSS s'élèvent à 8 670 000 mégatonnes. Mais Strishkov[15] déclare qu'il faut les réviser car elles ne sont que de 6 800 000 mégatonnes. Melnikov dit aussi que le total des réserves connues à une profondeur de 1200 m n'est pas de 468 888 mégatonnes mais de 2 000 000 à 2 200 000 mégatonnes, ce qui indique que les nouvelles estimations sont relativement prudentes. Son estimation des réserves est basée sur les résultats d'une exploration récente et vaste des bassins houillers du Don, du Kuznetsk, de Pechora et d'Intinski, du Kansk-Achinsk et d'autres. Beaucoup de ces gisements se trouvent près des régions polaires et étant très éloignés des centres de population et d'industrie, il se peut qu'on ne les utilise pas avant longtemps; mais de vastes projets sont à l'étude pour construire de très grandes centrales brûlant du charbon (bassins du Kansk-Achinsk et d'Irsha-Borodinski) qui fourniraient de l'électricité sur de longues distances aux principaux marchés d'énergie.

Melnikov[14] dit qu'environ 20% des ressources géologiques se trouvent dans l'URSS d'Europe, y compris la région de l'Oural, 80% se trouvant dans l'URSS asiatique. Environ 47% des ressources sont à des profondeurs de 600 m, 33% entre 600 et 1200 m, et 20% au-delà de 1200 m. Environ 12% des réserves sont de l'anthracite et du charbon maigre, 22% du charbon cokéfiant, 25% d'autres charbons bitumineux (charbons à gaz et flambants), 5% du subbitumineux et 35% de la houille brune et du lignite. Les ressources géologiques dans les plus grands bassins de l'URSS européenne et asiatique sont les suivants(14) :

Bassins européens

Pechora	344 500 mégatonnes
Donetz	240 600 mégatonnes
Kama	30 320 mégatonnes
Moscou	24 310 mégatonnes

Bassins asiatiques

Léna	2 647 000 mégatonnes
Tunguska	1 775 000 mégatonnes
Kansk-Achinsk	1 220 000 mégatonnes
Kuznetsk	905 300 mégatonnes
Taimyr	583 500 mégatonnes

resources of anthracite coal and lignite are also known. Most coal resources are generally agreed to be of poor to fair quality, and much of it must be upgraded for use. However, as noted earlier, the world's thickest bituminous coal seam exists in China, where thicknesses up to 130 metres have been measured in the western part of the Fushun coal deposit in Manchuria.

Canada. In the present survey Canada is reported to have 108 800 megatonnes of solid fuel resources of which 9034 megatonnes are classified as known reserves and 5540 megatonnes are regarded as recoverable. Canada's mineable resources have increased from an estimated 90 000 megatonnes in 1946[17] and 85 000 megatonnes in 1967 (1968 WEC) to the value given above. The reported recoverable reserves of 5540 megatonnes are believed to be subject to large increases in the future as domestic needs increase, prices continue to rise, and world demands for coal enlarge as a result of depletion of world oil and gas resources. Like the United States, the bulk of Canadian coal resources are in the Rocky Mountains, far from major energy markets. Canada's peat reserves are conservatively reported (1968 WEC) as 200 megatonnes, principally in the areas north of the Great Lakes and St. Lawrence River.

About 1% of Canadian coal resources are in the Maritime Provinces and 99% in Saskatchwan, Alberta, and British Columbia. Approximately 80% of Canadian resources are bituminous coal, 8% subbituminous coal, and 12% lignite. All western coals contain less than 1% sulfur and have low to medium heat contents. Coal is nearly absent in the Laurentian Precambrian Shield that covers all of eastern and most of central Canada.

European Resources

Except for Scandinavia, where coals and lignite are generally absent because this area is conterminous with the Baltic Precambrian Shield, most of

plupart sont de qualité cokéfiante; on sait aussi qu'il y a des ressources appréciables d'anthracite et de lignite. On pense généralement que la plupart des ressources en charbon sont de qualité faible ou moyenne et qu'il faut en améliorer la qualité avant de s'en servir. Mais, comme indiqué plus haut, il existe en Chine les gisements de charbon bitumineux les plus épais du monde, des épaisseurs allant jusqu'à 130 m ayant été mesurées dans la partie ouest des houillères du Fushun, en Mandchourie.

Canada. Pour la présente enquête le Canada à indiqué avoir 108 800 mégatonnes de ressources en combustibles solides, dont 9 034 mégatonnes sont classées comme réserves connues et 5 540 mégatonnes comme réserves récupérables.

Les ressources minières du Canada sont passées de 90 000 mégatonnes suivant l'estimation de 1946[17] et 85 000 mégatonnes en 1967 (enquête) 1968 de la CME) aux chiffres cités plus haut. On croit que les réserves indiquées récupérables, soit 5 540 mégatonnes, vont beaucoup augmenter dans l'avenir au fur et à mesure que les besoins domestiques s'accroîtront, que les prix continueront à augmenter et que la demande mondiale en charbon s'accroîtra par suite de l'épuisement des ressources mondiales en pétrole et en gaz. Comme aux Etats-Unis, les ressources principales en charbon du Canada se trouvent dans les Montagnes Rocheuses, loin des grands marchés d'énergie. Les réserves en tourbe du Canada sont indiquées d'une façon prudente (enquête 1968 de la CME) comme s'élevant à 200 mégatonnes, surtout dans les régions au nord des Grands Lacs et du fleuve Saint Laurent.

Environ 1% des ressources en charbon du Canada se trouvent dans les provinces maritimes, et 99% à Saskatchwan, dans l'Alberta, et dans la Colombie britannique. A peu près 80% des ressources canadiennes sont des charbons bitumineux, 8% des subbitumineux et 12% des lignites. Tous les charbons de l'ouest contiennent moins de 1% de soufre et ont des pouvoirs calorifiques bas ou moyens. Le charbon est presque complètement absent du bouclier précambrien du Saint Laurent qui couvre tout l'est et la plus grande partie du centre du Canada.

Ressources européennes.

Sauf en Scandinavie où il n'y a généralement pas de charbons ni de lignites parce que cette région est limitrophe du bouclier précambrien de la Baltique, la plupart des pays européens possèdent des quanthe European nations possess moderate to large quantities of these resources. To compensate for their deficiencies, the Scandinavian nations have large known peat resources totaling at least 43,000 megatonnes, and at least one nation—Finland—has definite plans to use peat as a major domestic energy resource.

The European countries have explored for and used coal longer and in greater amounts than any other world region. Therefore, reserves are well known and in a few nations constitute the total resource base. The current survey indicates that European resources now total 607 400 megatonnes, of which 53% or 320 000 megatonnes are regarded as reserves. About 40% of reserves (127 000 megatonnes) are presently considered economically recoverable.

Table III-8 gives the total solid fossil fuel resources of the various nations of Europe as reported in the current survey for four major areas of Europe. The nations in each region are listed in decreasing order of total resources. As shown, one or two nations in each region possess the bulk of regional resources. Those nations in northern Europe having peat as the major or sole resource are indicated by (P); the designations (HC) or (LC) indicate whether solid fuel resources in the other nations are predominantly of high or low ranking coals.

In western Europe (excluding the United Kingdom), 98% of regional resources are in the Federal Republic of Germany where 80% of resources and reserves are bituminous coal and 20% brown coal; German reserves are 35% of total resources and about 40% of reserves are regarded as recoverable. Although small in percentage, resources and reserves in the other countries are still significant in meeting energy needs although those nations have become highly dependent on oil and gas, most of which is now imported. Solid fossil fuel resources outside Germany are very predominantly anthracite and bituminous coal.

Of the four regions of Europe, southern Europe is the most deficient in solid fuels. Except for Italy,

tités modérées ou importantes de ces ressources. Pour compenser leur déficience à cet égard les pays scandinaves ont d'importantes ressources connues de tourbe, soit un total d'au moins 43 000 mégatonnes, et un pays au moins, la Finlande, a des projets définis pour utiliser la tourbe comme une importante ressource d'énergie domestique.

Les pays européens ont fait des explorations charbonnières et utilisé le charbon plus longtemps et en plus grandes quantités que n'importe quel autre pays du monde. Leurs réserves sont donc bien connues et dans quelques pays elles constituent une grande partie de la totalité des ressources. La présente enquête montre que la totalité des ressources est actuellement de 607 500 mégatonnes dont 53%, soit 320 000 mégatonnes, sont considérées comme des réserves. Environ 40% des réserves (127 000 mégatonnes) sont actuellement considérées comme économiquement récupérables.

Le tableau III-8 indique les totaux des ressources en combustibles fossiles solides des divers pays européens tels qu'ils ont été donnés pour la présente enquête pour quatre régions européennes principales. Les pays de chaque région sont donnés par ordre décroissant de leurs ressources. Dans chaque région un ou deux pays possède la plus grande quantité des ressources de la région. Dans l'Europe septentrionale après le nom des pays ayant surtout ou uniquement de la tourbe on a mis entre parenthèses la lettre P; les lettres HC ou LC indiquent si les ressources en combustibles solides dans les autres pays sont surtout des charbons de qualité supérieure ou inférieure.

Dans l'Europe occidentale (excepté le Royaumme-Uni) 98% des ressources régionales se trouvent dans la République Féderale d'Allemagne où 80% des ressources et réserves sont des charbons bitumineux et 20% des lignites; les réserves de la R.F.A. représentent 35% du total des ressources, et environ 40% des réserves sont considérées comme récupérables. Bien que le pourcentage des ressources et des réserves des autres pays soit faible, il est encore important pour satisfaire les besoins en énergie, bien que ces pays soient devenus largement dépendants du pétrole et du gaz dont la majorité est actuellement importé. Les ressources en combustibles fossiles solides en dehors de la R.F.A. sont surtout du charbon bitumineux.

Parmi les régions européennes, l'Europe du sud est celle qui a le moins de combustibles solides. Excepté l'Italie, les autres pays ont des ressources

Table III-8. Reserves and Resources of Solid Fossil Fuels in the Various Regions and Nations of Europe (All quantities in Megatonnes)

Tableau III-8. Réserves et ressources en combustibles fossiles solides dans les diverses régions et les divers pays d'Europe (en mégatonnes)

Nation *Pays*	Reserves *Réserves*		Total Resources *Ressources totales*
	Recoverable *récupérables*	Total *totales*	
Western Europe			
Germany, F.R. of (HC)	39,571	99,520	286,150
Netherlands (HC)	1,840	3,705	3,705
France (HC)	458	1,407	1,407
Belgium (HC)	127	253	253
Austria (SB)	64	148	177
Total	42,060	105,033	291,692
Southern Europe			
Yugoslavia (LC)	16,870	17,976	21,751
Spain (HC)	1,643	2,202	3,562
Greece (LC)	680	908	1,575
Italy (LC)	33	110	110
Portugal (LC)	33	42	42
Total	19,259	21,238	27,040
Northern Europe			
United Kingdom (HC)	3,871	98,877	162,814
Finland (P)	4,290	33,000	33,000
Sweden (P)	30	9,460	9,490
Iceland (P)		2,000	2,000
Denmark (P)	20	561	581
Ireland (P)	418	422	448
Norway (HC)	2	2	152
Total	8,631	144,322	208,485
Eastern Europe			
Poland (HC)	22,640	38,874	60,600
Germany, D.R. of (LC)	25,300	30,200	30,050
Czechoslovakia (HC)	6,363	13,774	21,430
Hungary (LC)	1,675	3,350	6,400
Bulgaria (LC)	4,387	4,387	5,230
Romania (LC)	1,150	3,970	1,960
Total	61,515	94,555	125,670
Total Europe	131,465	365,148	652,887

however, the other nations have quite significant resources based on their needs. According to the latest survey, 80% of the regional resources are in Yugoslavia, mainly as brown coal, and 13% in Spain, principally as anthracite and bituminous coals. Resources in Portugal, Greece, and Albania are mainly lignite.

About 78% of solid fuel resources and 69% of reserves in northern Europe are in the United Kingdom mainly as bituminous coal; however, only 4% of British reserves are presently considered recover-

importantes par rapport à leurs propres besoins. D'après la dernière enquête 80% des ressources de cette région se trouvent en Yougoslavie, surtout le lignite, et 13% en Espagne, surtout l'anthracite et les charbons bitumineux. Au Portugal, en Grèce et en Albanie il y a surtout des lignites.

Environ 78% des ressources en combustibles solides et 69% des réserves de l'Europe septentrionale se trouvent au Royaume-Uni sous forme de charbon bitumineux; toutefois seulement 4% des reserves britanniques sont actuellement considérées able. Small amounts of high-ranking coal reserves exist in Sweden and Ireland, and moderate amounts are owned by Norway in Svalbard (Spitsbergen Island) a resource which is shared with the USSR. Small brown-coal resources occur in Denmark, and about 2 megatonnes of bituminous coal exists in Greenland. Large peat resources occur in Denmark, Sweden, Finland, Ireland, Iceland, and Great Britain, but are important as a fuel, now, only in Ireland and, in the near future, in Finland.

New information on solid fuels was incompletely reported for eastern Europe since only Bulgaria reported new quantitative data on resources and reserves. However, the 1968 WEC data is believed to still represent the resource situation in these nations. The bulk of reserves in this region occurs in Poland (48%) where bituminous coal represents 54% of reserves, brown coal 18%, and peat 28%; 34% of regional reserves are in the Democratic Republic of Germany, almost exclusively as brown coal, and 17% in Czechoslovakia, mainly as bituminous coal. Smaller resources in Hungary, Bulgaria, and Romania are principally lignites.

In 1968, the European Communities Commission[18] reported the following resource value for eastern Europe:

comme récupérables. Des réserves de petites quantités de charbon de qualité élevée existent en Suède et en Irlande, et des quantités moyennes en Norvège, au Svalbard (îles du Spitzenberg), ces dernières ressources étant partagées avec l'URSS. On trouve de petites ressources de lignite au Danemark et environ 2 mégatonnes de charbon bitumineux au Groenland. Des ressources importantes de tourbe existent au Danemark, en Suède, en Finlande, en Irlande, en Islande et en Grande-Bretagne, mais elles ne sont importantes, maintenant, comme combustibles qu'en Irlande, et elles le seront dans un proche avenir en Finlande.

Les chiffres reçus sur les combustibles solides en Europe orientale sont incomplets puisque seule la Bulgarie en a donnés sur les ressources et les réserves. Mais l'on croit que les informations fournies pour l'enquête de 1968 de la CME sont toujours valables à l'heure actuelle. Dans cette région les réserves les plus importantes sont en Pologne (48%) où le charbon bitumineux représente 54% des réserves, le lignite 18% et la tourbe 28%; 34% des réserves de cette région se trouvent dans la République Démocratique Allemande où il s'agit presqu'exclusivement de lignite, et 17% en Tchécoslovaquie où il s'agit surtout de charbon bitumineux. Des ressources en plus petites quantités en Hongrie, en Bulgarie et en Roumanie consistent surtout en lignites.

En 1968 la Commission des Communautés Européennes[18] a donné les chiffres suivants pour les ressources de l'Europe de l'Est :

	High-ranking Coals (thousands of megatonnes)		Brown Coal and Lignite (thousands of megatonnes)	
	Total	Recoverable	Total	Recoverable
Poland	110 - 135	66	33 - 40	1
East Germany	0.2	U	49	25.2
Czechoslovakia	15.4 - 16.4	6	12.5 - 17.0	U
Hungary	0.4 - 0.5	U	2.6 - 3.2	U
Romania	0.07	0.05	3.9	1.1

	Charbons de qualité supérieure (milliers de mégatonnes)		Houille brune et lignite (milliers de mégatonnes)	
	Totales	Récupérables	Totales	Récupérables
Pologne	110 - 135	66	33 - 40	1
R.D.A.	0,2	U*	49	25,2
Tchécoslovaquie	15,4 - 16,4	6	12,5 - 17	U*
Hongrie	0,4 - 0,5	U*	2,6 - 3,2	U*
Roumanie	0,07	0,05	3,9	1,1

*U = inconnu

In general, these values are higher than those given in Table III-12 which tends to reflect the fact that the economics of coal utilization in eastern Europe is less competitive with regard to alternative fuels compared with the western European nations.

Rest of the World

Although solid fossil fuel resources in the rest of the world constitute only 4% of the world total, they represent a very significant actual total of a about 400 000 megatonnes. Three nations—Australia, India, and South Africa—have the largest parts of this resource, 50, 21, and 11%, respectively, with the remaining 18% being shared among about 40 nations. On a continental basis, the largest share is in Oceania (50%), followed by the rest of Asia (27%), Africa (15%), and Latin America (8%). South Africa possess 75% of all African resources, Australia over 99% of the resources of Oceania, and India 77% of Asiatic resources excluding those in China and Asiatic USSR. Resources in Latin America are more evenly spread.

Total resources in each of the nations in those areas are shown in Table III-9 and are arranged in decreasing order of quantity on each continent. Once again, the dominant positions of Australia, India, and South Africa are apparent.

Of all the continents Africa is the most stable geologically and has large Precambrian Shield areas generally nonconducive to the existence of coal. Only in the south, in the Mediterranean region (particularly in the northwest), and in the coastal areas along the Gulf of Guinea have coal deposits been found.

The total resources of solid fuels in Africa currently amount to about 59 000 megatonnes. Economic reserves total 30 000 megatonnes of which 15 000 megatonnes or 52% are now considered recoverable. Almost all of Africa's solid fossil fuels exist in a north-south zone extending from Swaziland and eastern South Africa to eastern Zaire and western Tanzania in the Rift Valley region. Resources in this zone are principally high-ranking fuels. South Africa has the largest deposits by far, but significant coal basins exist in Rhodesia, Swaziland, Botswana, Mozambique, Tanzania, Malawi, Zambia, and Zaire. The small coal resources of

En général ces chiffres sont plus élevés que ceux donnés au tableau III-12, ce qui tend à refléter le fait que l'économie de l'utilisation du charbon dans l'Europe orientale est moins compétitive par rapport aux autres combustibles que celle des pays de l'Europe occidentale.

Reste du monde

Bien que les ressources en combustibles fossiles solides dans le reste du monde constituent seulement 4% du total mondial, elles représentent un total réellement très important d'environ 400 000 mégatonnes. Trois pays—Australie, Inde et Afrique du Sud—en possèdent les plus grandes parties, 20, 21 et 11% respectivement; le reste, soit 18%, est réparti dans environ 40 pays. Si l'on compare les ressources par continents on trouve la plus grande partie en Océanie (50%), puis en Asie (27%), en Afrique (15%), en Amérique Latine (8%). L'Afrique du Sud possède 75% de toutes les ressources africaines, l'Australie plus de 99% des ressources de l'Océanie, et l'Inde 77% des ressources asiatiques sans comprendre celles de la Chine et de l'URSS asiatique. Les ressources de l'Amérique Latine sont plus également réparties.

Les ressources totales de chacun des pays de ces continents sont indiquées au tableau III-9 par ordre décroissant de quantités. Là encore l'Australie, l'Inde et l'Afrique du Sud ont des positions prédominantes.

De tous les continents, l'Afrique est le plus stable au point de vue géologique et a de vastes régions du bouclier précambrien généralement non-favorables à l'existence de charbon. Ce n'est que dans le sud, dans la région méditerranéenne (surtout au nord-ouest) et dans les régions côtières le long du golfe de Guinée que l'on trouve des gisements de charbon.

Les ressources totales de combustibles solides en Afrique se montent actuellement à environ 59 000 mégatonnes, la totalité des réserves économiques s'élève à 30 000 mégatonnes sont 15 000 mégatonnes, soit 50%, sont maintenant estimées récupérables. Presque tous les combustibles fossiles solides de l'Afrique se trouvent dans une zone nord-sud s'étendant du Swaziland et de l'est de l'Afrique du Sud à l'est du Zaïre et à l'ouest de la Tanzanie dans la région de la vallée du Rift. Dans cette zone les ressources sont surtout des combustibles de qualité élevée. L'Afrique du Sud a de loin les plus grands gisements, mais des bassins houillers importants se trouvent en Rhodésie, au Swaziland, au Botswana, au Mozambique, en Tanzanie, au Malawi, en Zambie et au Zaïre. Les petites ressources charbonnières

Table III-9. Reserves and Resources of Solid Fossil Fuels in Africa, East and South Asia and Latin America (All quantities in Megatonnes)

Tableau III-9. Réserves et ressources en combustibles fossiles solides en Afrique, dans l'est et le sud de l'Asie, et en Amérique Latine (toutes quantités en mégatonnes)

Nation *Pays*	Reserves *Réserves*		Total Resources *Ressources totales*
	Recoverable *récupérables*	Total *totales*	
Africa			
South Africa	10584	24224	44339
Rhodesia	~1390	1760	6613
Swaziland	1820	2022	5022
Zaire	720	720	720
Botswana	506	506	506
Mozambique	80	100	400
Tanzania	180	309	370
Nigeria	225	449	449
Zambia	51	74	154
Morocco	15	15	96
Malagasy	39	78	92
Malawi			38
Egypt	~13	25	25
Algeria	~5	9	20
Total Africa	15628	30291	58844
Asia			
India	11580	23160	82977
Japan	1026	8628	8628
Turkey	2025	2893	7282
Indonesia	1060	2123	2533
Pakistan	172	804	1941
Bangladesh	519	780	1491
Korea, Rep. of	544	890	1450
China, Rep. of	261	479	660
Iran	193	385	385
Burma	7	13	286
Thailand	~118	235	235
Philippines	~38	75	88
Afghanistan			85
Vietnam, Rep. of	~6	12	12
Total Asia	17549	40477	108053
Latin America & Greenland			
Mexico	629	5316	12000
Peru	105	211	6964
Colombia	109	150	5330
Chile	58	97	3945
Brazil	1790	3256	3256
Venezuela	11	14	871
Argentina	100	155	555
Honduras			5
Greenland	1	2	2
Total Latin America	2803	9201	32928

Malagasy are probably of the same origin. Along the Gulf of Guinea, Nigeria has resources of 449 megatonnes and some of the nations to the west

malgaches ont probablement la même origine. Le long de la côte du golfe de Guinée la Nigéria a des ressources atteignant 449 mégatonnes et certains have considerably smaller resources. The resources in northwest Africa are anthracite coal in Morocco and bituminous coal in Algeria, which have resources of 96 and 20 megatonnes, respectively, in the Atlas Mountains and plateau areas to the south. Additional resources will undoubtedly be discovered in Africa, but large increases in resources or major discoveries in new areas appear unlikely.

The western half of Australia is also a stable Precambrian Shield area almost devoid of coal. As a result, nearly all of Australia's solid fuel resources are near the east coast. Of the total of nearly 200 000 megatonnes in resources, 74 300 megatonnes are considered reserves of which 24 300 megatonnes are regarded as recoverable. Most of this resource exists in three bituminous coal basins on the east coast and a lignite basin in Victoria near the southeast coast. New Zealand has slightly over 1000 megatonnes in resources and small reserves are known in New Caledonia. Approximately 10 megatonnes of peat have been found in Papua-New Guinea.

Nearly all of the nations of southern Asia have at least some solid fuel resources except for the countries of the Arabian peninsula. Total resources in southern Asia and Japan total 108 000 megatonnes and reserves amount to 40 500 megatonnes of which 17 500 megatonnes, or 43% are considered recoverable. India has the greatest amount, about 83 000 megatonnes which are almost exclusively bituminous coal. Indian reserves are 23 200 megatonnes of which about half are recoverable. The bulk of resources is in the northeast of the country.

Japan has resources, principally of high-ranking fuels, totaling 8628 megatonnes; all resources are considered reserves of which only 12% are economically recoverable. Turkey is in third place with resources of 7282 megatonnes, mostly of low-ranking fuels. Resources in all other nations of this area are less than 3000 megatonnes each. Resources in Pakistan, Bangladesh, Iran, South Korea, and the Republic of China are predominantly high-ranking fuels, but lignites are the principal fuels of the

pays à l'ouest ont des ressources bien moins considérables. Les ressources du nord-ouest de l'Afrique consistent en anthracite au Maroc, et en charbon bitumineux en Algérie, avec des quantités de, respectivement, 96 et 20 mégatonnes, dans les monts Atlas et dans les régions des plateaux vers le sud. Sans aucun doute on découvrira d'autres ressources en Afrique, mais il est peu vraisemblable qu'elles soient considérables ou que des découvertes plus importantes soient faites dans de nouvelles régions.

La moitié occidentale de l'Australie est aussi une région du bouclier précambrien presque dépourvue de charbon. En conséquence, presque toutes les ressources en combustibles solides de l'Australie se trouvent près de la côte est. Sur un total de près de 200 000 mégatonnes de ressources, 74 300 mégatonnes sont considérées comme des réserves, dont 24 300 mégatonnes estimées récupérables. La plus grande partie de ces ressources se trouve dans trois bassins houillers bitumineux sur la côte est et dans un bassin de lignite dans l'Etat de Victoria près de la côte sud-est. La Nouvelle-Zélande possède un peu plus de 1 000 mégatonnes de ressources et de petites réserves sont connues en Nouvelle Calédonie. On a trouvé à peu près 10 mégatonnes de tourbe en Papaousie (Nouvelle-Guinée).

Presque tous les pays du sud de l'Asie ont au moins quelques ressources importantes en combustibles, excepté les pays de la péninsule de l'Arabie. Les ressources totales du sud de l'Asie et du Japon sélèvent à 108 000 mégatonnes et les réserves à 40 500 mégatonnes dont 17 500 mégatonnes, soit 43%, sont estimées récupérables. L'Inde possède les plus grandes quantités, environ 83 000 mégatonnes, qui consistent presqu'exclusivement en charbon bitumineux. Les réserves de l'Inde sont de 23 200 mégatonnes dont environ la moitié est récupérable. Les plus grandes quantités de ressources se trouvent dans le nord-est du pays.

Le Japon a des ressources, surtout de combustibles de qualité supérieure, dont le total s'élève a 8 628 mégatonnes; toutes ces ressources sont considérées comme des réserves, dont seulement 12% sont économiquement récupérables. La Turquie vient en troisième place avec des ressources de 7 282 mégatonnes, surtout des combustibles de qualité inférieure. Les ressources dans les autres pays de cette région sont inférieures à 3 000 mégatonnes pour chacun de ces pays. Les ressources du Pakistan, du Bangladesh, de l'Iran, de la Corée du Sud et de la République de Chine consistent surtout en combustibles de qualité supérieure, mais southeast Asian nations. Moderate resources exist in North Korea, North Vietnam, and Mongolia, but no reliable data on the extent of resources are available.

Of all the regions of the world, Latin America is the least endowed with solid fossil fuels. Large areas of South America are covered by the Guianian, Brazilian, and Patagonian Precambrian Shields, and solid fuels are found only in the younger Andean region and in extreme southern Brazil. Total solid fuel resources in Latin American amount to 33 000 megatonnes of which about 9 200 megatonnes are classified as reserves. Only 2 800 megatonnes or 30% of reserves are now considered recoverable. About one-third of Latin American solid fuel resources are in Mexico, 21% in Peru, 16% in Colombia, 12% in Chile, and 10% in Brazil. However, only Mexico and Brazil have large measured reserves. Small resources also exist in Honduras and Ecuador, and about 10 megatonnes of peat occur in southern Uruguay. Resources in Mexico and Colombia are bituminous coal and in Peru bituminous and anthracite. Solid fuels in Brazil, Venezuela, and Argentina are principally subbituminous coal, and resources in Chile are mainly lignite.

World Production of Solid Fossil Fuels, 1971

Production of solid fossil fuels by rank and by nation or region in calendar year 1971 is summarized in Table III-10, which shows that total world annual output has now surpassed 3000 megatonnes. As shown below, the present world average resource to demand ratio (R/D) for all solid fuels is currently 197 years for recoverable reserves, 472 years for total reserves in place, and about 3500 years for total resources. If, as is expected, world consump-

les lignites sont les principaux combustibles des pays de l'Asie du sud-est. Des ressources de moyenne importance existent en Corée du Nord au Vietnam du Nord et en Mongolie mais on n'a pas d'informations exactes sur leur étendue.

De toutes les régions du monde l'Amérique Latine est la moins nantie en combustibles fossiles solides. De vastes étendues de l'Amérique du Sud sont couvertes par les boucliers précambriens de Guyane, du Brésil et de la Patagonie; on ne trouve des combustibles solides que dans la région plus jeune des Andes et à l'extrême sud du Brésil. Les ressources totales en combustibles solides d'Amérique du Sud s'élèvent à 33 000 mégatonnes dont environ 9 200 mégatonnes sont classées comme réserves. Seulement 2 800 mégatonnes, soit 30% des réserves, sont maintenant estimées récupérables. Environ un tiers des ressources en combustibles solides de l'Amérique Latine se trouvent au Mexique, 21% au Pérou, 16% en Colombie, 12% au Chili et 10% au Brésil. Mais seuls le Mexique et le Brésil ont d'importantes réserves mesurées. De petites ressources existent aussi en Honduras et en Equateur, et environ 10 mégatonnes de tourbe dans le sud de l'Uruguay. Les ressources du Mexique et de la Colombie consistent en charbons bitumineux, celles du Péron en bitumineux et en anthracites. Les combustibles solides du Brésil, du Vénézuéla et de l'Argentine sont surtout des charbons subbitumineux, et celles du Chili des lignites.

Production mondiale de combustibles fossiles solides en 1971

La production des combustibles fossiles solides par qualité et par pays ou région pour l'année calendaire 1971 est donnée au tableau III-10 qui montre que la production mondiale annuelle a maintenant dépassé 3 000 mégatonnes. Comme on le verra ci-dessous le rapport actuel de la moyenne des ressources mondiales et de la demande (R/D) pour tous les combustibles solides est de 197 années pour les réserves récupérables, 472 années pour les réserves totales in situ et environ 3 500 années pour les ressources totales.

R/D Ratios (years)

	Millions of Tonnes	High-ranking Solid Fuels	Low-ranking Solid Fuels	All Solid Fuels
World Resources	10 750 000	3 760	3 137	3 513
World Reserves	1 420 000	494	415	473
Recoverable Reserves	591 000	198	194	197

R/D (en années)

	Millions de tonnes	Combustibles solides de qualité supérieure	Combustibles solides de qualité inférieure	Total des Combustibles solides
Ressources mondiales	10 750 000	3 760	3 137	3 513
Réserves mondiales	1 420 000	494	415	473
Réserves récupérables	591 000	198	194	197

tion of solid fuel continues to increase, and particularly if the use growth rate increases, all R/D ratios will decrease in the future. However, the recoverable reserve ratios will tend to remain stable for decades as more resources become reserves, and as the fraction of reserves-in-place that are recovered is increased through improved technology.

The above tabulation also indicates that present R/D ratios are about the same for high- and low-ranking fuels. Since growth in the use of the latter has been greater than that for high-ranking fuels, R/D ratios for lignite and brown coal may decrease, in the future, more rapidly than for the better grade coals.

To predict future R/D ratios for individual regions or nations is difficult for a number of reasons. On an internal basis, future use of domestic solid fuel resources will depend extensively on the amounts of domestic oil and gas resources or the ability to import them and on the future use of oil shale, nuclear fuels, and renewable resources. The other major factor will be increases in world trade in solid fuels, either as solid fuel or as synthetic oil, and possibly gas, made from coal.

In Table III-10 data provided in "Mineral Yearbook, 1971" (ref. 6) have been used as annual production statistics for nonreporting nations because these data are given in terms of actual tonnes (after conversion from short tons) which appear to provide a better comparison with resources that are reported in similar units. The data for high-rank

Si, comme on s'y attend, la consommation mondiale de combustibles solides continue à s'accroître, et en particulier si le taux de croissance de l'utilisation augmente, tous les rapports R/D décroîtront dans l'avenir. Cependant la proportion de réserves récupérables tendra à rester stable pendant des décennies au fur et à mesure que davantage de ressources deviendront des réserves et que la fraction des réserves in situ seront récupérées s'accroîtra grâce à une technologie améliorée.

Le tableau ci-dessus indique aussi que les rapports actuels R/D sont à peu près les mêmes pour les combustibles de qualité supérieure et inférieure. Comme la croissance d'utilisation de ces derniers a été plus grande que celle des combustibles de qualité supérieure, les rapports R/D pour les lignites et la houille brune peuvent décroître dans l'avenir plus rapidement que pour les charbons de meilleure qualité.

Pour un certain nombre de raisons, il est difficile de prédire les rapports futurs R/D pour une région ou un pays. Au point de vue interne, l'utilisation future des ressources locales en combustibles solides dépendra surtout des quantités de ressources locales en pétrole et en gaz ou de la possibilité d'en importer, et de l'utilisation future des schistes bitumineux, des combustibles nucléaires et des ressources non épuisables. L'autre facteur important sera la progression mondiale de la commercialisation des combustibles solides, soit en l'état, soit comme pétrole synthétique, et peut-être comme gaz provenant du charbon.

Dans le tableau III-10 les chiffres provenant du "Mineral Yearbook 1971"(réf. 6) ont été utilisés pour les pays n'ayant pas répondu aux demandes de l'enquête, pour les statistiques annuelles de production, parce que ces informations sont données en tonnes métriques (après conversion à partir de tonnes courtes), ce qui semble permettre une meilleure comparaison avec les ressources données en unités similaires. Les statistiques pour les com-

Table III-10. World Production of Solid Fossil Fuels by Rank and Nation, 1971
(All quantities in kilotonnes)
Tableau III-10. Production mondiale de combustibles fossiles solides par type et par pays en 1971 (toutes quantités en kilotonnes)

Nation or Area *Pays ou Region*	Anthracite *Anthracite*	Bituminous *Bitumineux*	Brown Coal and Lignite *Houille brune et Lignite*	Peat** *Tourbe*	Total *Total*	Percent of World Production *% de la production mondiale*
USSR	79,000	404,000	154,000	57,000	694,000	22.7
United States	8,830	495,300	5,800		509,930	16.7
China, P.R. of	20,000	390,000*	U		410,000	13.5
Canada		14,600	3,000		17,600	0.6
Europe						
Western	27,800	132,300	111,100	320	271,520	8.9
Southern	3,140	8,650	46,270		58,260	1.9
Northern	3,760	143,550	90	5,020	152,420	5.0
Eastern	200	187,700	447,730	50	635,680	20.6
Total	34,900	472,200	605,190	5,390	1,117,680	36.4
India		69,120	3,700		72,820	2.4
Australia		48,920	23,390		72,310	2.4
South Africa	1,680	56,840			58,520	1.9
Japan	1,040	32,940	130		34,110	1.1
North Korea	21,800	6,170*	U		27,970	0.9
South Korea	12,400				12,400	0.4
Turkey		4,180	5,820		10,000	0.3
Rest of Asia	3,000	8,150*	450		11,600	0.3
Rest of Oceania		1,920	160		2,080	0.1
Rest of Africa	430	4,970			5,400	0.2
Latin America	7	10,970			10,980	0.1
Total	183,090	2,020,280	801,640	62,390	3,067,400	100.0

*Include some lignite for P. R. of China, P. R. of Korea, Mongolia and Pakistan.
**Includes peat used for fuel only.

Source of Data: *Minerals Yearbook, 1971*, U.S. Bureau of Mines

solid fuels reported by the United Nations in their J-series reports are in terms of coal equivalents where one tonne is equivalent to 8000 kilowatt-hours thermal (6880 kcal/kg or 28.8 million joules/kg). World production of solid fuels reported by the UN for 1971 was 2409 megatonnes coal equivalent compared with 3067 megatonnes of actual fuel including fuel peat. Thus the actual world average heat content of mined coal is about 5400 kcal/kg (22.6 million joules/kg).

Europe is the major solid fuels producing area and accounts for 36% of total world output. Since European resources are only 6% of the world's total, this continent is using up its solid fuel resources more rapidly than any other region. This trend is most pronounced in eastern Europe which produces 57% of Europe's solid fuels but has only 32% of its

bustibles solides fournies par les Nations Unies dans leur Série J sont en unités d'équivalent charbon, une tonne équivalent à 1 000 kWh thermiques (6880 kcal/kg ou 28,8 millions de joules/kg). La production mondiale de combustibles solides donnée par les Nations Unies pour 1971 est de 2 409 mégatonnes d'équivalent charbon comparée à 3 067 mégatonnes de combustibles y compris la tourbe combustible. Ainsi la moyenne mondiale réelle du pouvoir calorifique du charbon extrait est d'environ 5 400 kcal/kg (22,6 millions de joules/kg).

L'Europe constitue la plus grande zone de production de combustibles solides, elle représente 36% du total mondial. Comme les ressources européennes ne représentent que 6% du total mondial, l'Europe utilise ses ressources en combustibles solides plus rapidement que toute autre région du monde. Cette tendance est plus prononcée dans l'Europe de l'est qui produit 57% des combustibles resources. The three major producing nations are the Democratic Republic of Germany (42%), Poland (28%), and Czechoslovakia (18%). East Germany's output is almost exclusively brown coal, Poland's is mainly bituminous coal, and Czechoslovakia's is principally brown coal. The total output of eastern Europe is nearly as large as that of either of the world's two largest producing nations, the USSR and United States.

Output in the rest of Europe is 41% of the total. Western Europe produces 24.3% of the European total. The Federal Republic of Germany accounts for 76% of regional output and produces about equal quantities of high-ranking coals and brown coal. France is second with 13% and Belgium third with 5% of regional output. Production outside Germany is almost exclusively high-ranking fuels, including large quantities of anthracite. Northern Europe produced 13.6% of the European total of which 94% is bituminous coal (plus some anthracite) mined in the United Kingdom. Most of the remaining regional output is fuel peat in Ireland and bituminous coal mined in Svalbard by Norway. Southern Europe accounts for only 5% of European production. Yugoslavia is the leading producer with 53% of the regional total, almost exclusively lignite. Spain is second with 23%, which is mostly anthracite and bituminous coal, and Greece third at 19% which is exclusively lignite. Italy is the only major European nation with essentially no solid fuel production.

Slightly more than half of world production comes from the four nations with the greatest resources. The USSR produces 22.7% of world output. About 58% is bituminous coal, 22% is lignite, 11% anthracite, and 8% peat, excluding agricultural peat. The USSR is the world's leading producer of all ranks of coal except bituminous. The United States share of world production is 16.7%, which is almost exclusively (97%) bituminous coal. The Peoples' Republic of China is in third place with 13.5% of world output which is principally anthracite and bituminous coal. Canadian production, which is principally bituminous coal, accounts for only 0.6% of the world total.

Outside of Europe and the four nations just discussed, seven countries produce 10 megatonnes or

solides européens mais ne possède que 32% de s
ressources. Les trois principaux pays producteu
sont la République Démocratique Allemande (4
la Pologne (28%) et la Tchécoslovaquie (18%).
production de l'Allemagne de l'est est composée
presqu'exclusivement de lignite, celle de la Polo
de charbon bitumineux et celle de la Tchécoslovaquie de lignite. La production totale de l'Europe de l'est est presqu'aussi importante que
celle de l'un ou l'autre des deux pays qui sont le
plus grands producteurs : l'URSS et les Etats-Ur

Le production du reste de l'Europe représent
41% du total de l'Europe. L'Europe de l'ouest produit 24,3% du total de l'Europe. La Républ
Fédérale d'Allemagne produit 76% de la production de l'Europe de l'ouest consistant en quanti
peu près égales de charbon de qualité supérieure
de lignite. La France vient en second avec 13%
la Belgique en troisième avec 5%. La productio
dehors de l'Allemagne est constituée presqu'exclusivement de combustibles de qualité supérieu
compris de grandes quantités d'anthracites.
L'Europe du nord produit 13,6% de la producti
totale de l'Europe, dont 94% est du charbon bit
neux (plus un peu d'anthracite) extrait au Roya
Uni. Le reste de la production de l'Europe du n
est surtout de la tourbe combustible en Irlande,
du charbon bitumineux au Svalbard, en Norvège
L'Europe du sud représente seulement 5% de la
production de toute l'Europe. La Yougoslavie
est le principal producteur avec 53% de la prod
tion totale de la région, presqu'exclusivement d
lignite. L'Espagne vient en second avec 23%,
surtout de l'anthracite et du charbon bitumineu
et la Grèce en troisième avec 19%, seulement d
lignite. L'Italie est le seul pays européen impor
tant ne produisant pas de combustibles solides.

Un peu plus de la moitié de la production mondiale provient des quatre pays ayant le plu
ressources. L'URSS produit 22,7% de la produ
mondiale. Environ 58% est du charbon bitumi
22% du lignite, 11% de l'anthracite et 8% de la tourbe, sans compter la tourbe servant à l'agriculture. L'URSS est le principal producteur d
monde de tous les types de charbon sauf les bi
neux. Les Etats-Unis produisent 16,7% de la p
duction mondiale, presqu'exclusivement (97%
charbon bitumineux. La production du Canad
constituée surtout par du charbon bitumineux
représente seulement 0,6% de la production mondiale.

En dehors de l'Europe et de ces quatre pay
pays produisent 10 mégatonnes ou plus par ar

Table III-11. World Production of Solid Fossil Fuels by Rank and Year, 1966–1971
(All quantities in kilotonnes)
Tableau III-11. Production mondiale de combustibles fossiles solides par type et par année, 1966–1971 (toutes quantités en kilotonnes)

Year *Année*	Anthracite *Anthracite*	Bituminous *Bitumineux*	Lignite *Lignite*	Mixed[1] *Mélanges*	Peat[2] *Tourbe*	Total *Total*
1966	189,580	1,554,530	733,560	348,500	70,370	2,896,540
1967	182,160	1,567,040	719,120	250,700	65,480	2,784,500
1968	182,330	1,555,560	737,570	325,300	60,160	2,860,920
1969	180,600	1,617,880	760,660	334,290	51,030	2,944,460
1970	182,960	1,653,200	785,260	371,720	62,720	3,055,860
1971	183,090	1,620,280	801,640	400,000	62,390	3,067,400
Total	1,100,720	9,568,490	4,537,810	2,030,510	372,150	17,609,680

[1] Principally bituminous coal in People's Republic of China
[2] Excludes agricultural peat.

Source of Data: *Minerals Yearbook, 1971*, U.S. Bureau of Mines

more annually. Five of these (India, Japan, North and South Korea, and Turkey) are in Asia; the other two are Australia and South Africa. Production in each of these seven countries ranges from 0.3 to 2.4% of the world total. The output of North and South Korea and of North Vietnam is mainly anthracite coal. Production in the rest of the world accounts for only 0.7% of the world total.

As shown in Table III-11, the world's total production of solid fossil fuels for the period 1966 to 1971 was about 17 600 megatonnes. About 54% of this output was bituminous and subbituminous coal and 12% was mixed bituminous coal and lignite in the Peoples' Republic of China, North Korea, Mongolia, and Pakistan. Since China is the major producer within this group, and since Chinese production is mainly bituminous coal, total world production of bituminous coal is close to 66% of all solid fuel output. Slightly more than 26% of world output is brown coal and lignite, 6% is anthracite, and 2% is peat, excluding peat used in agriculture.

The trend toward decreasing use of anthracite continues but seems to have leveled off. Use of peat as a fuel reached a minimum in 1969 but now appears to be increasing. Use of lignite has increased significantly since 1966, and use of bituminous coal has also risen but at a lower rate. World annual output of all ranks has risen by 1970 million tons over

Cinq d'entre eux (Inde, Japon, Corée du Nord, Corée du Sud et Turquie) sont en Asie, les deux autres sont l'Australie et l'Afrique du Sud. La production de chacun de ces sept pays représente 0,3 à 2,4% de la production mondiale. La production de la Corée du Nord, de la Corée du Sud et du Viet-nam du Nord consiste surtout en anthracite. Celle du reste du monde ne représente que 7% du total mondial.

Comme le montre le tableau III-11 la production mondiale de combustibles fossiles solides a été de 1966 à 1971 d'environ 17 600 mégatonnes. A peu près 54% de cette production a été du charbon bitumineux et subbitumineux, et 12% des mélanges de charbon bitumineux et de lignite dans la République Populaire de Chine, la Corée du Nord, la Mongolie et le Pakistan. Comme dans ce groupe la Chine est le principal producteur, et comme la production chinoise consiste surtout en charbon bitumineux, la production mondiale totale de charbon bitumineux atteint près de 66% de la production de tous les combustibles solides. Un peu plus de 26% de la production mondiale est de la houille brune et du lignite, 6% de l'anthracite et 2% de la tourbe, sans compter la tourbe utilisée pour l'agriculture.

La tendance vers une utilisation décroissante d'anthracite continue mais semble s'être stabilisée. L'utilisation de la tourbe comme combustible a atteint un minimum en 1969 mais semble maintenant augmenter. L'utilisation du lignite a augmenté d'une façon importante depuis 1966, celle du charbon bitumineux également mais pas autant. La production annuelle mondiale de tous les types a augmenté de 1970 millions de tonnes pendant les the past six years which is an average annual growth rate of approximately 1% per year.

six dernières années, ce qui représente une croissance annuelle moyenne d'environ 1%.

Summary

This discussion has presented a brief appraisal of solid fuel resources, reserves, and production in the various countries and sectors of the world with the knowledge that such a survey can only touch upon a subject with such a vast literature.

In summary, the USSR, the United States, and the Peoples' Republic of China own the vast bulk of presently known world resources which will be more than adequate to meet their own domestic requirements for a century or more. It is very likely that they will be the major world suppliers in the longer term. Resources in Europe are also large, but since this area is the heaviest user of coal resources, they may be deceptively short-lived particularly in eastern Europe. Canada, Australia, South Africa, and India also have large resources that will sustain their energy needs for a long while, although India's large population could consume such resources much more rapidly than the much smaller populations in the other countries. Resources in all other countries are small on a relative basis; however, since most of these nations are developing nations, with limited per capita energy demand, even small supplies should, in most cases, last for many decades. Ultimately, however, these countries will become increasingly dependent on the nations with large solid fossil fuel resources or on the use of such alternative energy sources as may exist domestically.

Résumé

On s'est efforcé dans cette étude de donner un bref aperçu des ressources, des réserves et de la production de combustibles solides dans les divers pays et secteurs du monde, tout en sachant qu'une enquête de ce genre ne peut qu'effleurer un si vaste sujet.

En résumé l'URSS, les Etats-Unis et la République Populaire de Chine possèdent les grandes quantités des ressources mondiales actuellement connues, ce qui sera plus que suffisant pour satisfaire leurs propres besoins domestiques pendant un siècle ou plus. Il est très probable que ces pays seront les plus grands fournisseurs du monde à plus long terme. Les ressources de l'Europe sont également importantes mais comme cette région est le plus grand utilisateur des ressources en charbon, elle pourra connaître la pénurie, surtout l'Europe de l'est. Le Canada, l'Australie, l'Afrique du Sud et l'Inde ont également de grandes ressources qui suffiront à leurs besoins en énergie pendant longtemps, quoique l'importante population de l'Inde pourrait consommer ces ressources beaucoup plus rapidement que les populations moins importantes des autres pays. Dans tous les autres pays les ressources sont relativement faibles; mais comme la plupart de ces pays sont en voie de développement, avec une demande limitée en énergie par habitant, même de faibles ressources devraient suffire pendant des décennies dans la plupart des cas. Mais finalement ces pays deviendront de plus en plus dépendants de ceux ayant de vastes ressources en combustibles fossiles solides, ou devront utiliser les autres sources d'énergie qui pourraient exister chez eux.

Other Solid Carbonaceous Fuels

Up until the start of this century, noncommercial fuels such as wood, agricultural plant wastes, and dung were probably still the predominant energy source in the world as a whole. Use of commercial fossil fuels was predominant in most of Europe and in Northern America by 1900, but not elsewhere. The United Nations estimated in the early 1950's that about 15% of noncommunist world energy was still obtained from noncommercial sources[19] and gave the following breakdown for the various continents:

Autres combustibles solides carbonés

Jusqu'au début du siècle actuel il est probable que les combustibles non industrialisés tels que le bois, les déchets agricoles et le fumier constituaient la source d'énergie prédominante dans l'ensemble du monde. En 1900 on utilisait des combustibles fossiles industrialisés dans la plus grande partie de l'Europe et en Amérique du Nord, mais pas ailleurs. Les Nations Unies ont estimé au début des années 1950 qu'environ 15% de l'énergie du monde non-communiste provenait toujours de ressources non-industrialisées(19) et elles ont donné la répartition suivante pour les divers continents :

North America	3%	South America	45%
Europe	7%	Africa	51%
Oceania	13%	Asia	58%
Central America	35%	Total	15%

Amérique du Nord	3%
Amérique du Sud	45%
Europe	7%
Afrique	51%
Océanie	13%
Asie	58%
Amérique Centrale	35%
Total	15%

The world total is somewhat misleading because more than half the world's people were probably still totally independent of commercial energy at that time. By 1967 only 4% of total world energy was derived from noncommercial energy resources, but nearly half the world's population still was dependent on them.

Le total mondial est quelque peu trompeur car il est probable que plus de la moitié des habitants du monde sont aujourd'hui toujours indépendants de l'énergie d'origine industrielle. En 1967, seulement 4% de l'énergie totale mondiale provenait de ressources d'énergie non-industrialisées, mais près de la moitié de la population mondiale en dépendait encore.

The present general world apathy on the use of noncommercial carbonaceous fuels, particularly wastes, was borne out by the dearth of replies received on this item in the solid fuels questionnaire.

Only eleven countries provided any data at all; in addition South Africa indicated that use of such material was nil, and the United States stated that use was negligible. The eleven nations that replied and the forms of noncommercial materials indicated are tabulated below:

L'apathie générale mondiale actuelle concernant l'utilisation des combustibles carbonés non-industrialisés, surtout les déchets, s'est manifestée par le manque de réponse à ce sujet au questionnaire sur les combustibles fossiles. Seuls onze pays ont fourni des informations dans ce domaine; en outre l'Afrique du Sud a indiqué que l'utilisation de ces matières était nulle, et les Etats-Unis qu'elle était négligeable. Les onze pays ayant répondu sont indiqués ci-dessous ainsi que les types de combustibles non-industrialsés qu'ils utilisent :

Country	Forms of Noncommercial Fuels
Australia	Wood, bagasse
Austria	Wood, unclassified wastes
Bangladesh	Wood, bagasse, jute stick, cow-dung
Brazil	Wood, charcoal, bagasse
Colombia	Wood, bagasse
Ethiopia	Wood, dung
India	Wood, vegetable waste, dung
Nigeria	Wood
Poland	Wood, peat
Turkey	Wood, dung
Western Samoa	Wood trash

Pays	Types de combustibles non-industrialisés
Australie	bois, bagasse
Autriche	bois, déchets non-classés
Bangladesh	bois, bagasse, tiges de jute, bouses de vaches
Brésil	bois, charbon de bois, bagasse
Colombie	bois, bagasse
Ethiopie	bois, fumier
Inde	bois, déchets de végétaux, fumier
Nigéria	bois
Pologne	bois, tourbe
Turquie	bois, fumier
Samoa occidental	débris de bois

Further details on the quantities now used and plans for future use are provided in Table 2B of Appendix 2.

D'autres détails sur les quantités utilisées actuellement et sur les plans d'utilisation dans l'avenir sont donnés au tableau 2B de l'annexe 2.

Societal Problems Associated with the Acquisition and Use of Solid Fossil Fuels

Serious environmental problems exist both in the acquisition and use of solid fossil fuels. Very

Problèmes sociaux liés à l'acquisition et à l'utilisation des combustibles fossiles solides

Dans la précédente section nous avons indiqué quelques-uns des problèmes socio-économiques et large areas of the world are underlain by coal and lignite; for example, 13% of the total area of the United States, including Alaska, or about 1.2 million square kilometres contain coal-bearing strata. The situation is similar in the USSR and only somewhat less so in Canada, the Peoples' Republic of China, parts of Europe, and South Africa. Further, because coal resources are more prevalent near the surface than at depth, the amount of land surface suitable for surface mining is probably a third of the total mineable area. For example, 5% of all coal resources in the United States is at depths of 30 metres or less and probably 15% is at depths up to 100 metres. Because of recent advances in the development of strip-mining technology and its increasing use in many nations, a growing proportion of the coal recovered in the next several decades will probably be mined by this method. As this technology develops, its use may eventually permit recovery to much greater depths, depending of course on the overall ratio of rock to coal or lignite. In the longer term, as greater depths and thinner seams must be exploited, a return to greater use of underground mining can be anticipated, but with much greater use of capital-, rather than labor-intensive methods.

Because solid fossil fuel resources are geographically so extensive, their exploitation creates problems unless conducted in an environmentally satisfactory manner within the larger context of regional or national land-use planning. In general, such problems include land restoration after surface mining; subsidence, flooding, and fires in abandoned underground mines; disposal of coal processing wastes; and the acidification of streams. Land-use planning involves assuring the protection of and determining the best future use of mining land for agricultural,

des problèmes d'environnement liés à l'utilisation de déchets solides carbonés comme combustibles, et comme matières premières pour d'autres fins. Dans cette section qui servira de conclusion nous élargissons l'étude pour y comprendre tous les combustibles solides.

De sérieux problèmes d'environnement existent à la fois pour l'acquisition et l'utilisation de combustibles fossiles solides. De très grandes superficies du monde possèdent du charbon et du lignite; par exemple 13% de la superficie totale des Etats-Unis, y compris l'Alaska, soit environ 1,2 million de km^2, contient des strates carbonées. La situation est similaire en URSS, mais un peu inférieure au Canada dans la République Populaire de Chine, dans certaines régions d'Europe et en Afrique du Sud. En outre, parce que les ressources en charbon sont plus abondantes près de la surface qu'en profondeur, la superficie du sol permettant l'extraction en surface représente probablement un tiers de toute la superficie minière. Par exemple, aux Etats-Unis 5% de toutes les ressources en charbon se trouvent à des profondeurs de 30 mètres ou moins, et probablement 15% à des profondeurs allant jusqu'à 100m. Grâce aux progrès récents de la technologie de l'extraction à ciel ouvert et à son emploi croissant dans beaucoup de pays, une proportion de plus en plus importante du charbon qui sera extrait dans les prochaines décennies emploiera sans doute cette méthode. Au fur et à mesure que cette technologie progresse, son utilisation pourra éventuellement permettre la récupération à de plus grandes profondeurs selon, évidemment, le rapport global roches/charbon ou lignite. A plus long terme, comme des gisements plus profonds et plus minces devront être exploités, un retour à une plus grande utilisation d'extraction souterraine peut avoir lieu, mais en augmentant les investissements plutôt que la main d'oeuvre pour un rendement intensif.

Comme les ressources en combustibles fossiles solides sont géographiquement très étendues, leur exploitation crée des problèmes, à moins qu'elle n'ait lieu d'une façon satisfaisante pour l'environnement dans le vaste contexte de planification régionale ou nationale de l'utilisation des sols. En général ces problèmes comprennent la restauration du sol après l'extraction en surface; les affaissements, les inondations, les incendies dans les mines souterrain abandonnées; l'élimination des déchets provenant du traitement du charbon; l'acidification des voies d'eau. La planification pour l'utilisation des sols demande d'assurer leur protection et de déterminer le meilleur usage future du terrain d'extraction pour l'agriculture, les loisirs et les besoins urbains afin recreational, and urban needs to optimize future social benefits. Restoration of land does not necessarily mean returning it to its original condition; for example, restoration of hilly or mountainous land as flat terrain may actually make it more useful.

An important criterion for satisfactory agricultural restoration is the separation of agriculturally valuable topsoil from common dirt and rock so that the former is available for providing the top cover for restored land. Natural conversion of rock to topsoil is a process requiring thousands of years; thus topsoil must be regarded as an important world resource. As more and more land is needed to grow food for an expanding world population, this factor will increase in significance.

In underground mines the two major earth-management problems are land subsidence and mine flooding and fires, particularly in abandoned mines and in mines under populated areas. The problem is most severe for room and pillar mines where fires burn out the mine supports and lead to almost certain collapse; it is least severe for longwall mining where the roof has been strengthened by the placing of rock support to minimize subsidence or where the roof has been lowered in a controlled manner.

Operation of underground mines also results in the accumulation of large piles of debris above ground, much of which is fine material. Such debris, particularly from older mines, may contain much small-size coal since in former times this was an unmarketable product. When such piles contain appreciable coal, longlived fires have occurred with emission of CO_2, SO_2, and nitrogen oxides. In arid regions such debris is readily windborne and distributed as dust over wide areas. In wetter areas, when such piles become saturated with rainwater or melting snow, parts or all of such piles may suddenly flow with damage to property and loss of life.

Rainwashing of unrestored stripmine debris or solid wastes from underground mines results in the siltation of streams at and around coal-mining areas. Since coal and coal-mining wastes contain up to several percent sulfur as sulfide, sulfates, and organic

d'en faire bénéficier au maximum les collectivités. La restauration des sols ne signifie pas nécessairement le retour à ses conditions d'origine; par exemple, actuellement on peut niveler un terrain de collines ou de montagnes pour le rendre plus utile.

Un important critère pour une restauration du sol favorable à l'agriculture est de garder les terres arables séparées des déblais et des roches afin qu'on puisse se servir de ces terres pour recouvrir le terrain restauré. La transformation naturelle des roches en terres arables est un procédé qui demande des milliers d'années; ainsi on peut considérer les terreaux comme une importante ressource mondiale. Comme il faut de plus en plus de terrain pour faire pousser des aliments pour une population mondiale en expansion, ce facteur est de plus en plus important.

Dans les mines souterraines les deux principaux problèmes de gestion proviennent de l'affaissement des sols et des inondations et incendies des mines, surtout dans les mines abandonnées et celles situées dans des zones peuplées. Le problème est plus grave pour les mines à chambres et piliers où les incendies brûlent les soutènements des mines et provoquent presque certainement des éboulements; c'est moins grave pour les mines à grand front de taille où le toit a été renforcé par des soutènements en roches pour minimiser les affaissements, ou bien quand le toit de la mine a été abaissé sous contrôle.

L'exploitation des mines souterraines conduit aussi à la création de grands terrils constitués par des débris non-combustibles dont la plupart sont sous forme pulvérulente. Ces débris, particulièrement ceux des mines plus anciennes, peuvent aussi contenir du charbon en petits grains car autrefois ce produit ne pouvait pas être vendu. Quand ces terrils contiennent du charbon en quantité appréciable il se produit parfois des incendies de longue durée évec émissions de CO_2, de SO_2 et d'oxyde d'azote. Dans les régions arides ces débris peuvent être transportés par le vent et répandus sur de vastes superficies sous forme de poussière. Dans les régions plus humides, quand ces terrils sont saturés d'eau de pluie ou de neige fondue, ils peuvent, en partie ou entièrement, s'effondrer soudain en bouleversant les terrains et en causant des morts.

L'entrainement par la pluie des débris résultant d'extraction à ciel ouvert sans qu'il y ait eu restauration ou des déchets solides provenant de mines souterraines provoque l'envasement des rivières dans les zones d'extraction de charbon ou autour d'elles. Comme les déchets de charbon et d'extraction du charbon contiennent un certain pourcentage de sulfur, this sulfur is slowly oxidized to sulfates and sulfuric acid and leached into streams. Both siltation and acidification of streams have been extremely harmful to aquatic plants and animals and have produced biological deserts in some coal-mining areas. Acidification has also resulted from runoff from naturally flooded abandoned mines.

In recent years more coal has been processed to provide a cleaner and generally smaller sized product by grinding, and use of classifier or flotation-type cleaners and washers. The wastes from such operations are more readily airborne, oxidized, and leached and are more subject to spontaneous combustion. Some control is exerted to minimize these problems at larger mines, but much more needs to be accomplished for adequate environmental protection. Because coal and lignite often contain considerably more uranium than ordinary rocks, possible release of unsafe amounts of radioactive materials to the environment must be monitored more carefully.

Many environmental problems also exist in the use of coal as a fuel and in the iron and steel and nonferrous-metals industries as a reductant. These include the emission of particulates, SO_2, and nitrogen oxides during combustion, the disposal of solid ash, and the emission of carbon monoxide, hydrogen sulfide, and hydrocarbons from coke ovens. Probably the most serious current overall problem[23] is emission of SO_2. A great research effort is currently in progress on devising acceptable methods for removing sulfur from coal either before or after combustion, but at this time no totally satisfactory solution has been achieved. As a result, low sulfur coals are now in great demand, but supplies are limited, and greater resort to coals with higher sulfur contents will eventually become necessary. Partial removal of particulates is generally achieved by use of electrostatic precipitators. Tall stacks are also widely used to achieve dispersion of particulate and gaseous pollutants, but may become less effective in the future as the numbers and sizes of power plants continue to increase.

soufre sous forme de sulfure, de sulfate et de soufre organique, ce soufre est lentement oxydé pour produire des sulfates et de l'acide sulfurique, et il se dilue dans les rivières. L'envasement et l'acidification des rivières ont extrêmement nui aux plantes aquatiques et aux animaux et ont produit des déserts biologiques dans quelques zones d'extraction du charbon. L'acification provient aussi de l'écoulement provenant des mines abandonées et inondées naturellement.

Ces dernières années on a traité de plus grandes quantités de charbon pour fournir un produit plus propre et d'un calibre généralement plus petit en le broyant, en le lavant et en le classant par flottation. Les déchets de ces opérations sont plus facilement entrainés par l'air, oxydés et lessivés et ils sont davantage sujets à la combustion spontanée. On peut exercer un certain contrôle pour minimiser ces inconvénient dans les grandes mines, mais il faut faire bien davantage pour une bonne protection de l'environnement. Comme le charbon et le lignite contiennent souvent beaucoup plus d'uranium que les roches ordinaires, il faut surveiller très attentirement un dégagement possible de quantités dangereuses de matières radio-actives dans l'environnement.

Beaucoup de problèmes concernant l'environnement existent aussi par suite de l'utilisation du charbon comme combustible, et comme réducteur dans la sidérurgie et la métallurgie des métaux nonferreux. Cela comprend l'émission de particules, de SO_2 et d'oxydes d'azote pendant la combustion, l'élimination de cendres solides, et l'émission d'oxyde de carbone, d'hydrogène sulfuré et d'hydrocarbures par les fours à coke. Le problème général actuel le plus sérieux[20] est probablement l'émission de SO_2. Beaucoup d'efforts de recherche sont en cours actuellement pour établir des méthodes acceptables pour enlever le soufre du charbon, soit avant, soit après la combustion; mais à l'heure actuelle on n'a pas encore trouvé de solution tout à fait satisfaisante. En conséquence, les charbons à faible teneur en soufre sont maintenant très demandés, mais les ressources sont limitées et il va être finalement nécessaire de recourir aux charbons ayant une plus forte teneur en soufre. L'élimination partielle des particules se fait généralement en utilisant des dépoussiéreurs électrostatiques. L'usage de hautes cheminées est largement répandu pour arriver à une bonne dispersion des particules et des polluants gazeux, mais il pourra devenir moins efficace dans l'avenir au fur et à mesure que le nombre et la taille des centrales énergétiques continueront à augmenter.

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Table III-12. Reserves, Resources and Annual Production of Coal, Brown Coal and Lignite
Tableau III-12. Réserves, ressources et production annuelle de charbon, de houille brune et de lignite

Name of Continent, Region and Country / *Continents, Régions et Pays*	Ref. No. / *N° de réf.*	Year of Ref. / *Année de réf.*	Rank / *Types*	Recoverable Reserves / *Réserves récupérables*: Amount (mega-tonnes) / *Quantités (méga-tonnes)*	Energy Content / *Teneur en énergie*: (millions of Gcal.) / *(millions de Gcal)*	Energy Content: (millions of GJ) / *(millions de GJ)*	Min. Seam Thickness (m) / *Epaisseur min. du gisement*	Max. Depth (m) / *Profondeur max.*	Total Resources in Place / *Réserves totales in situ*: Reserves (mega-tonnes) / *Réserves (méga-tonnes)*	Additional (mega-tonnes) / *Additionnelles (méga-tonnes)*	Total (mega-tonnes) / *totales (méga-tonnes)*	Recent Annual Production / *Production annuelle récente*: Year of Ref. / *Année de production*	Amount (mega-tonnes) / *Quantité (méga-tonnes)*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Africa													
Western Africa													
Nigeria	1	1963	SB	180	1 080	4 521	1.30	290	359	U	359	–	0.610
	1	1957	LN	45	158	659	2.40	150	90	U	90	–	–
Total		–	–	225	1 238	5 180	–	–	449	U	449	–	0.610
Eastern Africa													
Tanzania	2,3	1967	HC	180	1 206	5 048	0.30	1 200	309	61	370	1971	0.003
Mozambique	1	1969	BC	80	280	1 172	1.30	600	100	300	400	–	0.400
Malagasy	2	1963	HC	30*	210	879	0.30	1 200	60	U	60	–	–
	2	1963	LC	9*	32	132	0.30	500	18	14	32	–	–
Total		–	–	39	242	1 011	–	–	78	14	92	–	–
Rhodesia	2,3	1960	HC	1 390*	9 730	40 730	0.30	1 200	1 760	4 853	6 613	1971	3.357
Malawi	1	1960	HC	U	–	–	U	U	U	38	38	–	0.000
Zambia	1	1973	BT	51	316	1 323	2.00	150	74	80	154	1973	0.900
Total, Eastern Africa			BT	51	316	1 323	–	–	74	80	154	–	0.900
			HC	1 600	11 146	46 657	–	–	2 129	4 952	7 081	–	3.360
			BC	80	280	1 172	–	–	100	300	400	–	0.400
			LC	9	32	132	–	–	18	14	32	–	–
Total			–	1 740	11 774	49 284	–	–	2 321	5 346	7 667	–	4.660
Middle Africa													
Zaire	1	1920	SB	720	4 320	18 084	2.00	U	720	U	720	1972	0.130
Northern Africa													
Egypt	2,3	1965	HC	13*	91	381	0.30	1 200	25	U	25	1969	0.004
Morocco	2,3	1960	AN	15	105	440	0.30	1 200	15	81	96	1970	0.475
Algeria	2,3	1957	HC	5*	35	147	0.30	1 200	9	11	20	1971	0.015
Total, Northern Africa		–	AN	15	105	440	–	–	15	81	96	–	0.475
		–	HC	18	126	525	–	–	34	11	45	–	0.019
Total		–	–	33	231	968	–	–	49	92	141	–	0.494
Southern Africa													
South Africa	1	1969	AN	100	800	3 349	2.74	914	181	0	181	–	1.100
	1	1969	BT	10 484	58 720	245 802	2.74	914	24 043	20 115	44 158	–	53.300
Total		–	–	10 584	59 520	249 151	–	–	24 224	20 115	44 339	–	54.400
Botswana	2	1961	HC	506	1 337	5 596	0.30	1 200	506	U	506	–	–
Swaziland	2,3	1961	HC	1820	12 740	53 330	0.30	1 200	2 022	3 000	5 022	1971	0.148
Total, Southern Africa		–	AN	100	800	3 349	–	–	181	0	181	–	1.100
		–	BT	10 484	58 720	245 802	–	–	24 043	20 115	44 158	–	53.300
		–	HC	2 326	14 077	58 926	–	–	2 528	3 000	5 528	–	0.148
		–	–	12 910	73 597	308 077	–	–	26 752	23 115	49 867	–	54.548
Total Africa		–	AN	115	905	3 789	–	–	196	81	277	–	1.575
		–	BT	10 535	59 036	247 125	–	–	24 117	20 195	44 312	–	54.200
		–	SB	900	5 400	22 605	–	–	1 079	U	1 079	–	0.740
		–	HC	3 944	25 349	106 111	–	–	4 691	7 963	12 654	–	3.527
		–	BC	80	280	1 172	–	–	100	300	400	–	0.400
		–	LN	45	158	659	–	–	90	U	90	–	–
		–	LC	9	32	132	–	–	18	14	32	–	–
Total		–	–	15 628	91 160	381 593	–	–	30 291	28 553	58 844	–	60.442
Asia													
East Asia													
China, P.R. of	3	–	AN	–	–	–	–	–	–	–	–	1971	20.000
	3	–	BT	–	–	–	–	–	–	–	–	1971	390.000
	3	–	LN	–	–	–	–	–	–	–	–	1971	
Total	4,3	–	–	80 000	560 000	2 090 000	–	–	300 000	700 000	1 000 000	–	410.000
Korea, Rep. of	1	1962	AN	544	4 352	18 217	0.60	1 000	890	560	1 450	–	12.403
Korea, D.P.R. of	3	–	AN	–	–	–	–	–	–	–	–	1971	24.320
		–	BT	–	–	–	–	–	–	–	–	1971	6.170
		–	LN	–	–	–	–	–	–	–	–	1971	
Total		–	–	U	–	–	–	–	U	U	U	–	30.490

Table III-12 (continued)

Name of Continent, Region and Country *Continents, Régions et Pays*	Ref. No. *N° de réf.*	Year of Ref. *Année de réf.*	Rank *Types*	Recoverable Reserves *Réserves récupérables*: Amount (mega-tonnes) *Quantités (mega-tonnes)*	Recoverable Reserves: Energy Content *Teneur en énergie* (millions of Gcal.) *(millions de Gcal)*	Recoverable Reserves: Energy Content *Teneur en énergie* (millions of GJ) *(millions de GJ)*	Recoverable Reserves: Min. Seam Thickness (m) *Epaisseur min. du gisement*	Recoverable Reserves: Max. Depth (m) *Profondeur max.*	Total Resources in Place *Réserves totales in situ*: Reserves (mega-tonnes) *Réserves (méga-tonnes)*	Total Resources in Place: Additional (mega-tonnes) *Additionnelles (méga-tonnes)*	Total Resources in Place: Total (mega-tonnes) *totales (méga-tonnes)*	Recent Annual Production *Production annuelle récente*: Year of Ref. *Année de production*	Recent Annual Production: Amount (mega-tonnes) *Quantité (méga-tonnes)*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Taiwan	1	1965	BT	261	1 696	7 102	0.25	2 000	479	181	660	–	4.000
Mongolia	3	–	BT	U	–	–	–	–	U	U	U	1971	2.000
Total, East Asia		–	AN	544	4 352	18 217	–	–	890	560	1 450	–	56.723
		–	BT	80 261	561 696	2 351 260	–	–	300 479	700 181	1 000 660	–	402.170
Total		–	–	80 805	566 048	2 369 477	–	–	301 369	700 741	1 002 110	–	458.893
Japan	1	1973	AN	11	77	322	1.20	285	74	0	74	1972	0.500
	1	1973	BT	780	5 460	22 856			6 210	0	6 210	1972	
	1	1973	SB	142	852	3 566	1.40	1 000	1 159	0	1 159	1972	27.600
	1	1973	BC	75	375	1 570			1 004	0	1 004	1972	
	1	1973	LN	18	63	264	0.90	150	181	0	181	1972	0.100
Total		–	–	1 026	6 827	28 578	–	–	8 628	0	8 628	–	28.200
Middle South Asia													
India	1	1972	HC	10 683	60 893	254 898	1.20	600	21 365	59 587	80 952	1971	71.500
	1	1972	LC	897	4 037	16 897	1.20	600	1 795	231	2 025	1971	3.660
Total		–	–	11 580	64 930	271 795	–	–	23 160	59 818	82 977	–	75.160
Bangladesh	1	1965	BT	517	3 619	15 149	1.52	1 172	777	711	1 488	–	0.000
	1	1963	SB	2	12	50	0.91	310	3	U	3	–	0.000
	1	1962	P	35	70	293	0.08	4	39	119	158	–	0.000
Total		–	–	554	3 701	15 492	–	–	819	830	1 649	–	0.000
Pakistan	2,3	1966	HC	157	1 256	5 258	0.30	1 200	782	877	1 661	1971	1.250
	2,3	1966	LC	15	53	220	0.30	500	22	258	280	1971	
Total		–	–	172	1 309	5 478	–	–	804	1 135	1 941	–	1.250
Iran	1	1972	HC	193*	1 351	5 655	0.40	150	385	0	385	1972	1.000
Afghanistan	2,3	1965	HC	–	–	–	0.30	1 200	–	85	85	1971	0.181
Total, Middle South Asia		–	BT	517	3 619	15 149	–	–	777	711	1 488	–	–
		–	SB	2	12	50	–	–	3	U	3	–	–
		–	HC	11 033	63 500	265 811	–	–	22 534	60 549	83 083	–	73.931
		–	LC	912	4 090	17 117	–	–	1 817	489	2 305	–	3.660
Total		–	–	12 464	71 221	298 127	–	–	25 131	61 749	86 879	–	77.591
Southeast Asia													
Indonesia	1	1972	BT	37	174	728	1.00	300	109	140	249	–	0.090
	1	1972	SB	43	172	720	2.00	85	54	270	324	–	0.100
	1	1950	BC	44*	220	921	U	U	88	U	88	–	–
	1	1920	LN	936*	2 808	11 754	U	U	1 872	U	1 872	–	–
Total		–	–	1 060	3 374	14 123	–	–	2 123	410	2 533	–	0.190
Philippines	1,3	1965	BC	46*	214	895	U	U	91	U	91	1971	0.036
Thailand	2,3	1967	LC	118*	550	2 307	0.30	500	235	N	235	1971	0.446
Burma	2,3	1960	HC	7*	49	205	0.30	1 200	13	8	21	1971	0.020
	2,3	1951	LC	–	–	–	0.30	500	U	265	265	1971	–
Total		–	–	7	49	205	–	–	13	273	286	–	0.020
Vietnam, D.P.R. of	3	–	AN	U	–	–	–	–	U	U	U	1971	3.000
Vietnam, Rep. of	1	–	LC	6*	24	100	–	4	12	U	12	–	–
Total, Southeast Asia		–	AN	–	–	–	–	–	–	–	–	–	3.000
		–	BT	37	174	728	–	–	109	140	249	–	0.090
		–	SB	43	172	720	–	–	54	270	324	–	0.100
		–	HC	7	49	205	–	–	13	8	21	–	0.020
		–	BC	90	434	1 816	–	–	179	U	179	–	0.036
		–	LN	936	2 808	11 754	–	–	1 872	U	1 872	–	–
		–	LC	124	574	2 407	–	–	247	265	512	–	0.446
Total		–	–	1 237	4 211	17 630	–	–	2 474	683	3 157	–	3.692
Southwest Asia													
Turkey	1	1972	HC	134	858	3 590	0.80	1 200	191	1 100	1 291	–	7.862
	1	1972	LC	1 891*	6 620	27 710	U	U	2 702	3 289	5 991	–	9.814
Total		–	–	2 025	7 478	31 300	–	–	2 893	4 389	7 282	–	17.676

Table III-12 (continued)

Name of Continent, Region and Country *Continents, Régions et Pays* (1)	Ref. No. *N° de réf.* (2)	Year of Ref. *Année de réf.* (3)	Rank *Types* (4)	Recoverable Reserves *Réserves récupérables*: Amount (mega-tonnes) *Quantités (méga-tonnes)* (5)	Recoverable Reserves: Energy Content *Teneur en énergie* (millions of Gcal.) *(millions de Gcal)* (6)	Recoverable Reserves: Energy Content (millions of GJ) *(millions de GJ)* (7)	Recoverable Reserves: Min. Seam Thickness (m) *Epaisseur min. du gisement* (8)	Recoverable Reserves: Max. Depth (m) *Profondeur max.* (9)	Total Resources in Place *Réserves totales in situ*: Reserves (mega-tonnes) *Réserves (méga-tonnes)* (10)	Total Resources in Place: Additional (mega-tonnes) *Additionnelles (méga-tonnes)* (11)	Total Resources in Place: Total (mega-tonnes) *totales (méga-tonnes)* (12)	Recent Annual Production *Production annuelle récente*: Year of Ref. *Année de production* (13)	Recent Annual Production: Amount (mega-tonnes) *Quantité (méga-tonnes)* (14)
Total Asia		–	AN	555	4 429	18 539	–	–	964	560	1 524	–	60.223
		–	BT	81 494	570 949	2 389 993	–	–	307 575	701 032	1 008 607	–	429.860
		–	SB	187	1 036	4 336	–	–	1 216	270	1 486	–	0.100
		–	HC	11 174	64 407	269 606	–	–	22 738	61 657	84 395	–	81.813
		–	BC	165	809	3 386	–	–	1 183	0	1 183	–	0.036
		–	LN	954	2 871	12 018	–	–	2 053	–	2 053	–	0.100
		–	LC	2 927	11 284	47 234	–	–	4 766	4 043	8 808	–	13.920
Total		–	–	97 557	655 785	2 745 112	–	–	340 495	767 562	1 108 056	–	586.052
Europe													
Western Europe													
Germany, F.R. of	1	1971	HC	30 000	210 000	879 060	0.60	1 500	44 000	186 300	230 300	1972	102.470
	1	1971	BC	9 571	17 706	74 119	2.00	450	55 520	330	55 850	1972	110.400
	1	1972	P	900	1 800	7 535	2.00	12	900	–	900	1972	0.400
Total		–	–	40 471	229 506	960 714	–	–	100 420	186 630	287 050	–	213.270
France	1	1973	HC	443	3 101	12 980	0.70	1 250	1 380	U	1 380	1972	29.740
	1	1973	BC	15	53	223	2.00	600	27	U	27	1972	1.510
Total		–	–	458	3 154	13 203	–	–	1 407	–	1 407	–	31.250
Netherlands	1	1972	AN	290*	2 320	9 711	0.50	1 400	580	0	580	1972	2.800
	1	1955	BT	1 550*	10 850	45 418	0.50	1 400	3 125	0	3 125	1972	0.000
Total		–	–	1 840	13 170	55 129	–	–	3 705	0	3 705	–	2.800
Belgium	1	1973	HC	127*	886	3 721	–	–	253	–	253	–	9.750
Austria	1	1972	SB	0	–	–	0.40	1 200	1	3	4	1972	0.000
	1	1972	BC	64	384	1 607	0.50	1500	147	26	173	1972	3.760
Total		–	–	64	384	1 607	–	–	148	29	177	–	3.760
Total, Western Europe		–	AN	290	2 320	9 711	–	–	580	0	580	–	2.800
		–	BT	1 550	10 850	45 418	–	–	3 125	0	3 125	–	0
		–	SB	0	–	–	–	–	1	3	4	–	–
		–	HC	30 570	213 987	895 761	–	–	45 633	186 300	231 933	–	141.960
		–	BC	9 650	18 143	75 949	–	–	55 649	356	56 050	–	115.670
Total		–	–	42 060	245 300	1 026 839	–	–	105 033	186 659	291 692	–	260.430
Southern Europe													
Italy	1	1972	LN	33	78	325	3.00	150	70	0	70	1972	1.390
	1	1972	LC	N	N	N	U	U	40	0	40	1972	0.200
Total		–	–	33	78	325	–	–	110	0	110	–	1.590
Spain	1	1970	AN	354	2 832	11 845	0.40	500	454	229	682	1972	3.020
	1	1970	BT	99	693	2 901	0.50	300	140	244	384	1972	1.510
	1	1970	SB	454	2 724	11 403	0.50	900	678	626	1 304	1972	5.960
	1	1970	BC	15	63	263	0.80	400	23	9	32	1972	0.580
	1	1970	LN	721	3 028	12 675	0.70	500	907	253	1 160	1972	3.070
Total		–	–	1 643	9 340	39 087	–	–	2 202	1 361	3 562	–	14.140
Yugoslavia	1	1971	SB	70	490	2 051	0.50	500	82	22	104	1972	0.600
	1	1971	BC	1 500	3 750	15 698	1.50	400	1 761	273	2 034	1972	9.200
	1	1971	LN	15 300	38 250	160 115	20.00	130	16 133	3 480	19 613	1972	21.200
Total		–	–	16 870	42 490	177 864	–	–	17 976	3 775	21 751	–	31.000
Portugal	1	1972	AN	8*	42	177	1.00	300	15	U	15	1972	0.250
	1	1972	LN	25	41	173	1.00	100	27	U	27	1972	0.000
Total		–	–	33	83	350	–	–	42	U	42	–	0.250
Greece	2,3	1961	LC	680	1 020	4 270	0.30	500	908	667	1 575	1971	10.978
Albania	3	–	U	U	–	–	–	U	U	U	–	–	0.699
Total, Southern Europe		–	AN	362	2 874	12 022	–	–	469	229	697	–	3.285
		–	BT	99	693	2 901	–	–	140	244	384	–	1.510
		–	SB	524	3 214	13 454	–	–	760	648	1 408	–	6.560
		–	BC	1 515	3 813	15 961	–	–	1 784	282	2 066	–	9.780
		–	LN	16 079	41 397	173 288	–	–	17 137	3 733	20 870	–	25.660
		–	LC	680	1 020	4 270	–	–	948	667	1 615	–	11.877
Total		–	–	19 259	53 011	221 896	–	–	21 238	5 803	27 040	–	58.672

Table III-12 (continued)

Name of Continent, Region and Country *Continents, Régions et Pays*	Ref. No. *N° de réf.*	Year of Ref. *Année de réf.*	Rank *Types*	Recoverable Reserves *Réserves récupérables*: Amount (mega-tonnes) *Quantités (méga-tonnes)*	Energy Content *Teneur en énergie*: (millions of Gcal.) *(millions de Gcal)*	(millions of GJ) *(millions de GJ)*	Min. Seam Thickness (m) *Epaisseur min. du gisement*	Max. Depth (m) *Profondeur max.*	Total Resources in Place *Réserves totales in situ*: Reserves (mega-tonnes) *Réserves (méga-tonnes)*	Additional (mega-tonnes) *Additionnelles (méga-tonnes)*	Total (mega-tonnes) *totales (méga-tonnes)*	Recent Annual Production *Production annuelle récente*: Year of Ref. *Année de production*	Amount (mega-tonnes) *Quantité (méga-tonnes)*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Northern Europe													
United Kingdom	1	1973	AN	69	552	2 311	0.61	1 219	5 618	417	6 035	1973	3.353
	1	1973	BT	3 802	26 614	111 406	0.61	1 219	93 259	63 520	156 779	1973	135.737
Total	1	–	–	3 871	27 166	113 717	–	–	98 877	63 937	162 814	–	139.090
Sweden	1	1967	SB	30	126	527	0.75	1.90	60	30	90	–	0.000
	1,3	1952	P	0	–	–	–	–	9 400	–	9 400	1971	0.104
Total		–	–	30	126	527	–	–	9 460	30	9 490	–	0.104
Denmark	1	1970	BC	20	40	167	2.00	10	20	0	20	1972	0.000
	1,3	1958	P	0	–	–	0.30	4	561	0	561	1971	0.007
Total		–	–	20	40	167	–	–	581	0	581	–	0.007
Finland	1	1972	P	4290	8580	35 916	1.00	3	33 000	0	33 000	1972	0.165
Norway	1	1972	BT	2	15	63	0.60	500	2	150	152	1972	0.430
Ireland	2,1	1967	HC	18	126	527	0.30	1 200	22	26	48	1972	0.155
Total, Northern Europe		–	AN	69	552	2 311	–	–	5 618	417	6 035	–	3.353
		–	BT	3 804	26 629	111 469	–	–	93 261	63 670	156 931	–	136.167
		–	SB	30	126	527	–	–	60	30	90	–	–
		–	HC	18	126	527	–	–	22	26	48	–	0.155
		–	BC	20	40	167	–	–	20	0	20	–	–
Total		–	–	3 941	27 473	115 001	–	–	98 981	64 143	163 124	–	139.675
Eastern Europe													
Poland	2,1	1967	HC	17 800	99 680	417 260	1.00	1 000	32 425	13 316	45 741	1972	150.700
	2,1	1967	LC	4 840	12 334	51 630	3.00	300	6 449	8 413	14 862	1972	38.200
Total		–	–	22 640	112 014	468 890	–	–	38 874	21 729	60 603	–	188.900
Romania	2,3,4	1966	HC	50	420	17 300	0.30	1 200	70	–	590	1971	8.091
	2,3,4	1966	LC	1 100	4 785	20 028	0.30	500	3 900	–	1 367	1971	13.803
Total		–	–	1 150	5 205	21 758	–	–	3 970	–	1 957	–	21.895
Germany, D.R. of	2,3	1956	HC	100*	700	2 930	0.30	1 200	200	–	50	1971	1.198
	2,1	1966	BC	25 200	105 000	439 530	2.00	150	30 000	–	30 000	1971	246.000
Total		–	–	25 300	105 700	442 460	–	–	30 200	–	30 050	–	247.198
Czechoslovakia	2,3	1966	HC	2 493	17 451	73 050	0.30	1 200	5 540	6 033	11 573	1971	28.708
	2,3	1966	LC	3 870	13 545	56 700	0.30	500	8 234	1 623	9 857	1971	84.324
Total		–	–	6 363	30 996	129 750	–	–	13 774	7 656	21 430	–	113.032
Hungary	2,3,4	1966	HC	225*	1 125	4 710	0.30	1 200	450	–	714	1971	3.942
	2,3,4	1966	LC	1 450*	4 205	17 600	0.30	500	2 900	–	5 679	1971	23.472
Total		–	–	1 675	5 330	22 310	–	–	3 350	–	6 393	–	27.414
Bulgaria	1	1972	BT	29	203	850	0.50	3	29	5	34	–	0.500
	1	1972	BC	346	865	3 621	0.70	20	346	110	456	–	8.000
	1	1972	LN	4 012	10 030	41 986	10.00	15	4 012	730	4 742	–	20.000
Total		–	–	4 387	11 098	46 457	–	–	4 387	845	5 232	–	28.500
Total, Eastern Europe		–	BT	29	203	850	–	–	29	5	34	–	0.500
		–	HC	20 668	119 376	499 680	–	–	38 685	19 349	58 668	–	192.639
		–	BC	25 546	105 865	443 151	–	–	30 346	110	30 456	–	254.000
		–	LN	4 012	10 030	41 986	–	–	4 012	730	4 742	–	20.000
		–	LC	11 260	34 869	145 958	–	–	21 483	10 036	31 765	–	159.800
Total		–	–	61 515	270 343	1 131 625	–	–	94 555	30 230	125 665	–	626.939
Total Europe		–	AN	721	5 746	24 044	–	–	6 667	646	7 312	–	9.438
		–	BT	5 482	38 375	160 638	–	–	96 555	63 919	160 474	–	138.177
		–	SB	554	3 340	13 981	–	–	821	681	1 502	–	6.560
		–	HC	51 256	333 489	1 395 968	–	–	84 340	205 675	290 649	–	334.754
		–	BC	36 731	127 861	535 228	–	–	87 844	748	88 592	–	379.450
		–	LN	20 091	51 427	215 274	–	–	21 149	4 463	25 612	–	45.660
		–	LC	11 940	35 889	150 228	–	–	22 431	10 703	33 380	–	171.677
Total		–	–	126 775	596 127	2 495 361	–	–	319 807	286 835	607 521	–	1 085.716
USSR	1	1971	HC	82 900*	431 080	1 804 500	0.60	1 000	165 800	3 827 500	3 993 300	1971	461.500
	1	1971	LC	53 700*	155 730	651 886	0.80	430	107 400	1 612 900	1 720 300	1971	179.500
Total		–	–	136 600	586 810	2 456 386	–	–	273 200	5 440 400	5 713 600	–	641.000

Table III-12 (continued)

Name of Continent, Region and Country *Continents, Régions et Pays*	Ref. No. *N° de réf.*	Year of Ref. *Année de réf.*	Rank *Types*	Recoverable Reserves *Réserves récupérables*: Amount (mega-tonnes) *Quantités (méga-tonnes)*	Recoverable Reserves: Energy Content *Teneur en energie* (millions of Gcal.) *(millions de Gcal)*	Recoverable Reserves: Energy Content *Teneur en energie* (millions of GJ) *(millions de GJ)*	Recoverable Reserves: Min. Seam Thickness (m) *Epaisseur min. du gisement*	Recoverable Reserves: Max. Depth (m) *Profondeur max.*	Total Resources in Place *Réserves totales in situ*: Reserves (mega-tonnes) *Réserves (méga-tonnes)*	Total Resources in Place: Additional (mega-tonnes) *Additionnelles (méga-tonnes)*	Total Resources in Place: Total (mega-tonnes) *totales (méga-tonnes)*	Recent Annual Production *Production annuelle récente*: Year of Ref. *Année de production*	Recent Annual Production: Amount (mega-tonnes) *Quantité (méga-tonnes)*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
North America													
Northern America													
United States	1	1972	AN	5 755	46 064	192 824	0.71	305	11 510	7 866	19 375	1971	7.891
	1	1972	BT	117 688	827 393	3 463 467	0.71	305	235 376	989 005	1 224 380	1971	495.040
	1	1972	SB	35 282	233 028	975 455	1.52	305	70 565	971 441	1 042 006	1971	1.088
	1	1972	LN	23 056	110 722	463 481	1.52	305	46 112	592 634	638 746	1971	8.095
Total		–	–	181 781	1 217 207	5 095 227	–	–	363 562	2 560 942	2 924 503	–	512.114
Canada	1	1973	BT	4 195	26 357	110 331	0.30	–	7 356	80 705	88 061	1972	11.356
	1	1970	SB	885	3 278	13 722	0.91	–	1 107	7 873	8 979	1972	4.449
	1	1970	LN	457	1 691	7 078	0.91	–	571	11 165	11 737	1972	2.978
Total		–	–	5 537	31 326	131 131	–	–	9 034	99 743	108 777	–	18.783
Greenland	2,1	1967	HC	1	7	29	0.30	1 200	2	–	2	–	0.004
Total, Northern America		–	AN	5 755	46 064	192 824	–	–	11 510	7 866	19 375	–	7.891
		–	BT	121 883	853 750	3 573 798	–	–	242 732	1 069 710	1 312 441	–	506.396
		–	SB	36 167	236 306	989 177	–	–	71 672	979 314	1 050 985	–	5.537
		–	HC	1	7	29	–	–	2	–	2	–	0.004
		–	LN	23 513	112 413	470 559	–	–	46 683	603 799	650 483	–	11.073
Total		–	–	187 319	1 248 540	5 226 387	–	–	372 598	2 660 689	3 033 286	–	530.901
Middle America													
Mexico	1	1973	HC	629	4 018	16 820	1.20	1 200	5 316	U	12 000	1971	3.563
Honduras	2	1913	HC	–	–	–	0.30	1 200	–	1	1	–	–
	2	1913	LC	–	–	–	0.30	500	–	4	4	–	–
Total		–	–	–	–	–	–	–	–	5	5	–	–
Total, Middle America		–	HC	629	4 018	16 820	–	–	5 316	1	12 001	–	3.563
		–	LC	–	–	–	–	–	–	4	4	–	–
Total		–	–	629	4 018	16 820	–	–	5 316	5	12 005	–	3.563
Total, North America		–	AN	5 755	46 064	192 824	–	–	11 510	7 866	19 375	–	7.891
		–	BT	121 883	853 750	3 573 798	–	–	242 732	1 069 710	1 312 441	–	506.396
		–	SB	36 167	236 306	989 177	–	–	71 672	979 314	1 050 985	–	5.537
		–	HC	630	4 025	16 849	–	–	5 318	1	12 003	–	3.567
		–	LN	23 513	112 413	470 559	–	–	46 683	603 799	650 483	–	11.073
		–	LC	–	–	–	–	–	–	4	4	–	–
Total		–	–	187 948	1 252 558	5 243 207	–	–	377 915	2 660 689	3 045 287	–	534.464
South America													
Tropical South America													
Brazil	1	1972	SB	1 790*	9 845	41 210	0.60	300	3 256	U	3 256	1972	5.860
Colombia	1	1971	BT	28	196	820	0.60	U	40	3 220	3 260	1971	3.800
	1	1971	SB	81	486	2 034	1.20	700	110	730	840	1971	U
	1	1971	LC	U	–	–	U	U	U	1 230	1 230	1971	U
Total		–	–	109	682	2 854	–	–	150	5 180	5 330	–	3.800
Peru	2,3	1966	HC	105	663	2 770	0.30	1 200	211	2 123	2 334	1971	0.107
	2,3	1966	LC	–	–	–	0.30	500	–	4 630	4 630	1971	0.000
Total		–	–	105	663	2 770	–	–	211	6 753	6 934	–	0.107
Venezuela	1	1972	SB	11	81	338	0.50	500	14	831	845	–	0.030
	1	1953	LN	0	–	–	0.50	200	0	26	26	–	0.001
Total		–	–	11	81	338	–	–	14	857	871	–	0.031
Total, Tropical South America		–	BT	28	196	820	–	–	40	3 220	3 260	–	3.800
		–	SB	1 882	10 412	43 582	–	–	3 380	1 561	4 941	–	5.890
		–	HC	105	663	2 770	–	–	211	2 123	2 334	–	0.107
		–	LN	–	–	–	–	–	–	26	26	–	0.001
		–	LC	–	–	–	–	–	–	5 860	5 860	–	–
Total		–	–	2 015	11 271	47 172	–	–	3 631	12 790	16 421	–	9.798
Temperate South America													
Argentina	1	1972	SB	100	620	2 595	0.80	600	155	400	555	1972	1.200
	1,3	1972	P	45*	90	377	U	10	90	50	140	1972	0.003
Total		–	–	145	710	2 972	–	–	245	450	695	–	1.203

Table III-12 (continued)

Name of Continent, Region and Country / *Continents, Régions et Pays*	Ref. No. / *N° de réf.*	Year of Ref. / *Année de réf.*	Rank / *Types*	Recoverable Reserves / *Réserves récupérables*: Amount (mega-tonnes) / *Quantités (méga-tonnes)*	Recoverable Reserves: Energy Content / *Teneur en energie* (millions of Gcal.) / *(millions de Gcal)*	Recoverable Reserves: Energy Content / *Teneur en energie* (millions of GJ) / *(millions de GJ)*	Recoverable Reserves: Min. Seam Thickness (m) / *Epaisseur min. du gisement*	Recoverable Reserves: Max. Depth (m) / *Profondeur max.*	Total Resources in Place / *Réserves totales in situ*: Reserves (mega-tonnes) / *Réserves (méga-tonnes)*	Total Resources in Place: Additional (mega-tonnes) / *Additionnelles (méga-tonnes)*	Total Resources in Place: Total (mega-tonnes) / *totales (méga-tonnes)*	Recent Annual Production / *Production annuelle récente*: Year of Ref. / *Année de production*	Recent Annual Production: Amount (mega-tonnes) / *Quantité (méga-tonnes)*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Chile	1	1972	BT	32	243	1 018	0.75	1 000	45	245	290	1972	1.500
	1	1972	SB	26	130	544	1.00	500	52	3 603	3 655	1972	0.050
Total		–	–	58	373	1 562	–	–	97	3 848	3 945	–	1.550
Uruguay	1	1969	P	10	20	84	0.30	6	10	0	10	1973	0.000
Total, Temperate South America		–	BT	32	243	1 018	–	–	45	245	290	–	1.500
		–	SB	126	750	3 139	–	–	207	4 003	4 210	–	1.250
Total		–	–	158	993	4 157	–	–	252	4 248	4 500	–	1.750
Total South America		–	BT	60	439	1 838	–	–	85	3 465	3 550	–	5.300
		–	SB	2 008	11 162	46 721	–	–	3 587	5 564	9 151	–	7.140
		–	HC	105	663	2 770	–	–	211	2 123	2 334	–	0.107
		–	LN	–	–	–	–	–	–	26	26	–	0.001
		–	LC	–	–	–	–	–	–	5 860	5 860	–	–
Total		–	–	2 173	12 264	51 329	–	–	3 883	17 038	20 921	–	12.548
Oceania													
Australia	1	1972	BT	13 770	90 882	380 432	1.00	600	25 032	86 324	111 356	–	56.800
	1	1972	SB	395	1 778	7 441	1.50	200	508	0	• 508	–	2.700
	1	1973	BC	10 160	22 352	93 565	30.00	200	48 800	37 900	86 700	–	23.700
Total		–	–	24 325	115 012	481 438	–	–	74 340	124 224	198 564	–	83.200
New Zealand	1	1969	BT	36	200	837	1.20	305	58	73	131	1971	0.380
	1	1969	SB	137	571	2 390	1.20	305	239	308	548	1971	1.550
	1	1969	LN	17	60	249	1.50	305	57	340	396	1971	0.160
Total		–	–	190	831	3 476	–	–	354	721	1 075	–	2.090
New Caledonia	2	1952	HC	3*	18	73	0.30	1 200	5	10	15	–	–
Total Oceania		–	BT	13 806	91 082	381 269	–	–	25 090	86 397	111 487	–	57.180
		–	SB	532	2 349	9 831	–	–	747	308	1 056	–	4.250
		–	HC	3	18	73	–	–	5	10	15	–	–
		–	BC	10 160	22 352	93 565	–	–	48 800	37 900	86 700	–	23.700
		–	LN	17	60	249	–	–	57	340	396	–	0.160
Total		–	–	24 518	115 861	484 987	–	–	74 699	124 955	199 654	–	85.290
World Total		–	AN	7 146	57 144	239 196	–	–	19 337	9 153	28 488	–	79.127
		–	BT	233 361	1 613 631	6 754 661	–	–	696 154	1 944 718	2 640 871	–	1 191.113
		–	SB	40 348	259 593	1 086 651	–	–	79 122	986 137	1 065 259	–	24.327
		–	HC	150 012	859 031	3 595 877	–	–	283 103	4 104 929	4 395 350	–	885.268
Subtotal		–	–	430 867	2 789 399	11 676 385	–	–	1 077 716	7 044 937	8 129 968	–	2 179.835
		–	BC	47 090	151 088	632 456	–	–	137 836	38 948	176 784	–	403.550
		–	LN	44 620	166 929	698 759	–	–	70 032	608 628	678 660	–	56.994
		–	LC	68 614	203 181	850 511	–	–	134 690	1 633 537	1 768 472	–	365.133
Subtotal		–	–	160 324	2 181 726	2 181 726	–	–	342 558	2 281 113	2 623 916	–	825.677
Total		–	–	591 191	3 310 597	13 858 111	–	–	1 420 274	9 326 050	10 753 884	–	3 005.512

Notes:

*Where data on recoverable reserves were unavailable, values which are 50% of reserves-in-place have been used.

In addition to the countries listed in the tabulation above negligible resources have been reported for higher ranking solid fuels in Lesotho (1947), Philippines (1966), Thailand (1967), and Switzerland (1967) and for brown coal and lignite in Lesotho (1947), South Africa (1959), Mexico (1966), and United Kingdom (1967).

The assumptions used for calculating total energy content of fuels are described in the text.

Reference:

1. Current (1974) World Energy Conference Survey
2. 1968 World Energy Conference Survey; (Resource data only)
3. Mineral Yearbook, 1971, U.S. Bureau of Mines; (Production data only)
4. J. G. Polach, The Development of Energy in East Europe, RFF, 1970; (Resource data only)
5. M. Rumberger, Deutsches Institut für Wirtschafts forschung, personal communication. Values given are probably conservative.

Table III-12A. Reserves and Annual Production of Peat
Tableau III-12A. Réserves et production annuelle de tourbe
(titres des colonnes comme celles du tableau III-12)

Name of Continent, Region and Country	Ref. No.	Year of Ref.	Recoverable Reserves: Amount (megatonnes)	Recoverable Reserves: Min thickness (m)	Recoverable Reserves: Max Depth (m)	Total Reserves: Amount (megatonnes)	Total Reserves: Total Energy (millions of Gcal)	Total Reserves: Total Energy (millions of GJ)	Year of Ref.	Recent Annual Production: Amount (megatonnes): Fuel	Recent Annual Production: Amount (megatonnes): Agriculture	Recent Annual Production: Amount (megatonnes): Total
Asia												
Korea, Rep. of	2,3	–	U	0.50	–	163	326	1 365	1971	–	0.009	0.009
Japan	2,3	1963	U	0.50	–	500	1 000	4 186	1971	U	U	0.073
Pakistan	2,3	1966	U	0.50	–	100[1]	200	837	–	–	–	–
Bangladesh	1	1962	35	0.08	4	39[2]	78	327	–	–	–	–
Israel	2,3	–	U	0.50	–	U	U	U	1971	–	0.020	0.020
Total Asia		–	–	–	–	802	1 604	6 715	–	–	0.029	0.102
Europe												
Western Europe												
Germany, F.R. of	1,3	1972	900	2.00	12	900	1 800	7 535	1972	0.400	1.300	1.700
France	2,3	1967	N	0.50	–	N	–	–	1971	–	0.073	0.073
Netherlands	2,3	1955	U	0.50	–	13	26	109	1971	U	U	0.400
Austria	2	1966	U	0.50	–	20	40	167	–	–	–	–
Total, Western Europe		–	–	–	–	933	1 866	7 811	–	0.400	1.373	2.173
Northern Europe												
United Kingdom	2	1968	U	–	–	1 610	3 220	13 478	–	–	–	–
Sweden	1,3	1952	U	–	–	9 400	18 800	78 697	1971	0.023	0.082	0.105
Denmark	1,3	–	0	0.30	4	561	1 122	4 697	1971	0.005	–	0.005
Finland	1,3	1972	4 290	1.00	3	33 000	66 000	276 276	1972	0.170	0.145	0.315
Norway	2,3	1966	U	0.50	–	85	170	712	1971	0.004	0.012	0.016
Ireland	2,3	1967	U	0.50	–	400	800	3 349	1971	4.900	0.050	4.950
Iceland	2	1967	U	0.50	–	2 000	4 000	16 744	–	–	–	–
Total, Northern Europe		–	–	–	–	47 056	94 112	393 953	–	5.102	0.289	5.390
Eastern Europe												
Poland	2,3	1967	U	0.50	–	24 000	48 000	200 928	1971	0.050	–	0.050
Romania	2	1932	U	0.50	–	68	136	569	–	–	–	–
Hungary	2,3	1966	N	0.50	–	N	N	N	1971	–	0.065	0.065
Total, Eastern Europe		–	–	–	–	24 068	48 136	201 479	–	0.050	0.065	0.115
Total Europe		–	–	–	–	72 057	144 114	603 243	–	5.552	1.727	7.678
USSR	2,3	1967	U	0.50	–	125 592	251 194	1 051 500	1971	57.000	130.000	187.000
North America												
United States	2,3	1967	U	0.50	–	12 540	25 080	104 985	1971	–	0.550	0.550
Canada	2,3	1926	U	0.50	–	200	400	1 675	1971	–	0.280	0.280
Total North America		–	–	–	–	12 740	25 480	106 660	–	–	0.830	0.830
South America												
Argentina	1,3	1972	U	U	10	90[3]	180	753	1971	–	0.003	0.003
Uruguay	1	1972	10	0.30	6	10	20	84	–	–	0.003	0.003
Total South America		–	10	–	–	100	200	837	–	–	0.003	0.003
Oceania												
Papua-New Guinea	2	1967	U	0.50	–	10	20	84	–	–	–	–
World Total		–	–	–	–	211 301	422 612	1 769 039	–	62.552	132.589	195.613

Notes:

In addition to the countries listed in the tabulations above, Lesotho (1960), Guyana (1961), Philippines (1966), Bulgaria (1965), Portugal (–), Switzerland (1966) and Australia (1967) have reported negligible resources. Mexico (1967) and Thailand (1967) have reported that resource data have been recorded but are not yet available. Rhodesia (1961), Angola (1965), South Africa (1959), P.R. of China (–), India (–), Indonesia (1962), D.R. of Germany (1973), Spain (–), Cuba (1963), Chile (1967), Venezuela (–), and New Zealand (1967) have indicated that data are unavailable.

Total energy content of peat reserves in each country are calculated values based on the use of 2000 kcal (8.37 million joules)/kg.

1. Excludes reserves in Bangladesh.
2. Excludes 119 million tons of additional resources.
3. Excludes 50 million tons of additional resources.

References

1. Data from current survey; see Appendix 2.
2. "World Power Conference Survey of Energy Resources, 1968," A. Parker, 1968 (Resource data only).
3. "Mineral Yearbook, 1971," Vol. I-II, U.S. Bureau of Mines, 1972 (Production data only).

Appendixes
Annexes

Introduction to Appendixes

All information received from participating nations is incorporated in the following nine appendixes. Each appendix includes an explanatory introduction, a table of statistical data, a table summarizing notes and qualifications, and a table of references provided by the reporting nations. Additional tables are also provided in several appendixes for supplementary qualifying information such as definitions of rank for solid fossil fuels and the bases for nuclear fuel costs.

Following preparation and printing of the survey questionnaires, each National Committee of the World Energy Conference was sent a set of copies and was then responsible for having them filled out by the appropriate agencies or organizations within the country. Where a country had dependent or associated territories not separately represented on the World Energy Conference, the National Committee was also requested to assume the responsibility for completion of tables relating to those territories. In order to provide greater coverage questionnaires were also sent to 60 non-WEC nations and data from an additional ten countries were obtained in this way. Upon receipt, all data

INTRODUCTION aux ANNEXES

Toutes les informations reçues des pays participants sont incluses dans les 9 annexes suivantes. Chaque annexe comprend une introduction explicative, un tableau de données statistiques, un tableau récapitulant les notes et les qualifications et un tableau de références fournies par les pays rapporteurs. On trouvera également dans plusieurs annexes d'autres tableaux donnant des informations complémentaires particulières telles que les définitions des types de combustibles solides fossiles et les bases d'établissement des coûts des combustibles nucléaires.

Quand les questionnaires ont été établis et imprimés on les a envoyés à tous les Comités Nationaux de la Conférence Mondiale de l'Energie en leur demandant de les faire remplir, sous leur responsibilité, par les services ou les organisations compétentes de leur pays. Lorsqu'un pays avait des territoires associés ou sous sa dépendance, non représentés de façon indépendante à la Conférence Mondiale de l'Energie, le Comité National a également été chargé de prendre sous sa responsabilité l'établissement des tableaux relatifs à ces territoires. De façon à assurer une diffusion plus grande, des questionnaires ont également été envoyés à 60 pays non membres de la CME, et l'on a obtenu de cette façon des informations relatives à 10 pays supplémentaires. Dès réception, toutes ces informations ont été mises were appropriately edited and entered into a computer bank. Since much of the reported data were in non-metric units, the computer converted these to Systéme International (SI) units prior to print-out in the form presented. Use of the computer also simplified processing of added and/or corrected information received from some nations subsequent to the initial submission.

The remainder of this section is devoted to (1) a general explanation of the data in the appendixes, (2) a note on units used in the report, and (3) a short discussion of Table 1 included in this introductory section.

General Explanations

As noted above, only data received from reporting nations are contained in the appendixes; data for non-reporting countries, obtained from other sources, are listed only in the summary tables, in the main text for each resource. In most instances all reported data are given; however, in a few cases where very detailed information was submitted some recombination was done. All information submitted in a language other than English was translated into English except for references, which were retained in the original language. A certain amount of editing of notes and comments was done to provide for a limited degree of uniformity.

In all appendix and summary tables the nations have been arranged by continent and region. Regions are approximately the same as those used by the United Nations in listing demographic and other data. Within a given region, the nations are listed in decreasing order of population. When data were provided for national subdivisions, these are listed under the national heading. In many cases subdivisions for various resources were different. When a nation reported only total data, such data are listed on a subdivision line entitled "Entire Nation," or an actual subdivision name where the resource exists only in a single area. The various national subdivisions are shown on most of the resource maps at the end of the report.

sous une forme appropriée et entrées dans une banque de données sur ordinateur. Comme beaucoup des informations soumises étaient exprimées en unités non métriques, l'ordinateur les a converties en unité du système international (SI) avant leur impression sous la forme actuelle. L'utilisation de l'ordinateur a également simplifié le traitement des informations additionnelles et/ou corrigées reçues de quelques pays après leur envoi initial.

Le reste de la présente section se rapporte à: (1) une explication générale des informations données dans les annexes. (2) une note sur les unités utilisées dans le présent rapport. (3) une courte étude du tableau 1 qui fait partie de la présente introduction.

Explications générales

Comme il a été mentionné plus haut, seules sont consignées dans les annexes les informations reçues des pays rapporteurs; les informations en provenance des autres pays, obtenues par d'autres sources, sont simplement énumérées dans des tableaux récapitulatifs du texte principal relatif à chaque type de ressource. Dans la plupart des cas, toutes les informations communiquées sont données; cependant dans quelques cas où des informations très détaillées étaient fournies, on a procédé à quelques regroupements. Toutes les informations présentées dans une langue autre que l'anglais ont été traduites en anglais à l'exception des références qui ont été maintenues dans la langue d'origine. Un certain nombre de notes d'édition et de commentaires assurent un certain degré d'uniformité.

Dans tous les tableaux des annexes et dans les tableaux récapitulatifs, les pays ont été classés par continent et par région. Les régions sont approximativement les mêmes que celles qu'utilisent les Nations Unies dans leurs séries démographiques et pour d'autres informations. A l'intérieur d'une région donnée, les pays sont énumérés par ordre décroissant de population. Lorsque les informations sont données pour des subdivisions nationales, elles apparaissent sous la rubrique du pays. Dans de nombreux cas les subdivisions ne sont pas les mêmes pour différentes ressources. Lorsqu'un pays n'a communiqué que des informations globales, celles-ci sont énumérées sur une ligne d'une subdivision intitulée "ensemble du pays" ou sous le nom réel de la subdivision lorsque cette ressource n'existe que dans cette région particulière. Les différentes subdivisions nationales apparaissent sur la plupart des cartes sur les ressources à la fin du présent rapport.

From left to right, reserves data (including supplementary information), additional resources data, and information on recent annual production are listed in that order in the appendix tables. Where subdivision data are listed on more than one line (solid fuels, nuclear fuels), the descending order is for decreasing rank and increasing costs, respectively. Except for single line entries, totals are provided for each nation. Regional continental and world totals are not given in the appendix tables but are provided in the summary tables in the main text.

In most cases complete quantitative data were provided; in those cases where only partial data or qualitative responses were received the following symbols were used:

U = Unknown or not available
C = Confidential or proprietary
N = Negligible amount
O = Nil or none
\- = Not reported

When data were on bases other than those defined for the current survey, such deviations are explained in the Table of Notes with appropriate use of reference notations, i.e., (a), etc. The sources of statistics, that is, the name of the government department(s) or private organization(s) which collected, compiled, or prepared estimates of data reported in the statistical tables, are listed in the Table of References. Similarly, when data were derived from a publication, the author, title and agency is given. The National Committee was given as a source only when the data were collected by the National Committee itself or when data were so greatly adapted for reporting purposes that the responsibility for them no longer rests with the department or organization that originally collected them.

In both the appendix tables and the summary tables the number of significant figures given for quantities is generally greater than warranted. In a few instances nations reported data to the degree of

Les informations relatives aux réserves (y compris les informations complémentaires), les informations relatives aux ressources additionnelles et les informations relatives à la production annuelle la plus récente sont énumérées de la gauche vers la droite dans les tableaux des annexes. Lorsque des informations concernant une subdivision sont données sur plus d'une ligne (combustibles solides, combustibles nucléaires) l'ordre décroissant correspond respectivement au rang décroissant et aux coûts croissants. Sauf pour les renseignements figurant sur une seule ligne, les totaux sont donnés pour chaque pays. Les totaux par région, par continent, et pour le monde entier ne sont pas donnés dans les tableaux des annexes mais dans les tableaux récapitulatifs figurant dans le texte principal.

Dans la plupart des cas, des informations quantitatives complètes sont données; dans les cas où seules des informations partielles ou des réponses qualitatives ont été communiquées, on a utilisé les symboles suivants:

U = inconnu ou non disponible
C = confidentiel ou propriété privée
N = quantité négligeable
O = néant ou aucun
\- = non communiqué

Lorsque des informations reposent sur des bases autres que celles qui ont été définies pour l'enquête actuelle, ces différences sont expliquées dans le tableau de notes qui utilisent des notations de références appropriées c'est-à-dire (a), etc. . . L'origine des statistiques, c'est-à-dire le nom des services gouvernementaux ou des organismes privés qui les ont recueillies, compilées, ou qui ont préparé les estimations concernant les informations communiquées dans les tableaux statistiques, sont donnés dans la table de références. De la même façon, lorsque les informations proviennent d'une publication, l'auteur, son titre et son appartenance professionnelle sont indiqués. Le Comité National n'apparaît en tant que source seulement lorsque les informations ont été recueillies par le Comité National lui-même ou lorsque ces informations ont dû être tellement adaptées pour les besoins du rapport que la responsabilité des services ou des organismes qui les avaient recueillies à l'origine n'avait plus guère de signification.

Dans les tableaux des annexes tout comme dans les tableaux récapitulatifs le nombre de chiffres significatifs donnés pour les quantités est généralement plus grand que le nombre garanti. Peu de pays ont communiqué leurs informations avec le significance given; in most cases, however, the indicated degree of significance shown is the result of conversion of reported values to SI units. In general, all quantitative data are accurate to only two or, at most, three figures. It should also be noted that in the appendix tables (but not in the summary tables) decimal points do not line up vertically. This was done to give added significant figures to small numbers. This seemed satisfactory since national totals are provided in the appendixes.

Notes on Units Used in Current Survey

All data in the present survey are reported in Systeme International (SI) units.* In those cases where the reporting nations submitted information in terms of other units they were converted to equivalent SI units.

The original metric system employed the centimetre (length), gram (mass), and second (time) as standard basic units for the long used conventional cgs system. Starting in 1948, the metric system was revised to make the kilogram, metre and second the standard base units of the new Systeme International. The SI system also provides for use of prefixes to designate both multiple and submultiple units; however, in the present survey only the former are of importance. Thus, kilo designates units 10^3 times the basic units; mega, 10^6; giga, 10^9; and tera, 10^{12}. The tonne, which is equal to 10^3 kilograms, is an acceptable alternative basic unit for mass and has been used throughout the report because many numbers are too large to be expressed, conveniently, in terms of kilograms. The largest unit used is teratonnes which have generally been expressed as millions of megatonnes.

The SI system also employs units derived from the basic SI units. Those of importance to the current survey include:

Quality	Unit	Symbol
Area	square metre	m^2
Volume	cubic metre	m^3
Density	kilograms per cubic metre	kg/m^3
Energy	joule	$J = kg \times m^2/S^2$
Power	watt	$W = J/s$

*See *Le Systeme International d'Unites*, International Bureau of Weights and Measures, Paris, 1970 or U.S. National Bureau of Standards (NBS), Special publication 330, 2nd Edition, Washington, 1972.

degré de signification voulu; dans la plupart des cas le degré de signification indiqué montre qu'il s'agit simplement du résultat de la conversion des valeurs communiquées, en unités SI. En général, toutes les informations quantitatives sont précises à seulement 2 ou au plus à 3 chiffres près. Il faut également remarquer que dans les tableaux des annexes (mais pas dans les tableaux récapitulatifs), les virgules ne sont pas toutes sur une même ligne verticale. Ceci a été fait pour donner plus de signification aux petits nombres, et paraît satisfaisant car les totaux nationaux sont donnés dans les annexes.

Notes sur les unités utilisées pour l'enquête

Toutes les informations figurant dans la présente enquête sont données en unités du système international SI. Dans les cas où les pays rapporteurs ont communiqué des informations en unités autres que les unités internationales, cellesci ont été converties en unités SI.

Le système métrique original utilisé a été le centimètre (longueur), le gramme (masse) et la seconde (temps) comme unités de base normalisées pour l'ancien système conventionnel cgs. A partir de 1948 le système métrique a été révisé de façon à faire du kilogramme, du mètre et de la seconde, des unités de base normalisées du nouveau système international. Le système SI implique également l'utilisation de préfixes pour désigner à la fois le unités multiples et sous-multiples; cependant dans la présente enquête seules les premières ont de l'importance. Ainsi le préfixe kilo désigne des unités représentant 10^3 fois les unités de base; mega, 10^6; giga 10^9; et tera 10^{12}. La tonne qui est égale à 10^3 kilogrammes est aussi une unité de base acceptable pour la masse et a été utilisée dans tout le présent rapport car beaucoup de nombres sont trop importants pour être exprimés de façon convenable en terme de kilogramme. L'unité la plus grande utilisée est la teratonne qui a en général été exprimée en millions de mégatonnes.

Le système SI utilise également des unités dérivées des unités de base SI. Celles qui ont de l'importance dans la présente enquête comprennent:

Nature	Unité	Symbole
Surface	mètre carré	m^2
Volume	mètre cube	m^3
Densite	kilogramme par mètre cube	kg/m^3
Energie	joule	$J = kg \times m^2/s^2$
Puissance	watt	$W = J/s$

In the present report the joule has been used as the common denominator of energy; however, the calorie and the kilowatt-hour have also been used as secondary designations. One joule is equivalent to 0.23918 gramcalorie or to 1 watt-second (2.778 x 10^{-7} kilowatt-hour).

Where very large numbers occur the exponential form has been used occasionally, i.e., 20 000 000 000 is given as 2 x 10^{10}. Only exponents divisible by 3 have been employed, thus 2 x 10^{10} is given as 20 x 10^9 Since the term billion (and all larger numerical designations) are ambiguous on a worldwide basis, such designations have not been used.

The tabulation below gives the numerical terminology used almost exclusively in the current survey.

Dans le présent rapport on a utilisé le joule comme dénominateur commun pour l'énergie, cependant, la calorie et le kilowatt-heure ont également été utilisés comme unités secondaires. Un joule est équivalent à 0,23918 caloriegramme ou à un watt-seconde (2.778 x 10^{-7} kilowatt-heure).

Lorsque l'on s'est trouvé en face de nombres très importants on a utilisé la forme exponentielle à l'occasion c'est-à-dire que 20 000 000 000 est donné sous la forme de 2 x 10^{10}. Seuls les exposants divisibles par 3 ont été utilisés, ainsi 2 x 10^{10} est donné sous la forme 20 x 10^9. Comme le terme billion (et toutes les désignations numériques plus importantes) sont ambiguës de par le monde, de telles unités n'ont pas été utilisées.

Le tableau ci-dessous donné la terminologie numérique utilisée presque exclusivement dans la présente étude:

Resource	Unit	Prefixes	Largest Quantity
Coal	tonne	mega, kilo	million megatonnes (10^{15} kilograms)
Oil	tonne	mega	thousand megatonnes (10^{12} kilograms)
Natural gas*	cubic metre	kilo	cubic kilometres
Hydraulic capacity	watt	mega, giga	thousand megawatts (10^9 watts)
Hydraulic energy	joules	tera	million terajoules (10^{18} joules)
Nuclear	tonnes	mega	megatonnes (10^9 kilograms)

*Terminology for natural gas can be ambiguous. As used in this survey, one cubic kilometre does not mean 1000 cubic metres.

Ressource	Unité	Préfixes	Quantité la plus grande
Charbon	tonne	mega, kilo	million de mégatonnes (10^{15} kilogrammes)
Pétrole	tonne	mega	mille mégatonnes (10^{12} kilogrammes)
Gaz naturel*	mètre cube	kilo	kilomètre cube
Puissance Hydraulique	watt	mega, giga	mille megawatts (10^9 watts)
Energie Hydraulique	joule	tera	million de terajoules (10^{18} joules)
Nucléaire	tonne	mega	mégatonne (10^9 kilogrammes)

*La terminologie relative au gaz naturel peut être ambigue. Dans la présente étude un kilomètre cube ne signifie pas 1000 mètres cube.

Geographical Data and Energy Resource Index

Table 1 provides basic geographical data for essentially all nations of the world. It also gives an index of reported energy data submitted by each reporting country.

Informations géographiques et index des ressources énergétiques

Le tableau 1 donne les informations géographiques de base pour la plupart des pays du monde. Il fournit également un index des informations énergétiques fournies par chaque pays rapporteur.

Column 1 lists the nations by continent and region. Column 2 indicates whether a nation is a WEC member and whether it belongs to the United Nations. When "WEC" is followed by A, B, D, F, NZ, P, S, UN, or US such notation indicates that data (if any) for that nation were reported by Australia, United Kingdom, Denmark, France, New Zealand, Portugal, Spain, United Nations, or United States, respectively.

Columns 3 and 4 give national land and continental shelf areas in square kilometres, respectively. Continental shelf areas are exclusively from the present survey. Population information is provided in Columns 5 through 8. Such data were not requested in the new survey, but were a part of earlier surveys. The data in columns 5 through 8 were derived from data in the United Nations *Demographic Yearbook,* which provides latest population data and current population growth rates (column 7). These data were used to calculate 1974 and 1985 estimated populations (columns 5 and 6). Population density in column 8 is for the 1974 estimate.

The energy resource index in column 9 indicates the number of subdivisions for which each energy resource was reported for each country. A zero (0) indicates no report and a one (1) signifies that only a national total was provided. The symbols used in column 9 signify the following resources:

SF = Solid fossil fuels
C = Crude oil
NG = Natural gas
OS = Oil shale and/or bituminous sands
H = Hydraulic
U = Uranium
TH = Thorium
S = Solar
G = Geothermal
T = Tidal
W = Wind

Dans la colonne 1 on trouve la liste des pays par continent et par région, dans la colonne 2 on voit si un pays est membre de la CME ou s'il appartient aux Nations Unies. Lorsque le sigle "WEC" (1) est suivi de A, B, D, F, NZ, P, S, UN ou US cela signifie que l'information (le cas échéant) relative à ce pays a été fournie respectivement par l'Australie, le Royaume-Uni, le Danemark, la France, la Nouvelle Zélande, le Portugal, l'Espagne, les Nations Unies ou les Etats-Unis d'Amérique.

Les colonnes 3 et 4 donnent respectivement les surfaces de chaque pays et de leur plateau continental en kilomètres carrés. Les surfaces des plateaux continentaux sont données exclusivement d'après les chiffres fournis pour la présente enquête. Les informations relatives à la population sont données dans les colonnes 5 à 8, ces informations n'ont pas été demandées pour la présente enquête mais proviennent d'enquêtes antérieures. Les informations des colonnes 5 à 8 ont été tirées des informations de l'*Annuaire Démographique* des Nations Unies qui donne les derniers chiffres de population et les taux de croissance actuelle de celle-ci (colonne 7). Ces informations ont été utilisées pour calculer des estimations de population en 1974 et en 1985 (colonnes 5 et 6). La densité de population figurant à la colonne 8 correspond à l'estimation de 1974.

L'index des ressources énergétiques de la colonne 9 indique le nombre de subdivisions pour lesquelles chaque ressource énergétique a fait l'objet d'informations dans chaque pays. Un zéro (0) indique qu'aucune information n'a été communiquée et un UN (1) signifie que seul le total national est donné. Les symboles utilisés dans la colonne 9 correspondent aux ressources suivantes:

SF = combustible solide fossile
C = pétrole brut
NG = gaz naturel
OS = sables et/ou schiste bitumineux
H = hydraulique
U = Uranium
TH = Thorium
S = Solaire
G = Géothermique
T = Marémotrice
W = Eolienne

(1) en français: CME.

TABLE 1. GEOGRAPHICAL DATA AND ENERGY RESOURCE INDEX
TABLEAU 1. INFORMATIONS GEOGRAPHIQUES ET INDEX DES RESSOURCES ENERGETIQUES

Name of Continent, Region and Country	Affiliations	Area (sq km) Land and Inland Waters	Area (sq km) Continental Shelf	Estimated Population (Millions of Persons) 1974	Estimated Population (Millions of Persons) 1985	Population Growth Rate (%/Yr)	Population Density (Persons/sq km)	Number of National Subdivisions and Energy Resources Reported SP	C	NG	OS	H	U	TH	S	G	T	W
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)										
ASIA																		
Middle South Asia																		
Sri Lanka (Ceylon)	WEC, UN	65610	-	13.71	17.60	2.3	208.9	0	0	0	0	0	0	0	0	0	0	0
Nepal	WEC, UN	140797	0	10.64	13.52	2.2	75.56	0	0	0	0	0	0	0	0	0	0	0
Bhutan	-	47000	0	0.912	1.159	2.2	19.40	0	0	0	0	0	0	0	0	0	0	0
Sikkim	-	7107	0	0.210	0.261	2.0	29.55	0	0	0	0	0	0	0	0	0	0	0
Maldive Islands	UN	298.0	-	0.116	0.141	1.8	389.2	0	0	0	0	0	0	0	0	0	0	0
Southeast Asia																		
Indonesia	WEC, UN	1904345	-	135.4	183.4	2.8	71.09	0	0	0	0	0	0	0	0	0	0	0
Philippines	WEC, UN	299683	-	43.72	60.52	3.0	145.9	3	0	0	0	3	0	0	3	2	0	0
Thailand	WEC, UN	514000	-	40.47	56.61	3.1	78.73	0	0	0	0	0	0	0	0	0	0	0
Burma	UN	678033	-	30.09	38.23	2.2	44.38	0	0	0	0	0	0	0	0	0	0	0
Vietnam, D.P.R. of	-	158750	-	23.26	30.19	2.4	146.5	0	0	0	0	0	0	0	0	0	0	0
Vietnam, Rep. of	-	173809	300001U	20.31	26.94	2.6	116.9	2	0	0	0	2	0	0	2	0	0	0
Malaysia	WEC, UN	331051	U	12.06	16.34	2.8	36.43	0	3	0	0	3	0	0	0	0	0	0
Khmer Rep. (Cambodia)	UN	181035	-	8.154	11.29	3.0	45.04	0	0	0	0	0	0	0	0	0	0	0
Laos	UN	236800	0	3.257	4.227	2.4	13.75	0	0	0	0	0	0	0	0	0	0	0
Singapore	UN	581.0	-	2.273	2.918	2.3	3911	0	0	0	0	0	0	0	0	0	0	0
Portugese Timor	WECP	14925	2606	0.644	0.775	1.7	43.15	0	1	1	1	0	0	0	1	1	0	0
Brunei	WECB	5765	-	0.140	0.209	3.7	24.27	0	0	0	0	0	0	0	0	0	0	0
Southwest Asia																		
Turkey	WEC, UN	780578	-	38.89	51.03	2.5	49.82	7	2	7	6	7	3	0	7	7	1	0
Iraq	UN	434924	-	10.71	15.14	3.2	24.62	0	0	0	0	0	0	0	0	0	0	0
Saudi Arabia	UN	2149700	-	8.610	11.54	2.7	4.005	0	0	0	0	0	0	0	0	0	0	0
Syria	UN	185180	-	7.113	10.17	3.3	38.41	0	0	0	0	0	0	0	0	0	0	0
Yemen Arab Republic	UN	195000	-	6.378	8.549	2.7	32.71	0	0	0	0	0	0	0	0	0	0	0
Lebanon	UN	10230	-	3.125	4.279	2.9	305.4	0	0	0	0	0	0	0	0	0	0	0
Israel	WEC, UN	20700	U	3.263	4.468	2.9	157.6	0	1	1	1	0	0	0	1	1	0	0
Jordan	UN	97740	-	2.639	3.813	3.4	27.00	0	0	0	0	0	0	0	0	0	0	0
Yemen, P.R. of	UN	287683	-	1.616	2.237	3.0	5.618	0	0	0	0	0	0	0	0	0	0	0
Kuwait	UN	16000	-	1.108	3.162	10.0	69.27	0	0	0	0	0	0	0	0	0	0	0
Oman	-	212400	-	0.739	1.024	3.0	3.481	0	0	0	0	0	0	0	0	0	0	0
Cyprus	UN	9251	-	0.659	0.735	1.0	71.20	0	0	0	0	0	0	0	0	0	0	0
Gaza	UN	378.0	-	0.576	0.850	3.6	1524	0	0	0	0	0	0	0	0	0	0	0
Bahrain	-	660.5	U	0.242	0.335	3.0	366.4	0	1	1	0	0	0	0	0	1	0	0
United Arab Emirates	-	83600	-	0.226	0.316	3.1	2.703	0	0	0	0	0	0	0	0	0	0	0
Qatar	-	22014	-	0.097	0.171	5.3	4.412	0	0	0	0	0	0	0	0	0	0	0
International Zone	-	10000	-	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0
EUROPE																		
Western Europe																		
Germany, W.R. of	WEC, UN	248401	36000	62.80	66.34	0.5	252.8	1	3	4	2	2	1	0	2	4	0	0
France	WEC, UN	551002	125000	52.63	58.08	0.9	95.52	1	1	1	1	1	1	0	1	1	1	0
Netherlands	WEC, UN	41160	58700	13.66	15.57	1.2	331.8	2	1	2	0	0	0	0	2	2	0	0
Belgium	WEC, UN	30500	-	9.910	10.58	0.6	324.9	1	0	1	0	0	0	0	1	1	0	0
Austria	WEC, UN	83851	0	7.510	7.847	0.4	89.56	4	3	3	1	4	1	0	4	3	0	0
Switzerland	WEC, UN	41288	0	6.588	7.512	1.2	159.6	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	WEC, UN	2586	0	0.349	0.376	0.7	134.8	0	0	0	0	1	0	0	0	0	0	0
Other	-	162.0	0	0.046	0.053	1.3	286.0	0	0	0	0	0	0	0	0	0	0	0
Southern Europe																		
Italy	WEC, UN	301164	115650	55.40	60.48	0.8	184.0	2	3	7	0	7	2	0	2	7	0	0
Spain	WEC, UN	506000	66000	35.29	39.80	1.1	69.74	8	2	2	1	0	3	0	8	6	0	0
Yugoslavia	WEC, UN	255804	-	21.28	24.00	1.1	83.20	0	0	0	0	0	0	0	0	0	0	0
Portugal	WEC, UN	92131	27070	9.981	11.02	0.9	108.3	1	1	1	0	2	0	0	1	2	0	0
Greece	WEC, UN	131944	-	9.123	9.851	0.7	69.14	0	0	0	0	0	0	0	0	0	0	0
Albania	UN	28748	-	2.440	3.378	3.0	84.88	0	0	0	0	0	0	0	0	0	0	0
Malta	UN	316.0	-	0.326	0.326	0.0	1032	0	0	0	0	0	0	0	0	0	0	0
Other	-	521.0	-	0.066	0.082	2.0	126.7	0	0	0	0	0	0	0	0	0	0	0
Northern Europe																		
United Kingdom	WEC, UN	242460	548002	56.83	60.04	0.5	234.4	2	3	3	0	0	0	0	2	3	0	0
Sweden	WEC, UN	450001	165000	8.303	9.064	0.8	18.45	1	0	0	1	2	1	0	2	0	0	0
Denmark	WEC, UN	43000	U	5.060	5.464	0.7	117.7	0	1	1	0	0	0	0	0	1	0	0
Finland	WEC, UN	337001	U	4.787	5.056	0.5	14.20	1	0	0	0	1	1	0	1	0	0	0
Norway	WEC, UN	386287	940003	4.005	4.371	0.8	10.37	1	1	1	0	0	0	0	1	1	0	0
Ireland	WEC, UN	70285	67281	3.003	3.173	0.5	42.73	1	1	1	0	1	0	0	1	1	0	0
Iceland	WEC, UN	103000	280001	0.216	0.251	1.4	2.094	1	0	0	0	1	0	0	1	1	0	0
Other	-	2180	-	0.215	0.234	0.8	98.50	0	0	0	0	0	0	0	0	0	0	0
Eastern Europe																		
Poland	WEC, UN	312678	U	33.52	36.60	0.8	107.2	1	1	1	0	1	0	0	1	1	0	0
Romania	WEC, UN	237500	-	21.16	23.86	1.1	89.09	0	0	0	0	0	0	0	0	0	0	0
Germany, D.R. of	WEC, UN	108200	-	17.33	17.52	0.1	160.1	0	0	0	0	0	1	0	0	0	0	0
Czechoslovakia	WEC, UN	127870	0	14.76	15.59	0.5	115.4	0	0	0	0	0	0	0	0	0	0	0
Hungary	WEC, UN	93030	0	10.43	10.78	0.3	112.1	0	0	0	0	0	0	0	0	0	0	0
Bulgaria	WEC, UN	111000	0	8.730	9.426	0.7	78.65	1	1	1	0	0	0	0	1	1	0	0
EUROPE-ASIA																		
Northern																		
USSR	WEC, UN	22272192	-	252.6	281.9	1.0	11.34	0	0	0	0	0	0	0	0	0	0	0
NORTH AMERICA																		
Northern America																		
United States	WEC, UN	9363375	2266252	213.1	237.8	1.0	22.76	5	5	5	1	5	4	2	5	5	2	0

TABLE 1. GEOGRAPHICAL DATA AND ENERGY RESOURCE INDEX

TABLEAU 1. INFORMATIONS GEOGRAPHIQUES ET INDEX DES RESSOURCES ENERGETIQUES

Name of Continent, Region and Country	Affiliations	Area (sq km) Land and Inland Waters	Area (sq km) Continental Shelf	Estimated Population (Millions of Persons) 1974	Estimated Population (Millions of Persons) 1985	Population Growth Rate (%/Yr)	Population Density (Persons/sq km)	Number of National Subdivisions and Energy Resources Reported: SP	C	NG	OS	H	U	TH	S	G	T	W
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)										
AFRICA																		
Western Africa																		
Nigeria	WEC, UN	897763	38000	60.79	79.76	2.5	67.71	2	2	2	0	1	1	1	2	2	1	0
Ghana	WEC, UN	238701	27659	10.16	14.06	3.0	42.56	0	1	1	0	1	1	1	0	1	1	0
Upper Volta	UN	274200	0	5.851	7.353	2.1	21.34	0	0	0	0	0	0	0	0	0	0	0
Mali	UN	1239710	0	5.457	6.859	2.1	4.402	0	0	0	0	0	0	0	0	0	0	0
Ivory Coast	WEC, UN	322463	-	4.720	6.062	2.3	14.64	0	0	0	0	0	0	0	0	0	0	0
Senegal	UN	196722	-	4.316	5.602	2.4	21.94	0	0	0	0	0	0	0	0	0	0	0
Guinea	UN	245857	-	4.278	5.434	2.2	17.40	0	0	0	0	0	0	0	0	0	0	0
Niger	UN	1267000	0	4.468	5.989	2.7	3.526	0	0	0	0	0	0	0	0	0	0	0
Sierra Leone	WEC, UN	71740	-	2.955	3.795	2.3	41.19	0	0	0	0	0	0	0	0	0	0	0
Dahomey	UN	112622	-	2.965	3.890	2.5	26.33	0	0	0	0	0	0	0	0	0	0	0
Togo	UN	56000	-	2.061	2.733	2.6	36.81	0	0	0	0	0	0	0	0	0	0	0
Liberia	WEC, UN	111400	-	1.253	1.508	1.7	11.24	0	0	0	0	0	0	0	0	0	0	0
Mauritania	UN	1030700	-	1.277	1.623	2.2	1.239	0	0	0	0	0	0	0	0	0	0	0
Portugese Guinea	WECP	36125	42497	0.576	0.636	0.9	15.95	0	1	0	0	0	0	0	0	0	0	0
Gambia	UN	11295	-	0.392	0.483	1.9	34.75	0	0	0	0	0	0	0	0	0	0	0
Cape Verde Islands	WECP	4077	4800	0.265	0.326	1.9	65.06	0	0	0	0	0	0	0	0	0	0	0
St. Helena	WECB	419.0	-	0.007	0.010	2.5	17.39	0	0	0	0	0	0	0	0	0	0	0
Eastern Africa																		
Ethiopia	UN	1221903	60350	27.00	33.22	1.9	22.10	2	2	0	2	3	1	1	2	1	1	0
Tanzania	WEC, UN	939702	-	14.71	19.51	2.6	15.65	0	0	0	0	0	0	0	0	0	0	0
Kenya	UN	582644	-	12.66	17.52	3.0	21.73	0	0	0	0	0	0	0	0	0	0	0
Uganda	WEC, UN	235886	-	10.87	14.41	2.6	46.07	0	0	0	0	0	0	0	0	0	0	0
Mozambique	WECP	786382	82540	8.602	10.81	2.1	10.94	0	3	3	0	0	0	0	0	3	0	0
Malagasy Republic	UN	587041	-	7.393	9.494	2.3	12.59	0	0	0	0	0	0	0	0	0	0	0
Rhodesia	-	389361	0	5.978	8.453	3.2	15.35	0	0	0	0	0	0	0	0	0	0	0
Malawi	UN	118000	.0	4.899	6.427	2.5	41.51	1	0	0	0	1	0	0	1	0	0	0
Zambia	WEC, UN	751752	0	4.834	6.691	3.0	6.430	0	0	0	0	0	0	0	0	0	0	0
Rwanda	UN	26338	0	4.006	5.428	2.8	152.1	0	0	0	0	0	0	0	0	0	0	0
Burundi	UN	27834	0	3.836	4.770	2.0	137.8	0	0	0	0	0	0	0	0	0	0	0
Somalia	UN	637657	-	3.043	3.865	2.2	4.772	0	0	0	0	0	0	0	0	0	0	0
Mauritius	UN	2045	-	0.908	1.142	2.1	444.2	0	0	0	0	0	0	0	0	0	0	0
Reunion	WECP	2510	-	0.494	0.655	2.6	196.9	0	0	0	0	0	0	0	0	0	0	0
Comoro Islands	WECP	2171	-	0.299	0.392	2.5	137.8	0	0	0	0	0	0	0	0	0	0	0
Afars and Issas	WECP	21700	-	0.102	0.126	1.9	4.720	0	0	0	0	0	0	0	0	0	0	0
Seychelles Islands	WECB	376.0	-	0.057	0.071	2.1	150.3	0	0	0	0	0	0	0	0	0	0	0
Middle Africa																		
Zaire	UN	2345416	-	25.43	39.98	4.2	10.84	1	2	1	2	1	1	1	2	1	1	0
Cameroon	UN	475442	-	6.367	8.089	2.2	13.39	0	0	0	0	0	0	0	0	0	0	0
Angola	WECP	1246703	50288	6.305	7.924	2.1	5.057	0	3	2	2	1	0	0	2	2	0	0
Chad	UN	1284000	0	4.059	5.212	2.3	3.161	0	0	0	0	0	0	0	0	0	0	0
Central African Rep.	UN	622984	0	1.765	2.267	2.3	2.834	0	0	0	0	0	0	0	0	0	0	0
Congo, P.R. of	UN	342000	-	1.017	1.278	2.1	2.974	0	0	0	0	0	0	0	0	0	0	0
Gabon	UN	267667	-	0.527	0.607	1.3	1.967	0	0	0	0	0	0	0	0	0	0	0
Equatorial Guinea	UN	28051	-	0.310	0.373	1.7	11.06	0	0	0	0	0	0	0	0	0	0	0
Sao Tome and Principe	WECP	1045	1671	0.063	0.069	0.8	60.26	0	1	0	0	0	0	0	0	0	0	0
Northern Africa																		
Egypt	WEC, UN	1011449	-	36.79	48.27	2.5	36.37	0	0	0	0	0	0	0	0	0	0	0
Sudan	UN	2505813	-	17.53	23.75	2.8	6.995	0	0	0	0	0	0	0	0	0	0	0
Morocco	WEC, UN	446550	-	17.47	24.19	3.0	39.13	0	0	0	0	0	0	0	0	0	0	0
Algeria	WEC, UN	2381741	-	16.64	25.07	3.8	6.985	0	0	0	0	0	0	0	0	0	0	0
Tunisia	WEC, UN	164150	-	5.692	7.549	2.6	34.68	0	0	0	0	0	0	0	0	0	0	0
Libya	UN	1759540	-	2.241	3.342	3.7	1.274	0	0	0	0	0	0	0	0	0	0	0
Spanish North Africa	WECS	32.00	-	0.225	0.312	3.0	7034	0	0	0	0	0	0	0	0	0	0	0
Ifni	WECS	1502	-	0.056	0.061	0.8	37.12	0	0	0	0	0	0	0	0	0	0	0
Spanish Sahara	WECS	266001	0	0.060	0.101	4.8	0.227	0	0	0	0	0	0	0	0	0	0	0
Southern Africa																		
South Africa	WEC, UN	1221001	0	22.11	28.71	2.4	18.11	2	0	1	1	0	0	0	2	1	0	0
Lesotho	UN	30355	0	1.220	1.878	4.0	40.20	0	0	0	0	0	0	0	0	0	0	0
Southwest Africa	-	823168	-	0.681	0.838	1.9	0.828	0	0	0	0	0	0	0	0	0	0	0
Botswana	UN	600372	0	0.721	0.966	2.7	1.201	0	0	0	0	0	0	0	0	0	0	0
Swaziland	UN	17366	0	0.456	0.617	2.8	26.24	0	0	0	0	0	0	0	0	0	0	0
ASIA																		
East Asia																		
China, P.R. of	UN	9561000	-	815.8	992.7	1.8	85.33	0	0	0	0	0	0	0	0	0	0	0
Japan	WEC, UN	377391	160470	109.0	122.9	1.1	288.8	1	1	1	0	0	0	0	1	1	0	0
Korea, Rep. of	WEC	98479	300000	34.96	45.38	2.4	355.0	1	0	0	0	1	0	0	1	0	0	0
Korea, D.P.R. of	-	120538	-	15.51	21.02	2.8	128.7	0	0	0	0	0	0	0	0	0	0	0
Taiwan	WEC	35961	20100	15.55	20.63	2.6	432.5	1	1	1	0	1	0	0	1	2	0	0
Hong Kong	WECB	1034	-	4.302	5.407	2.1	4161	0	0	0	0	0	0	0	0	0	0	0
Mongolia	UN	1565000	0	1.394	1.888	2.8	0.891	0	0	0	0	0	0	0	0	0	0	0
Macau	WECP	16.00	20.00	0.336	0.404	1.7	20994	0	0	0	0	0	0	0	0	0	0	0
Middle South Asia																		
India	WEC, UN	3280587	260001	583.6	733.5	2.1	177.9	12	2	2	0	24	0	0	12	2	0	0
Bangladesh	WEC	140640	-	78.49	108.6	3.0	558.1	3	0	3	0	2	0	0	3	3	1	0
Pakistan	WEC, UN	894160	-	66.06	91.44	3.0	73.88	0	0	0	0	0	0	0	0	0	0	0
Iran	WEC, UN	1648000	-	33.31	47.61	3.3	20.21	0	0	0	0	0	0	0	0	0	0	0
Afghanistan	UN	647500	0	18.71	24.03	2.1	28.90	0	0	0	0	0	0	0	0	0	0	0

TABLE 1. GEOGRAPHICAL DATA AND ENERGY RESOURCE INDEX
TABLEAU 1. INFORMATIONS GEOGRAPHIQUES ET INDEX DES RESSOURCES ENERGETIQUES

Name of Continent, Region and Country	Affiliations	Area (sq km): Land and Inland Waters	Area (sq km): Continental Shelf	Estimated Population (Millions of Persons): 1974	Estimated Population (Millions of Persons): 1985	Population Growth Rate (%/Yr)	Population Density (Persons/sq km)	Number of National Subdivisions and Energy Resources Reported: SF	C	NG	OS	H	U	TH	S	G	T	W
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)										
NORTH AMERICA																		
Northern America																		
Canada	WEC, UN	9978762	3497278	22.90	27.56	1.7	2.295	13	17	18	3	0	0	0	13	18	0	0
Bermuda	WECB	54.00	-	0.059	0.074	2.1	1087	0	0	0	0	0	0	0	0	0	0	0
Greenland	WECD	2176005	700002	0.055	0.083	3.9	0.025	1	4	4	0	1	1	1	1	4	1	0
St. Pierre & Miquelon	WECF	240.0	-	0.005	0.006	1.1	21.77	0	0	0	0	0	0	0	0	0	0	0
Middle America																		
Mexico	WEC, UN	1972501	454900	55.25	76.48	3.0	28.01	6	8	6	0	10	4	0	6	12	0	0
Guatemala	UN	108889	-	5.863	8.203	3.1	53.84	0	1	1	0	3	1	0	0	4	0	0
El Salvador	UN	21393	-	4.103	6.183	3.8	191.8	0	0	0	0	0	0	0	0	0	0	0
Honduras	UN	112088	-	2.332	3.368	3.4	20.80	0	0	0	0	0	0	0	0	0	0	0
Nicaragua	UN	139700	-	2.294	3.422	3.7	16.42	0	0	0	0	0	0	0	0	0	0	0
Costa Rica	WEC, UN	50900	-	1.970	2.786	3.2	38.71	0	0	0	0	2	0	0	0	2	0	0
Panama	UN	76650	0	1.667	2.383	3.3	21.75	0	0	0	0	0	0	0	0	0	0	0
British Honduras	WECB	22965	-	0.145	0.211	3.5	6.296	0	0	0	0	0	0	0	0	0	0	0
Canal Zone	WECUS	1445	-	0.051	0.072	3.2	35.32	0	0	0	0	0	0	0	0	0	0	0
Caribbean																		
Cuba	WEC, UN	114524	-	9.119	11.46	2.1	79.63	0	0	0	0	0	0	0	0	0	0	0
Haiti	UN	27750	-	5.268	6.550	2.0	189.8	0	0	0	0	0	0	0	0	0	0	0
Dominican Republic	UN	48734	-	4.982	7.351	3.6	102.2	0	0	0	0	0	0	0	0	0	0	0
Puerto Rico	WECUS	8897	-	2.878	3.353	1.4	323.4	0	0	0	0	0	0	0	0	0	0	0
Jamaica	UN	10962	-	2.031	2.553	2.1	185.3	0	0	0	0	0	0	0	0	0	0	0
Trinidad and Tobago	WEC, UN	5128	-	0.987	1.114	1.1	192.5	0	0	0	0	0	0	0	0	0	0	0
Windward Islands	WECB	2100	-	0.420	0.522	2.0	200.0	0	0	0	0	0	0	0	0	0	0	0
Martinique	WECF	1100	-	0.366	0.455	2.0	332.6	0	0	0	0	0	0	0	0	0	0	0
Guadeloupe	WECF	1780	-	0.346	0.403	1.4	194.2	0	0	0	0	0	0	0	0	0	0	0
Barbados	UN	430.0	-	0.267	0.302	1.1	622.0	0	0	0	0	0	0	0	0	0	0	0
Netherlands Antilles	WECN	961.0	-	0.235	0.273	1.4	244.2	0	0	0	0	0	0	0	0	0	0	0
Leeward Islands	WECB	1053	-	0.160	0.199	2.0	152.1	0	0	0	0	0	0	0	0	0	0	0
Bahama Islands	WECB	11405	-	0.201	0.312	4.1	17.61	0	0	0	0	0	0	0	0	0	0	0
Virgin Islands	WECUS	344.0	-	0.070	0.111	4.3	203.0	0	0	0	0	0	0	0	0	0	0	0
Cayman Islands	WECB	260.0	-	0.011	0.013	2.0	41.63	0	0	0	0	0	0	0	0	0	0	0
Turks and Caicos I.	WECB	430.0	-	0.007	0.008	2.2	15.22	0	0	0	0	0	0	0	0	0	0	0
SOUTH AMERICA																		
Tropical South America																		
Brazil	WEC, UN	8511987	800002	108.1	152.9	3.2	12.70	2	1	1	2	5	1	1	2	1	1	0
Colombia	WEC, UN	1138917	53000	23.95	33.87	3.2	21.03	2	3	3	1	5	4	4	2	3	4	0
Peru	WEC, UN	1285216	-	15.35	21.48	3.1	11.94	0	0	0	0	0	0	0	0	0	0	0
Venezuela	WEC, UN	912052	102110	11.98	17.68	3.6	13.13	1	6	2	0	2	0	0	1	2	0	0
Ecuador	UN	283561	-	6.965	10.06	3.4	24.56	0	0	0	0	0	0	0	0	0	0	0
Bolivia	UN	1098581	0	5.464	7.247	2.6	4.974	0	0	0	0	0	0	0	0	0	0	0
Guyana	UN	215000	-	0.859	1.189	3.0	3.994	0	0	0	0	0	0	0	0	0	0	0
Surinam	WECN	163265	-	0.444	0.621	3.1	2.720	0	0	0	0	0	0	0	0	0	0	0
French Guiana	WECF	91000	-	0.061	0.099	4.5	0.668	0	0	0	0	0	0	0	0	0	0	0
Temperate South America																		
Argentina	WEC, UN	3264901	1000001	24.64	29.02	1.5	7.546	1	4	4	1	4	5	0	2	5	0	0
Chile	WEC, UN	741862	153700	10.75	13.96	2.4	14.89	2	1	2	2	3	0	0	3	3	0	0
Uruguay	WEC, UN	186540	65000	3.027	3.451	1.2	16.23	1	4	3	1	0	0	0	2	3	0	0
Paraguay	UN	406752	0	2.706	3.827	3.2	6.654	0	0	0	0	0	0	0	0	0	0	0
Falkland Islands	WECB	11961	-	0.002	0.003	1.7	0.179	0	0	0	0	0	0	0	0	0	0	0
OCEANIA																		
Australia & New Zealand																		
Australia	WEC, UN	7678019	2136004	13.59	16.89	2.0	1.770	3	6	6	1	1	3	1	3	6	2	0
New Zealand	WEC, UN	268677	137935	2.989	3.521	1.5	11.12	3	1	1	2	0	1	0	4	2	0	0
Melanesia																		
Papua-New Guinea	WECA	466001	159000	2.725	3.772	3.0	5.847	0	2	2	0	1	0	0	0	2	0	0
British Solomon I.	WECB	29785	-	0.181	0.240	2.6	6.064	0	0	0	0	0	0	0	0	0	0	0
New Caledonia	WECF	18653	-	0.124	0.177	3.3	6.654	0	0	0	0	0	0	0	0	0	0	0
New Hebridies	WECBF	14760	-	0.092	0.120	2.4	6.257	0	0	0	0	0	0	0	0	0	0	0
Polynesia																		
Fiji Islands	UN	18265	34205	0.576	0.764	2.6	31.55	0	1	0	0	1	0	0	0	0	0	0
Western Samoa	WECB	2760	2640	0.158	0.207	2.5	57.19	0	0	0	0	1	0	0	0	0	0	0
French Polynesia	WECF	3997	-	0.124	0.175	3.2	30.93	0	0	0	0	0	0	0	0	0	0	0
Tonga	WECB	699.0	-	0.098	0.140	3.3	140.1	0	0	0	0	0	0	0	0	0	0	0
American Samoa	WECUS	197.0	-	0.034	0.053	4.1	172.9	0	0	0	0	0	0	0	0	0	0	0
Cook Islands	WECNZ	241.0	-	0.027	0.040	3.4	113.8	0	0	0	0	0	0	0	0	0	0	0
Micronesia																		
Pacific Island Trust	UN-US	1740	-	0.113	0.148	2.5	64.71	0	0	0	0	0	0	0	0	0	0	0
Gilbert & Ellice I.	WECB	886.0	-	0.061	0.076	2.1	68.68	0	0	0	0	0	0	0	0	0	0	0
Guam	WECUS	549.0	-	0.124	0.226	5.6	226.5	0	0	0	0	0	0	0	0	0	0	0
Other	-	622.0	-	0.108	0.135	2.0	174.0	0	0	0	0	0	0	0	0	0	0	0

Appendix 1—Regional Data

Annexe I–Informations par region

One of the new features of the current energy survey is the inclusion of geological data, particularly for sedimentary formations, from the reporting nations. In addition, reporting of geological and energy resource data was requested on the basis of appropriate national subdivisions where feasible. As a result, the new information provides an extensive enlargement of background data since earlier reports in this series provided only national areas and populations.

Appendix 1 is organized as follows: all general explanations and definitions are given in the remainder of this introductory text. Table 1A provides statistical data from Part A of Questionnaire I. Table 1B gives notes, including geological descriptions for the various nations and their subdivisions, and Table 1C provides the references to source data given by the reporting nation. The information for Tables 1B and 1C is from Part B of Questionnaire I.

The general instructions submitted with Questionnaire I on Regional Data Related to the Survey of Energy Resources is as follows: "the purpose of this questionnaire is to provide general information basic to the preparation of estimates on a country's energy resources. It provides a basis for division of

L'une des caractéristiques nouvelles de la présente enquête sur l'énergie est d'avoir demandé aux pays rapporteurs d'y inclure des informations géologiques relatives en particulier aux formations sédimentaires. De plus, on demandait que les informations relative á la géologie et aux ressources énergétiques soient communiquées, lorsque cela était possible, sur la base de subdivisions nationales appropriées. De ce fait, ces nouvelles informations élargissent considérablement la couverture des données de base puisque les rapports précédents correspondants se limitaient à l'ensemble du territoire et de la population de chaque pays.

L'annexe I est articulée comme suit: toutes les explications et les définitions générales sont données dans le reste de la présente introduction. Le tableau 1A donne des informations statistiques relatives à la partie A du questionnaire I; le tableau 1B des notes, y compris des descriptions géologiques, pour les différents pays et leurs subdivisions; le tableau 1C les références de l'origine des informations fournies par les pays rapporteurs. Les informations des tableaux 1B et 1C proviennent de la partie B du questionnaire 1. Les instructions générales données avec le questionnaire 1 sur les informations régionales relatives à l'enquête sur les ressources énergétiques étaient les suivantes: "le but de ce questionnaire est de fournir les informations générales pour l'établissement des estimations des ressources énergétiques the national territory into the major geographical regions, useful in the preparation of energy resource estimates and helpful in interpretation and understanding of the data reported. If the national territory is small and relatively uniform or homogeneous in geological and geographical terms, it may be appropriate to report for the total national territory only. Larger countries and those with distinctive regional characteristics should develop a system of reporting to facilitate evaluation of resource data in relation to the geological and physical features of the land."

Geographical names, including appropriate names of national subdivisions are given in column 1 of Table 1A (and in column 1 of all tables in succeeding appendixes). The bases for establishing such subdivisions were further defined: "Divide the national territory into a few major geographic regions that will be most appropriate and convenient for estimating and reporting all energy sources. All regions of the country, including noncontiguous areas, dependencies, and associated territories, should be included. Offshore areas should be reported as separate regions or as separately designated subparts of regions or territories that also include land areas. If resources data are available only by political subdivisions and it is impractical to reorganize the data, use combinations of political subdivisions that most closely approximate natural geographic regions, using descriptive titles and/or geographical names for the individual regions." Some nations used the subdivisions provided in Questionnaire I for reporting all resource data; other countries used other forms of subdivisions for various resources. Subdivision definitions are avoided in this document since, in most cases, the subdivision boundaries are indicated on the various resource maps.

Geological descriptions, provided in Table 18 for the various nations and their subdivisions include "descriptions of the region in terms of its general physiography and general geologic features such as the major rock type, age or ages, and structural characteristics." Such descriptions are given in Table 1B.

Statistical data in Table 1 include (1) regional or national area of land and inland waters and area of

d'un pays. Il donne une base de la division du territoire national en régions géographiques principales, ce qui est utile à la preparation des estimations des ressources d'énergie et ce qui facilite l'interprétation et la compréhension des informations fournies.

Si le territoire national est petit ou relativement uniforme ou homogène en termes géologiques et géographiques, il peut être préférable de donner des informations globalement sur la totalité du territoire national. Les pays plus grands et ceux ayant des caractéristiques régionales distinctes, devront fournir des informations pouvant faciliter l'estimation des ressources par rapport aux traits géologiques et physiques du territoire.

Les noms géographiques, y compris les noms des subdivisions de chaque pays sont donnés dans la colonne 1 du tableau 1A (et dans la colonne 1 de tous les tableaux des annexes successives). Les bases d'établissement de ces subdivisions ont été ainsi définies: "Diviser le territoire national en quelques grandes régions géographiques convenant le mieux pour l'estimation et la présentation de toutes les ressources énergétiques. Toutes les régions du pays, les superficies non contiguës, comme les dépendances et les territoires associés, doivent y être incluses. Les extensions sous-marines doivent être considérées comme des régions séparées ou des parties désignées séparément de régions ou territoires géographiques. Si les informations sur les sources ne se rapportent qu'à des subdivisions politiques et qu'il ne soit pas possible de les adapter aux régions, utiliser des combinaisons de subdivisions politiques qui se rapprochent le plus possible des régions géographiques naturelles. Donner à chaque région des noms descriptifs et/ou géographiques." Certains pays ont utilisé les subdivisions fournies par le questionnaire 1 pour communiquer l'ensemble des informations relatives aux ressources; d'autres pays ont utilisé des subdivisions différentes selon le type de ressource. On s'est abstenu dans le présent document de définir les subdivisions car dans la plupart des cas, les limites de celles-ci sont indiquées sur les différentes cartes des ressources.

Les descriptions géologiques fournies au tableau 1B pour les différents pays et leurs subdivisions, comprennent "les descriptions de la région donnant ses caractères physiques et géologiques généraux, notamment les principaux types de roches, leurs âges, leurs structures." Ces descriptions sont données au tableau 1B.

Les informations statistiques du tableau 1 comprennant (1) la superficie (terres et eaux intérieures) the contiguous continental shelf, (2) areas and volumes of sedimentary basins and (3) areas covered by geological mapping. Area of land and inland waters is given in column 2, and continental shelf area in column 3; the continental shelf was defined as "the area of the submerged land beyond the line of permanent immersion and up to a depth of 200 m unless some other depth is specifically defined."

Sedimentary area of a region or nation (column 4) is defined as "the surface area that is underlain with sedimentary rock of sufficient depth to suggest the possible occurrence of fossil fuel deposits." Sedimentary volume is "the total volume of sedimentary deposits based on estimates (or measurements) of the average depth of sedimentary rocks" (column 5).

Data on geologic mapping include the areas in each region or nation already mapped (column 6). In addition, the scales to which such mapping has been done are given in the notes in Table 1B. For those nations reporting the above statistical data on the basis of two or more subdivisions, the national total is given below the data for subdivisions. In a few cases where the total area of reported subdivisions was less than the total national area, the difference is reported as "other area."

The rightmost column in Table 1A (column 7) lists the types of energy resources reported for each national subdivision (or nation, where subdivisions were not used), using the following code:

SF–solid fossil fuels, including peat
C–crude oil and natural gas liquids
NG–natural gas
OS–oil shale and/or bituminous sands
U–uranium
TH–thorium
H–hydraulic

In addition, other renewable resources are designated by:

G–geothermal
S–solar
T–tidal
W–wind

de la région ou du pays, et celle du plateau continental, (2) la superficie et le volume des bassins sédimentaires, et (3) les superficies couvertes par les cartes géologiques. La superficie des terres et des eaux intérieures est donnée à la colonne 2, et celle du plateau continental à la colonne 3; le plateau continental est défini comme "la superficie du pays submergé au-delà de la ligne des basses eaux et jusqu'à une profondeur de 200 mètres, à moins qu'une autre profondeur soit spécifiée."

La superficie sédimentaire d'une région ou d'un pays (colonne 4) est définie comme "la superficie dont le sous-sol comporte des roches sédimentaires à une profondeur suffisante pour qu'il soit possible d'y trouver des gisements de combustibles fossiles." Le volume sédimentaire est comme "le volume total des dépôts sédimentaires calculé sur la base d'estimation (ou de mesures) de la profondeur moyenne des roches sédimentaires" (colonnes 5).

Les informations sur la cartographie géologique comprennent les superficies de chaque région ou pays qui ont déjà fait l'objet d'une carte géologique (colonne 6). De plus, les échelles selon lesquelles ces cartes ont été établies sont données dans les notes du tableau 1B. Pour les pays rapporteurs qui utilisent pour leurs informations statistiques deux ou plusieurs subdivisions, le total national est donné en-dessous des chiffres des subdivisions. Dans un petit nombre de cas où la surface totale des subdivisions utilisée est plus petite que la superficie totale du pays, la différence est consignée sous le titre "autre zone."

La colonne tout à fait à droite du tableau 1A (colonne 7) donne la liste des types de ressources énergétiques communiquées pour chaque subdivision nationale (ou chaque pays lorsque l'on n'utilise pas de subdivisions), en utilisant le code suivant:

SF–Combustibles fossiles solides, y compris la tourbe
C–Pétrole brut et gaz naturel liquides
NG–Gaz naturel
OS–Schiste et/ou sables bitumineux
U–Uranium
TH–Thorium
H–Hydraulique

De plus, d'autres ressources renouvelables sont désignée par:

G–Géothermique
S–Solaire
T–Marémotrice
W–Eolienne

TABLE 1A. BASIC GEOLOGICAL DATA
TABLEAU 1A. INFORMATIONS GEOLOGIQUES DE BASE

Name of Continent, Region, Country and National Subdivision	Geological Description (see note)	Total Area: Land and Inland Waters (sq km)	Total Area: Continental Shelf (sq km)	Total Area: Total (sq km)	Sedimentary Formations: Area (sq km)	Sedimentary Formations: Volume (cu km)	Geological Mapping: Area (sq km)	Geological Mapping: Scale (note)	Energy Resources
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
AFRICA									
Western Africa									
Nigeria	-	-	-	-	-	-	-	(a)	-
South-East	(b)	176731	17500	194281	105840	3213856	99870	-	SF,C,NG
South-West	(c)	181191	20500	201691	71290	2172751	115840	-	SF,C,NG
North	(d)	539842	0	539842	286631	6989259	182701	-	U,TH
TOTAL Nigeria	-	897763	38000	935813	463361	12375866	398411	-	-
Ghana									
Entire Nation	(b)	238701	27659	266359	134998	219863	47175	(a)	NG,C,U,TH
Portugese Guinea	(a)	-	-	-	-	-	-	(b)	-
Onshore	-	36125	-	36125	56438	147830	36125	-	C
Offshore Faulted Zone	-	0	5800	5800	-	-	-	-	-
Offshore Salt Basin	-	0	2910	2900	-	-	-	-	-
Offshore Deltaic Zone	-	0	33787	33787	-	-	-	-	-
TOTAL Portugese Guinea	-	36125	42497	78612	56438	147830	36125	-	-
Cape Verde Islands									
Entire Nation	(a)	4077	4800	8877	274.0	U	4077	(b)	-
Eastern Africa									
Ethiopia (a)	(b)	-	-	-	-	-	-	-	-
The Ethiopian Plateau	(c)	521552	0	521552	-	-	90000	-	SF,OS,H
The Harrar Plateau	(d)	433551	0	433551	250001	625009	36000	-	C,U,TH
The Rift Valleys	(e)	266801	0	266801	100000	250004	-	-	SF,C,G,OS,H
Continental Shelf	-	0	60350	60350	-	-	-	-	-
TOTAL Ethiopia	-	1221903	60350	1282253	350001	875012	126000	-	-
Mozambique	(a)	-	-	-	-	-	-	(b)	-
Zambezi Basin	-	83320	35480	118800	100000	500007	83320	-	NG, C
Save-Limpopo Basin	-	36680	35440	72120	70000	185003	36680	-	NG, C
Rovuma Basin	-	23800	4280	28080	25000	55001	23800	-	NG, C
Other	-	642582	7440	650022	230001	535008	-	-	-
TOTAL Mozambique	-	786382	82640	869023	425001	1275018	143800	-	-
Malawi (b)	(c)	-	-	-	-	-	-	(a)	-
Northern Region	-	42000	0	42000	1600	U	27000	-	SF
Central Region	-	41000	0	41000	0	0	35000	-	-
Southern Region	-	35000	0	35000	1700	U	32000	-	H
TOTAL Malawi	-	118000	0	118000	3300	-	94000	-	-
Zambia	-	-	-	-	-	-	-	-	-
Barotse Plain	(b)	172001	0	172001	172001	U	172001	-	-
Luangwa Valley	(c)	49000	0	49000	49000	U	5800	-	-
Lukasashi-Luano Valleys	(d)	6470	0	6470	6470	U	4640	-	-
Zambesi Valley	(e)	7780	0	7780	6470	U	7780	-	-
Eastern Plateau	(f)	53000	0	53000	0	U	38800	-	-
Northern Area	(g)	191501	0	195501	0	U	26800	-	-
Other	(h)	272001	0	272001	0	U	65900	-	-
TOTAL Zambia	-	751752	0	755752	233941	-	321721	-	-
Middle Africa									
Zaire (a)	(c)	2345416	-	-	-	-	-	(b)	-
Atlantic Coastal Plain	(d)	-	-	-	4800	-	4800	-	C,OS
Central	(e)	-	-	-	591202	-	1800	-	C,OS,SF
Southeast	-	-	-	-	-	-	-	-	NG,G,U,TH
Other	-	-	-	-	-	-	-	-	-
TOTAL Zaire	-	2345416	-	-	596002	-	6600	-	-
Angola (a)	(c)	-	-	-	-	-	-	(b)	-
Cabinda Basin	(d)	4800	4950	9750	9000	25000	4925	-	C,NG,OS
Congo Basin	(e)	7750	10730	18480	17300	60551	7750	-	C
Cuanza Basin	(f)	26060	13070	39130	35000	105002	26050	-	C,NG,OS,H
Benguela Basin	(g)	4370	5230	9600	6000	12000	4370	-	-
Mocamedes Basin	(h)	10940	6510	17450	11500	28750	10940	-	-
Other	-	1192783	9798	1202581	-	286204	-	-	-
TOTAL Angola	-	1246703	50288	1296991	78800	517507	54085	-	-
Sao Tome and Principe	-	-	-	-	-	-	-	(a)	-
Sao Tome Island	(b)	855.0	509.0	1310	-	-	855.0	-	C
Principe Island	(c)	190.0	1162	1314	-	-	190.0	-	-
TOTAL Sao Tome and Principe	-	1045	1671	2624	-	-	1045	-	-
Northern Africa									
Spanish Sahara									
Entire Nation	(a)	266001	0	266001	159600	U	0	-	-
Southern Africa									
South Africa (a)	-	-	-	-	-	-	-	(b)	-
Ecca Strata (c)	(c)	134680	0	134680	134680	U	115000	-	SF,NG,OS
Molteno Strata (d)	(d)	16380	0	16380	16380	U	16380	-	SF
Other	-	1069981	U	1069941	-	U	-	-	-
TOTAL South Africa	-	1221001	-	1221001	151060	-	131380	-	-
ASIA									
East Asia									
Japan (a)									
Entire Nation	-	377391	160470	537861	36100	0	36100	(b)	SF, C, NG
Korea, Rep. of	-	-	-	-	-	-	-	(a)	-
Entire Nation	-	98479	300000	398479	0	0	U	-	SF,H
Taiwan (a)									
Geothermal area	(b)	350.0	0	350.0	50.00	100.0	350.0	-	G

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Name of Continent, Region, Country and National Subdivision	Geological Description (see note)	Total Area: Land and Inland Waters (sq km)	Total Area: Continental Shelf (sq km)	Total Area: Total (sq km)	Sedimentary Formations: Area (sq km)	Sedimentary Formations: Volume (cu km)	Geological Mapping: Area (sq km)	Geological Mapping: Scale (note)	Energy Resources
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ASIA									
East Asia									
Taiwan									
Oil and Gas area	(c)	6000	20000	26000	6000	36001	6000	-	C, NG
Coal area	(d)	4000	100.0	4100	4000	14400	40000	-	SF
Hydro-electric Power area	(e)	10000	0	10000	6000	U	U	-	H
Other	-	15611	U	15611	U	U	-	-	-
TOTAL Taiwan	-	35961	20100	56061	16050	50501	10350	-	-
Macau									
Entire Nation	(a)	16.00	20.00	36.00	-	-	16.00	(b)	-
Middle South Asia									
India (a,b,d)	-	-	260001	3540493	1670004	-	820122	(c)	-
Andhra Pradesh	-	276755	U	U	U	U	U	-	SF, H
Assam	-	122099	U	U	U	U	U	-	SF, C, NG, H
Bihar	-	173877	U	U	U	U	U	-	SF, H
Gujarat	-	195985	U	U	U	U	U	-	SF, C, NG, H
Haryana	-	44222	U	U	U	U	U	-	H
Himachal Pradesh	-	55673	U	U	U	U	U	-	H
Jammu & Kashmir	-	222237	U	U	U	U	U	-	SF, H
Kerala	-	38864	U	U	U	U	U	-	H
Madhya Pradesh	-	442842	U	U	U	U	U	-	SF, H
Maharashtra	-	307763	U	U	U	U	U	-	SF, H
Mysore	-	191774	U	U	U	U	U	-	H
Nagaland	-	16527	U	U	U	U	U	-	H
Orissa	-	155842	U	U	U	U	U	-	SF, H
Punjab	-	50362	U	U	U	U	U	-	H
Rajasthan	-	342215	U	U	U	U	U	-	SF, H
Tamil Nadu	-	130069	U	U	U	U	U	-	SF, H
Uttar Pradesh	-	294414	U	U	U	U	U	-	H, SF
West Bengal	-	87953	U	U	U	U	U	-	SF, H
Andaman & Nicobar Islands	-	8293	U	U	U	U	U	-	H
Chandigarh	-	114.0	U	U	U	U	U	-	-
Dadra & Nagar Haveli	-	491.0	U	U	U	U	U	-	H
Delhi	-	1485	U	U	U	U	U	-	-
Goa, Daman & Diu	-	3813	U	U	U	U	U	-	H
L.M. & A. Islands	-	32.00	U	U	U	U	U	-	-
Manipur	-	22356	U	U	U	U	U	-	H
Pondicherry	-	480.0	U	U	U	U	U	-	-
Tripura	-	10477	U	U	U	U	U	-	H
Arunachal Pradesh	-	83578	U	U	U	U	U	-	H
TOTAL India	-	3280587	260001	3540493	1670004	-	820122	-	-
Bangladesh	(a)	-	-	-	-	-	-	(a)	-
Peidmont Alluvial Plain	-	11720	U	11720	U	U	U	-	SF
Flood Plain Alluvial Plain	-	35160	U	35160	U	U	U	-	NG, H, SF
Deltaic Alluvial Plain	-	46880	U	46880	U	U	U	-	SF
Tippera Surfaces	-	11720	U	11720	U	U	U	-	NG
Highland Terraces	-	11720	U	11720	U	U	U	-	-
Tertiary Hills Region	-	17580	U	2930	U	U	U	-	H, NG
Sea Beaches & Tidal Belt	-	2930	U	2930	U	U	U	-	T
Offshore Island	-	2930	U	-	U	U	U	-	-
TOTAL Bangladesh	-	140640	-	123060	-	-	-	-	-
Southeast Asia									
Philippines	-	-	-	-	-	-	-	(a)	-
Luzon	(b)	104687	U	104687	U	U	-	-	H, G, SF
Visayas	(c)	92937	U	92937	U	U	-	-	H, G, SF
Mindanao	(d)	102058	U	102058	U	U	-	-	H, SF
TOTAL Philippines	-	299683	-	299683	-	-	-	-	-
Vietnam, Rep. of									
Central Plateau	(a)	49921	U	49921	U	U	U	-	SF, H
Central Plains	(b)	54998	U	54998	U	U	U	-	SF, H
Mekong Delta	(c)	68890	300001	368891	162000	U	U	-	-
TOTAL Vietnam, Rep. of	-	173809	300001	473810	162000	-	-	-	-
Malaysia									
West Malaysia	-	132201	U	U	U	U	U	-	C, H
Sabah	-	73968	U	U	U	U	U	-	C, H
Sarawak	-	124882	U	U	U	U	U	-	C, H
TOTAL Malaysia	-	331051	-	-	-	-	-	-	-
Portugese Timor									
Entire Nation	(a)	14925	2606	17531	12710	76261	14936	(b)	C, NG, OS
Southwest Asia									
Turkey (a)	-	-	-	-	-	-	-	(b)	-
Marmora	-	66349	U	66349	U	U	66349	-	SF, OS, NG, H, U, G
Aegean	-	78058	U	78058	U	U	78058	-	SF, OS, NG, H, U, G
Mediterranean	-	117086	U	117086	U	U	117086	-	SF, C, OS, NG, H, G
Inner Anatolia	-	156115	U	156115	U	U	156115	-	SF, OS, NG, H, T4, G
South-Eastern Anatolia	-	58543	U	58543	U	U	58543	-	SF, C, OS, NG, G, H
Eastern Anatolia	-	163921	U	163921	U	U	163921	-	SF, NG, H, G
Black Sea	-	140504	U	140504	U	U	140504	-	SF, OS, NG, H, U
TOTAL Turkey	-	780578	-	780578	-	-	780578	-	-
Israel (a)									
Entire Nation	-	20700	U	20700	U	U	U	-	C, NG, OS

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ASIA									
Southwest Asia									
Bahrain									
Entire Nation	(a)	660.5	U	660.5	U	U	660.5	-	C, NG
EUROPE									
Western Europe									
Germany, F.R. of	-	-	-	-	-	-	-	(a)	-
Shelf, North Sea	(b)	0	36000	36000	36000	U	0	-	C, NG
North German Plains	(c)	60000	0	60000	60000	U	60000	-	SF, C, NG, OS
Central Germany	(d)	156000	0	156000	140000	U	156000	-	NG, OS, U, H
German Alps	(e)	32400	0	32400	30000	U	32400	-	C, NG, H
TOTAL Germany, F.R. of	-	248401	36000	284401	266001	-	248401	-	-
France									
Entire Nation	-	551002	125000	676002	330001	650009	551002	-	SF, C, OS, NG, H, U, T,
Netherlands	(c)	-	-	-	-	-	-	(a)	-
Groningen concession	(b)	2870	100.0	2970	2970	U	2600	-	NG
South Limburg	-	260.0	0	260.0	260.0	U	260.0	-	SF
Eastern Gelderland	-	100.0	0	100.0	100.0	U	100.0	-	SF
Other Land Areas	-	37930	-	37930	36030	U	35290	-	-
Continental Shelf	-	0	58600	58600	56500	U	0	-	NG,C
TOTAL Netherlands	-	41160	58700	99860	95860	-	38250	-	-
Belgium									
Entire Nation	-	30500	-	30500	-	-	-	-	SF, NG
Austria	-	-	-	-	-	-	-	(a)	-
Bohemian Massif	(b)	8950	0	8950	90.00	U	8950	-	SF, H
Tertiary Foreland	(c)	9000	0	9000	9000	U	9000	-	SF, H, C, NG
Tertiary Basins	(d)	11847	0	11847	11847	U	11847	-	SF, C, NG
Paleogene&Mesozoic Alps	(e)	21612	0	21612	21612	U	21612	-	SF, C, NG, OS, H
Paleozoic Alps	(f)	5109	0	5109	0	0	5109	-	U
Metamorphic Alps	(g)	27333	0	27333	0	0	27333	-	H
TOTAL Austria	-	83851	0	83851	42549	-	83851	-	-
Southern Europe									
Italy	-	-	-	-	-	-	-	(a)	-
Alps	(b)	31866	0	31866	0	0	31866	-	H
Southern Calcareous Alps	(c)	20500	0	20500	20500	205003	20500	-	U, H
Po and Veneto Valley	(d)	53000	0	53000	53000	106002	53000	-	NG, H
Apennines	(e)	131000	0	131000	122000	U	131000	-	SF, C, NG, G, U, H
Calabria	(f)	15000	0	15000	6500	U	15080	-	H
Sicily	(g)	25708	0	25708	24000	U	25708	-	C, NG, H
Sardinia	(h)	24089	0	24089	4500	U	24089	-	SF, H
Upper Ardriatic Sea	(i)	0	13500	13500	13500	U	0	-	NG
Miidle and Lower Adriatic	(j)	0	35150	35150	35150	U	0	-	NG
Ionian Sea	(k)	0	6000	6000	6000	U	0	-	NG
Sicily and Malta Channels	(l)	0	20100	20100	U	U	0	-	C, NG
Tyrrhenian & Sardinian Sea	(m)	0	40900	40900	U	U	0	-	-
TOTAL Italy	-	301164	115650	416814	285151	311004	301244	-	-
Spain	-	-	-	-	-	-	-	(a)	-
Zocalo Herciniano	(b)	135000	0	135000	0	U	33750	-	SF,U
Astur-Pirenaica	(c)	10000	0	10000	10000	U	5000	-	SF
Astur	(d)	2000	0	2000	2000	U	0	-	-
Cantabrica Shelf	(e)	0	22000	22000	22000	U	0	-	-
Cantabrico-Pirenaica	(f)	52000	0	52000	41600	U	13000	-	C,NG
Costera Catalana	(g)	13000	0	13000	11700	U	10400	-	SF,U,G
Meseta de Castilla Vieja	(h)	35000	0	35000	35000	U	8750	-	-
Iberica	(i)	55000	0	55000	49500	U	11000	-	SF
Valle del Ebro	(j)	34000	0	34000	34000	U	17000	-	SF
Meseta de Castilla Nueva	(k)	32000	0	32000	32000	U	24000	-	G
Antebetica	(l)	20000	0	20000	20000	U	18000	-	-
Mediterranean Shelf	(m)	0	31000	31000	31000	U	0	-	C,NG
Sierra Morena	(n)	13000	0	13000	2600	U	2600	-	SF,OS,U
Baleares	(o)	5000	0	5000	5000	U	4500	-	SF
Valle del Guadalquivir	(p)	16000	0	16000	16000	U	6400	-	-
Betica	(q)	75000	0	75000	60000	U	22500	-	SF,G
Sea of Alboran Shelf	(r)	0	4000	4000	4000	U	0	-	-
Gulf of Cadiz Shelf	(s)	0	9000	9000	9000	U	0	-	-
Canary Islands	(t)	9000	0	9000	0	U	4500	-	G
TOTAL Spain	-	506000	66000	572000	385400	-	181400	-	-
Portugal	-	-	-	-	-	-	-	(a)	-
Mainland	(b)	89000	23400	112400	17900	U	28600	-	SF, C, NG
Azores	(c)	2335	2275	4410	-	-	-	-	G, H
Maderia	(c)	796.0	1395	2191	-	-	-	-	H
TOTAL Portugal	-	92131	27070	119001	17900	-	28600	-	-
Northern Europe									
United Kingdom (a)	(g)	-	-	-	-	U	-	(f)	-
England and Wales	(b)	151134	-	151134	149925	U	151134	-	SF, NG, C
Scotland	(c)	77179	270001	347178	275486	1417203	194304	-	SF, NG, C
Northern Ireland	(d)	14146	-	14146	2500	-	-	-	-
Continental Shelf	(e)	-	278001	278001	243001	745266	139000	-	NG, C
TOTAL United Kingdom	-	242460	548002	790459	670912	2162468	484438	-	-
Sweden (a)	-	-	-	-	-	-	-	(b)	-
Southern	(c)	11000	0	11000	4000	U	11000	-	SF

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		Land and Inland Waters (sq km)	Continental Shelf (sq km)	Total (sq km)	Area (sq km)	Volume (cu km)	Area (sq km)	Scale (note)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
EUROPE									
Northern Europe									
Sweden									
Central	(d)	27000	0	27000	3000	U	27000	-	OS, U
South and East Central	(e)	142000	125000	267001	85000	U	142000	-	H
Northern	(f)	270001	40000	310001	30000	U	110000	-	H
TOTAL Sweden	-	450001	165000	615002	122000	-	290001	-	-
Denmark (a)									
Entire Nation	(a)	43000	U	U	U	U	-	-	C, NG
Finland (a)									
Entire Nation	(c)	337001	U	U	U	U	337001	(b)	SF, U, H
Norway (a)	-	-	-	-	-	-	-	(b)	-
Onshore	(c)	323887	-	323887	162000	-	108000	-	-
Shelf, south of 62 degree N	(d)	-	140000	140000	C	U	-	-	C
Shelf, north of 62 degree	(e)	-	800002	800002	U	U	-	-	NG
Svalbard	(f)	62400	N	62400	35000	U	17000	-	SP
TOTAL Norway	-	386287	940003	1326289	197001	-	125000	-	-
Ireland									
Onshore	(a)	70285	-	70285	61085	122172	70285	-	SF, H
Offshore	(b)	-	67281	67281	64154	96201	-	-	C, NG
TOTAL Ireland	-	70285	67281	137566	125240	218373	70285	-	-
Iceland (a)									
Entire Nation	-	103000	280001	383001	0	0	-	(b)	SF, H, G
Eastern Europe									
Poland (a)									
Entire Nation	(c)	312678	U	312678	270001	U	312678	(b)	SF, C, NG, H
Germany, D.R. of									
Entire Nation	-	108200	-	-	-	-	-	-	U
Bulgaria									
Entire Nation	(a)	111000	0	111000	70000	U	U	(b)	NG, SF, C
NORTH AMERICA									
Northern America									
United States (a)	-	-	-	-	-	-	-	(b)	-
Eastern, PAD1	(c)	1160580	523181	1603760	927480	2846449	576794	-	SF, H, C, U, NG, TH
North Central, PAD2	(d)	2378658	0	2378658	1856513	4215047	443926	-	SF, NG, C, H
South Central, PAD3	(e)	1527842	176120	1703962	1627298	5963533	293706	-	SF, H, C, U, NG, G
North Rocky Mountain, PAD4	(f)	1340844	0	1340844	980057	3364365	604766	-	SF, H, C, U, NG, TH, OS
Western and Alaska, PAD5	(g)	2955451	1566952	4522402	643098	2790988	1650350	-	SF, H, C, U, NG, G
TOTAL United States	-	9363375	2266252	11629526	6034443	19180368	3569541	-	-
Canada	-	-	-	-	-	-	-	(a)	-
Sverdrup Basin	-	177674	118363	296037	296037	1905695	177674	-	C, NG, OS, SF
Arctic Fold Belt	-	264698	113442	378140	378140	1419058	264698	-	C, NG, OS, SF
Arctic Stable Platform	-	372960	409220	782181	782181	977034	372960	-	C, NG, SF
Arctic Coastal Plain	-	-	-	-	-	500401	-	-	SF, C, NG
Beaufort-Mackenzie	-	45325	37037	82362	82362	375301	65325	-	SF, C, NG
Mainland Northwest Terr.	-	713546	-	713546	713546	1155092	713546	-	SF, C, NG
Prarie Provinces	-	859881	-	859881	859881	2039135	859881	-	SF, C, NG, OS
British Columbia	-	105672	-	105672	105672	487891	105672	-	SF, C, NG
Bowser Basin	-	73815	-	73815	73815	350281	73815	-	SF, NG
West Coast Offshore	-	-	67340	67340	67340	250201	-	-	C NG
Scotia Basin	-	-	432530	432530	432530	1846897	-	-	SF, NG, C
Avalon Uplift-Flemish Cap	-	-	304584	304584	304584	660530	-	-	C, NG
East Newfoundland Basin	-	-	287490	287490	287490	1642567	-	-	C, NG
Labrador Shelf & Slope	-	-	161616	161616	-	915318	-	-	C, NG
Baffin I. Shelf & Slope	-	-	367003	367003	-	2401509	-	-	C, NG, SF
Hudson Platform	-	-	1198652	1198652	-	695558	-	-	C, NG, SF
St. Lawrence Platform	-	310541	-	310541	-	297739	310541	-	C, NG
Maritime Basins	-	318829	-	318829	-	726416	318829	-	SF, C, NG
Other Areas	-	6735821	-	6735821	U	U	6735821	-	-
TOTAL Canada	-	9978762	3497278	13476039	4383577	18646592	9978762	-	-
Greenland (a,b)									
Southwest	(c)	30000	0	30000	N	N	20000	-	U, TR
Continental Shelf	(d)	0	700002	70000	U	1000014	C	-	C, NG
North	(e)	100000	0	100000	100000	100001	-	-	C, NG
Central West	(f)	30000	0	30000	10000	10000	10000	-	SF, C, NG
East	(g)	110000	0	110000	20000	60001	40000	-	C, NG
Other	-	70000	0	70000	N	N	10000	-	-
Icecap	-	1836005	0	1836005	-	-	-	-	-
TOTAL Greenland	-	2176005	700002	2246005	130000	1170015	80000	-	-
Middle America									
Mexico	-	-	-	-	-	-	-	(a)	-
Baja California	(b)	143800	81000	224800	76000	228001	143800	-	G, C
Northwest	(c)	317700	69300	387001	-	-	317700	-	SF, U, H, G
Pacific-Central	(d)	126800	22000	148800	-	-	126800	-	U, H
Balsas River Basin	(e)	148000	10000	158000	30700	92100	148000	-	G, H
Isthmian Zone	(f)	88500	37100	125600	33700	94500	88500	-	SF, C, NG, G, H, G
North	(g)	340700	5000	345700	227000	681002	340700	-	SF, C, NG, U, H,
Gulf-North	(h)	152700	41500	194200	84300	377401	152700	-	C, NG, U, H
Papaloapan River Basin	(i)	61500	7500	69000	39400	108700	61500	-	SF, C, H, NG, G
Grijalva River Basin	(j)	84800	19800	104600	58800	235801	84800	-	C, NG, H
Yucatan Peninsula	(k)	130500	161700	292200	292200	876602	130500	-	C, NG

TABLE 1A. BASIC GEOLOGICAL DATA
TABLEAU 1A. INFORMATIONS GEOLOGIQUES DE BASE

Name of Continent, Region, Country and National Subdivision	Geological Description (see note)	Total Area: Land and Inland Waters (sq km)	Total Area: Continental Shelf (sq km)	Total Area: Total (sq km)	Sedimentary Formations: Area (sq km)	Sedimentary Formations: Volume (cu km)	Geological Mapping: Area (sq km)	Geological Mapping: Scale (note)	Energy Resources
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
NORTH AMERICA									
Middle America									
Mexico									
North Closed Basin	(l)	269000	-	269000	65500	196501	269000	-	SF,C,U
Central Lerma	(m)	90500	-	90500	-	-	90500	-	G,H
Mexico-Puebla	(n)	18000	-	18000	-	-	18000	-	SF,G,H
TOTAL Mexico	-	1972501	454900	2427401	907601	2890606	1972501	-	-
Guatemala	-	-	-	-	-	-	-	(a)	-
Pacific Coastal Plain	(b)	11032	-	11032	-	-	-	-	G, H
Pacific Volcanic Chain	(c)	25555	-	25555	-	-	-	-	G, H
Central Mountains	(d)	36950	-	25556	-	-	-	-	G, H, U
El Peten Lowlands	(e)	35352	-	36950	-	-	-	-	C, NG
TOTAL Guatemala	-	108889	-	99093	-	-	-	-	-
Costa Rica	-	50900	-	50900	-	-	-	(a)	-
Central Highlands	(b)	-	U	-	962.2	U	40000	-	G,H
Pacific Lowlands	(c)	-	U	-	117.6	U	5000	-	G,H
TOTAL Costa Rica	-	50900	-	50900	1080	-	45000	-	-
Panama	(b)	-	-	-	-	-	-	(a)	-
Land Area	-	76650	0	76650	30100	U	U	-	-
Continental Shelf	-	0	-	52330	52330	U	U	-	-
TOTAL Panama	-	76650	-	128980	82430	-	-	-	-
SOUTH AMERICA									
Tropical South America									
Brazil									
North	(f)	3581190	239001	3820191	1564003	4692066	339001	(a)	H
Northeast	(g)	1548676	136000	1684677	927203	2781640	613202	(b)	C, NG, H
Southeast	(h)	924938	104000	1028937	116500	349505	324501	(c)	SF, OS, U, TH, H
South	(i)	577725	321001	898726	1141002	3423049	288391	(d)	SF, OS, H
Central-West	(j)	1879460	0	1879460	340001	1020015	910178	(e)	H
TOTAL Brazil	-	8511987	800002	9311990	4088707	12266273	2475270	-	-
Colombia	-	-	-	-	-	-	-	(a)	-
Caribbean Coast	(b)	134000	31000	165000	85000	U	96000	-	SF,C,NG,U,TH,H
Pacific Lowlands	(c)	73000	19000	92000	60000	U	1000	-	H
Andes	(d)	283001	N	283001	56000	U	151000	-	SF,C,NG,U,TH,G,H,OS
Orinoco	(e)	320001	0	320001	160000	U	3500	-	U,TH,H,
Amazon	(f)	328871	0	328871	70000	U	0	-	C,NG,U,TH,H
Island Territories	(g)	44.00	3000	3044	0	0	44.00	-	-
TOTAL Colombia	-	1138917	53000	1191917	431001	-	251545	-	-
Venezuela	-	-	-	-	-	-	-	(a)	-
Cuenca de Apure-Barinas	(b)	113810	-	113810	113810	180003	113810	-	C
Cuenca de Cariaco	(c)	3670	24390	28060	3670	30000	3670	-	C
Cuenca de Falcon	(d)	32010	3080	35090	32010	100001	35090	-	C
Golfo de Venezuela	(e)	4900	27750	32650	4900	150002	32650	-	C
Cuenca de Maracaibo	(f)	57500	-	57500	57500	200003	57500	-	C, NG
Cordillera de los Andes	(g)	124340	-	124340	-	-	124340	-	H
Cuenca Oriental de Venez.	(h)	152820	25080	177900	152820	360005	152820	-	C, NG
Continental Shelf, East	(i)	-	21810	21810	-	60001	21810	-	-
El Escudo de Guayana	(j)	423001	-	423001	-	-	247251	-	SF, H
TOTAL Venezuela	-	912052	102110	1014163	364711	1090015	788942	-	-
Temperate South America									
Argentina									
Patagonia	(a)	975001	850001	1825001	220000	650002	250000	-	C, NG, U, H, SF, G
Comahue	(b)	440400	-	440400	190000	470001	120000	-	C, NG, H, G, U
Cuyo	(c)	237000	-	237000	130000	300001	237000	-	C, NG, OS, G, U
Centro	(d)	337800	-	337800	60000	60000	200000	-	U
Noroeste	(e)	465600	-	465599	110000	330001	330000	-	C, NG, U, G
Noreste	(f)	289700	-	289700	120000	200001	40000	-	H
Pampeana	(g)	519401	150000	669400	410001	1000003	50000	-	H, G
TOTAL Argentina	-	3264901	1000001	4264898	1240001	3010005	1227001	-	-
Chile (a)	-	-	-	-	-	-	-	(b)	-
Northern	(c)	310735	16940	327675	U	U	196308	-	G,OS,H
Central	(d)	180779	37500	218279	U	U	40900	-	SF,NG,H,OS
Southern	(e)	250349	99260	349609	U	U	107250	-	SF,C,NG,H
TOTAL Chile	-	741862	153700	895563	-	-	344458	-	-
Uruguay (a)									
Cuenca Laguna Merim	(b)	5000	15000	0	10000	6000	20000	-	C, NG
Cuenca Santa Lucia	(c)	6500	-	6500	5000	5000	6500	-	C, NG
Cuenca Noroeste	(d)	80000	-	80000	40000	30000	80000	-	C, OS
Atlantic Shelf	(e)	0	50000	50000	40000	60001	50000	-	C, NG
South Coastal Region	(f)	40.00	0	40.00	-	-	1000	-	SF
Other	(g)	95000	-	95000	-	-	-	-	-
TOTAL Uruguay	-	186540	65000	231541	95000	101001	157500	-	-
OCEANIA									
Australia & New Zealand									
Australia	-	-	-	-	-	-	-	(a)	-
Western	(b)	2390006	0	2390006	1169002	2466035	2390006	-	SF, C, NG, U, T
Central	(c)	2362005	0	2362005	966003	594008	2312005	-	SF, C, NG, U
Eastern	(d)	2926008	0	2926008	2212006	3215045	2926008	-	SF, C, NG, OS, U, H, TH
North-West Shelf	(e)	0	521002	521002	521002	2857040	439001	-	C, NG
West Coast Shelf	(f)	0	99000	99000	98000	960014	99000	-	-
Bass Strait Shelf	(g)	0	203001	203001	184000	351005	203001	-	C, NG

TABLE IA. BASIC GEOLOGICAL DATA
TABLEAU IA. INFORMATIONS GEOLOGIQUES DE BASE

Name of Continent, Region, Country and National Subdivision	Geological Description (see note)	Total Area			Sedimentary Formations		Geological Mapping		Energy Resources
		Land and Inland Waters (sq km)	Continental Shelf (sq km)	Total (sq km)	Area (sq km)	Volume (cu km)	Area (sq km)	Scale (note)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
OCEANIA									
Australia & New Zealand									
Australia									
North and East Shelf	(h)	0	999003	999003	842003	1109015	878003	-	C, NG
South Coast Shelf	(i)	0	314001	314001	224001	236003	304001	-	-
TOTAL Australia	-	7678019	2136004	9814022	6216013	11788163	9551022	-	-
New Zealand (a)	-	-	-	-	-	-	-	(b)	-
Northern Coal Region	(c)	28380	0	28380	28380	5700	28380	-	SF
Western Coal Region	(d)	21620	0	21620	21620	300.0	21620	-	SF, U
Southern Coal Region	(e)	56230	0	56230	56230	8500	56230	-	SF, OS
Northland - Waikato	(f)	17800	17940	35740	35740	54001	17800	-	-
Taranaki Region	(g)	22200	49560	71760	71760	2600037	22200	-	NG, C
East Coast	(h)	28100	9850	37950	37950	114002	28100	-	-
West Coast	(i)	3530	19850	23380	23380	35000	3530	-	-
Canterbury	(j)	19560	25735	45295	45295	543008	19560	-	-
Southland	(k)	11900	13240	25140	25140	25000	11900	-	OS
Rotorua - Taupo	(l)	7500	1760	9260	9260	23000	7500	-	G
Other	-	51856	0	51856	-	-	51856	-	-
TOTAL New Zealand	-	268677	137935	406612	354756	3408545	268677	-	-
Melanesia									
Papua-New Guinea	-	-	-	-	-	-	-	(a)	-
Onshore	(b)	466001	0	466001	276001	786011	466001	-	C, NG, H
Offshore	(c)	0	159000	159000	89000	382005	159000	-	C, NG
TOTAL Papua-New Guinea	-	466001	159000	625002	365001	1168016	625002	-	-
Polynesia									
Fiji Islands									
Land Area	(c)	18265	0	18265	0	0	16437	(a)	H
Continental shelf (b)	(d)	0	34205	34205	0	0	0	-	C
TOTAL Fiji Islands	-	18265	34205	52470	-	-	16437	-	-
Western Samoa (a)									
Entire Nation	-	2760	2640	5400	0	0	2760	-	H

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.	
AFRICA		
Western Africa		
Nigeria	(a)	All geologically mapped areas are to a scale of 1:250,000 except for 43,810 sq. km. in northern Nigeria which is only mapped to a scale of 1:100,000. In addition, 740 sq. km in southeastern Nigeria is also mapped at 1:100,000 and 46,790 sq. km. in northern Nigeria to 1:100,000.
	(b)	Southeastern Nigeria is characterised in the extreme south by a low area of mangrove swamps and deltaic deposits, which passes in the extreme north into open grass-covered plains. In the southern part of the intervening zone the ground is even or very gently undulating, rising northwards into a well dissected belt followed by a plateau area. Along much of the eastern flank of the region there is a chain of hills formed of Basement Complex rocks. The main rock types in the region are sandstones, shales and limestones of Albian to Pleistocene age, and crystalline rocks of Precambrian age. The main fold area of the sediments trend north-east and are intersected by north-trending escarpments and ridges.
	(c)	The entire southern part of Southwestern Nigeria is a sedimentary area characterised by thickly forested undulating hills and swampy lowlands of the coastal belt. The crystalline basement area to the north has a moderate relief over wide tracts with low forested hills and occasional ridges and inselbergs. In the extreme north, the vegetation is Guinea Savannah, the major rock types in the region are sandstones, shales, clays and limestones of Sanovian to Pleistocene age, and crystalline rocks of Precambrian age. The dip of the sedimentary rocks is very gentle to the south.
	(d)	Northern Nigeria has a great diversity of topographic forms including hills, plateaus and gently undulating plains. The Basement Complex, the volcanic rocks and some of the sandstones all form prominent hill features, and there are both sedimentary and volcanic plateaus. The major rock types include crystalline basement rocks of Precambrian age, volcanic rocks of Cretaceous and Tertiary age, and sandstones, clays, shales and limestones of Cenomanian to Pleistocene age.
Ghana	(a)	Ghana is geologically mapped at a scale of 1:62,500.
	(b)	Igneous and metamorphic rocks of Precambrian age and sedimentary rocks of Devonian, Cretaceous, Eocene, Miocene, Pliocene ages exist in Ghana.
Portuguese Guinea	(a)	In the Senegal Basin, the alluvium from the rivers has formed a delta along the Guinean Coast and Bijagoz Archipelago. The Paleozoic rocks comprise: Cambrian marine shale and sandstone, Ordovician quartzite, sandstone, and conglomerate, Silurian shales, Devonian sandstone and shale with dolerite lava flows. Mesozoic and Cenozoic marine sedimentary rocks underlie the deltaic sands, the evaporites, and the multifaulted north zone.
	(b)	Geological mapping is to scale of 1:200,000.
Cape Verde Islands	(a)	Volcanic islands with sedimentary strata, mainly of Tertiary and Quaternary age.
	(b)	The various islands are mapped geologically at scales of 1:25,000 to 1:200,000.
Eastern Africa		
Ethiopia	(a)	Investigation of energy resources currently in the exploratory stage. The reported energy resources are those of occurrences observed in the various regions of the country and those considered likely to exist on the basis of geological conditions.
	(b)	The geology of the country can be divided into three groups on the basis of rock types: basement complex comprising metamorphic rocks and igneous intrusives, Mesozoic and Cenozoic sedimentary rocks and volcanic rocks.
	(c)	Elevations above 1000 m consist of the Northern, Western, Southwestern and central parts of the country.
	(d)	Southern part of the country, bordered in the west and in the north by the rift escarpments, descends gradually to the southeast towards the Indian Ocean.
	(e)	Main Ethiopian rift, the Afar depression, the marginal zone of the Red Sea rift and some minor rifts such as the Lake Rudolf (Lower Omo) and Lake Stafonie rifts.
Mozambique	(a)	The major rift valley crosses the important sedimentary basins (depocenters). The Stromberg volcanics separate the Karoo continental sedimentary area from the Cretaceous-Tertiary areas. The Tertiary coastal sediments thicken considerably toward the Zambesi delta. Except in the Rovuma basin, the continental shelf is wide. The Mozambique Channel, formed by the drifting of Madagascar from the continent, contributes to the development of the Rovuma basin.
	(b)	Mozambique is mapped to scales of 1:2,000,000 and 1:250,000.
Malawi	(a)	The land area of the country has been geologically mapped, published, or to be published, at a scale of 1:100,000. No data are available for the areas covered by lakes.
	(b)	The sedimentary areas given exclude sediments underlying lakes and chilwa (24,000 sq km). They also exclude recent lacustrine, alluvial and colluvial deposits of unknown thickness.
	(c)	Plateau at 1000 m altitude, mountains and Rift Valley. The Rift Valley is largely filled by Lake Malawi and is mostly underlain by gneisses of the basement complex.
Zambia	(a)	The Barotse Plain is completely mapped to a scale of 1:250000 but maps are not published. The Zambesi Valley is completely mapped to a scale of 1:100000. All other regions are partially mapped to scales of 1:100000 or 1:250000.
	(b)	Extensive plain 916 to 1220 m above sea level covered by Kalahari sand formation (sand, sandstone, limestone, silcrete) and underlain by Karroo formation and in the west by Cretaceous sediments.
	(c)	Partly fault-bounded Rift Valley trending north-east. Floor between 457 m and 765 m above sea level and escarpments of 305 to 610 m on sides. Valley is 564 km long and 81 to 97 km across narrowing to 25 km in south-west. Floored by Karroo sediments.
	(d)	Parallel to Luangwa Valley but only 274 km long by 16 to 24 km wide. Northern part lies parallel to southern part of Luangwa Valley and is separated from it by a narrow ridge of Precambrian rocks. Floored by Karroo sediments.
	(e)	Narrow valley at foot of escarpment along north-west side of Zambezi River, about 483 km long and 8 to 40 km wide. Largely fault-bounded on north-west with escarpment up to 610 m high. Zambezi River and Lake Kariba are on the south-east. Valley is floored mainly by Karroo sediments with an extensive area of Karroo basalts at the south-west end.
	(f)	A high plateau lies to the south-east and east of the Luangwa Valley and extends from the Luangwa River in the south-west to Mpika Plateau and the Mafingi Hills in the north. Elevations are between 916 m and 1220 m with hill ranges of 1220 m to 1525 m mostly in the east and rising to over 2240 m with peaks of over 2740 m in Nyika Plateau and the Mafingi Hills. Area is composed entirely of Precambrian granites and metamorphic rocks.

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.	
AFRICA		
Eastern Africa		
Zambia	(g)	Plateau lies to north-west of Luangwa Valley and extending to boundries with Zaire and Tanzania on the west and north and near the end of Zaire Pedicle in the south. From Lake Bangweulu at north-east end of Zaire Pedicle land rises outwards in all directions to altitudes between 916 m and 1525 m with higher hill ranges and masses over 1525 m. Entirely underlain by Precambrian granites and metamorphic rocks with some large areas covered by swamps and alluvium.
	(h)	The remainder of the country extends southwards from the Angola and Zaire borders to the Zambezi escarpment and is flanked on the west by Barotse Plain Plateau. Area is underlain by Precambrian granitic and metamorphic rocks including the low grade copperbelt deposits. Lukanga swamps , and Kafue Flats are covered with alluvium.
Middle Africa		
Zaire	(a)	Maximum depth of sediments in Atlantic Coastal Plain Area is 3000 m. Depth of sediments in Central Zaire is 800 to 1000 m.
	(b)	Atlantic Coastal Plain has been geologically mapped to a scale of 1:200,000. About 1800 sq km of Central Zaire is mapped at 1:200,000. Much of the rest of this area is mapped at 1:1,000,000. Maps for Southern Zaire are to scales of 1:200,000 and 1:1,000,000. The interperative geological map of Jan. 1, 1969 covers the entire nation. The maps of the Atlantic Coastal Plain and Central Zaire at a scale of 1:200,000 are unedited reconnaisance maps.
	(c)	The Atlantic Coastal Plain of Zaire has Cenozoic marine deposits of Eocene to Pleistocene age, Mesozoic Marine sediments from the Aptices and Maestrichtien, and Mesozoic continental sediments of lower Cretecous age.
	(d)	Central Zaire is covered by continental sediments of Paleozoic to Pleistocene age over Mesozoic deposits, including upper Cretaceous continental sediments, lower Cretaceous continental and marine deposits and Jurassic marine sediments. There are also small areas of continental Paleozoic sediments of Permo-Carboniferous age. The Central Zaire Basin is limited to sedimentary cover at least 800-1300 m thick as determined by drill corings of Samba and Dekese.
	(e)	Recent sedimentary deposits in southern and eastern Zaire include grabens in the Upemba, Lake Tanganyika, and Ruwenzori Mountains, and Lake Kivu areas. There are also upper Precambrian uranium containing deposits at Shinkolobwe and thorium bearing deposits of lower Precambrian age at Koza.
Angola	(a)	The listed sedimentary areas do not include the Kalahari aeolean sands which cover a large part of Angola. The continental Karroo basins were also not listed because there is presently no information on the presence of fossil fuels.
	(b)	The Cabinda, Benguela and Mocamedes Basins have been mapped to a scale of 1:100,000, and the Congo and Cuanza Basin to a scale of 1:250,000. The Cuanza, Benguela and Mocamedes Basins have also been partly mapped to a scale of 1:40,000.
	(c)	Cretaceous and Tertiary sedimentary basins occur along the coastal areas. The interior basins comprise Karroo units and aeolean sands of the Kalahari desert.
	(d)	The coastal sedimentary basin is connected with the Congo Basin. Homocline dips to the southwest. Two fault trends NW-SE, and more recently NE-SW, control the folding of the system. Strata are Cretaceous and Tertiary sandstones, carbonates, shales and evaporites.
	(e)	The geology of the Congo basin is similar to that of the Cabinda Basin.
	(f)	Coastal sedimentary plain, mainly of Cretaceous and Tertiary age. Pronounced structural features (Diapirs, Saltwalis and Turtle Carapaces) due to halokinetic sandstones, marls, shales, carbonates and evaporites.
	(g)	Coastal sedimentary basin predominantly of Cretaceous and Tertiary age (Litoralbelt) separated by a NE-SW fault. Regular dip of 15-20 degrees to the west. Sandstones, mudstones, conglomerates and limestones.
	(h)	Coastal sedimentary plain.
Sao Tome and Principe	(a)	Sao Tome Island has been geologically mapped to a scale of 1:200,000, and Principe Island to 1:60,000.
	(b)	Volcanic island with small sedimentary deposits. Hydrocarbon explorations have been made.
	(c)	Volcanic island without sedimentary rocks.
Northern Africa		
Spanish Sahara	(a)	To the east, Paleozoic sedimentary rocks. To the west, Mesozoic sedimentary rocks. Slight tectonic deformation.
Southern Africa		
South Africa	(a)	The National subdivisions reported are only a small fraction of South Africa's total area of 1,221,000 sq km.
	(b)	Geological maps are produced mostly to scales of 1:125,000, 1:250,000 and 1:50000. Mapping is carried out on air photographs at scales larger than 1:50,000.
	(c)	Permo-Carboniferous Ecca Strata (Karoo System) that contain coal seams of economic importance are restricted to that portion of South Africa lying north of a line joining Welkom, O.F.S., and Ladysmith, Natal. South of this line the depth of the water in which the Ecca was deposited was too deep for coal formation.
	(d)	The coal-bearing Middle Triassic Molteno Strata are restricted to the north eastern part of Cape Province.
ASIA		
East Asia		
Japan	(a)	The area of continental shelf up to a depth of 200 meters is estimated at approximately 280,000 sq km by Japan Petroleum Corporation in its publication "Ocean oil development, 1969". The area given in column 4 is to a depth of 100m only.
	(b)	Areas of geological mapping are for coal, oil and natural gas deposits only. About 20,900 sq km of coal deposits, 9400 sq km of oil and associated gas fields and 5,800 sq km of gas-only fields have been mapped at scales of 1:30,000 up to 1:100,000. The above areas include about 11,000 sq km of coal deposits, 4500 sq km of oil and gas fields and 3600 sq km of unassociated gas fields mapped at 1:200,000.
Korea, Rep. of	(a)	Geological mapping is done to a scale of 1:250000 and in a few areas to 1:50000.
Taiwan	(a)	Subdivisions do not sum to total area of 36,000 sq km of Taiwan. Some overlapping of regions occurs.
	(b)	Tutun volcanic area (Northern tip of Taiwan) consists mainly of Pleistocene andesites and agglomerates and Miocene sedimentary rocks.

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.
ASIA	
East Asia	
Taiwan	(c) Middle to southern foothills area (Hsinchu Maoli and Tainan area) consists mainly of Miocene sedimentary rocks.
	(d) Middle to northern parts of Taiwan consist mainly of Miocene sedimentary rocks. Coal measures are divided into Maochung, Shihti, and Nushan formations.
	(e) Western and eastern parts of Taiwan (Jachin, Choshui, Hualien, Liwu and Pienan rivers) consist mainly of Miocene to Pleistocene sedimentary rocks in western parts, plus some Paleozoic metamorphic rocks (green and black schists, marbles).
Macau	(a) Precambrian formations overlain by Pleistocene sands.
	(b) Macau is geologically mapped to a scale of 1:25,000
Middle South Asia	
India	(a) The country has been divided into eighteen States and ten Union Territories. The Mizo District in Meghalaya which is now constituted as the Union Territory of Mizoram has been included in Assam.
	(b) The Sedimentary Area of 1,670,000 sq km includes the areas of 26 basins for the whole country. Areas for national subdivisions are total areas.
	(c) The figure given for area geologically mapped represents 25% of the total area mapped by reconnaissance
	(d) Area of the continental shelf is to a depth of 100m.
Bangladesh	(a) Bangladesh is divided into 8 physiographic divisions. Detailed information is, however, available only for 4 subregions: Lamakata Bhangarghat, Jamalganj Paharpur, Kola Mouza, and Baghia Chanda Beels. The greater part of Lamakata-Bhangarghat is recent piedmont alluvium, 12 to 18 m above sea level, gently undulating and sloping 1 in 100 southward to the margins of swamps. Only Sylhet limestone of Eocene age crops out at a few places. Coal-bearing Tura formation of Eocene age occurs in subsurface. About 1 sq km has been prospected and mapped to a depth of 315 m. The Jamalganj Paharpur area includes recent flood-plain alluvium of the Jamuan and its tributaries. Modhupur clay of possible Pliestocene age occurs in the neighborhood of the area. All other geological formations, including the coal-bearing Paharpur formation of Permian age, occur subsurface. About 50 sq km have been prospected to a depth of 1172m but are yet unmapped. The Kola Mouza area is of recent deltaic alluvium making low, sinuous shallow depressions and ridges from 1 to 3 m above sea level, rises being 1 m higher than depressions. The area is inundated during floods. About 233 sq km have been prospected to a depth of 3 m. The Baghia Chanda Beels area comprises recent deltaic alluvium only 1.5 to 3 m above sea level, surrounded by river levees 4 to 5 m above sea level. During floods the area goes under 3 to 4 m of water and a part remains under water even during the dry season. About 548 sq km have been mapped and prospected to a depth of 4 m.
Southeast Asia	
Philippines	(a) Geological maps are avalable at a scale of 1:1000000.
	(b) The Philippines lies 965 kilometers off the southeast coast of Asia, between latitude 4 and 22 degrees north and longitude 116 and 127 degrees east. The archipelago consists of more than seven thousand islands. In the south China Sea, with an aggregate land area of 299,682 square kilometers and with an inland water area of 2272 square kilometers.
	(c) Luzon is the largest, most populous and northernmost island and has an area of 104,687 square kilometers. The Island of Luzon comprises northern, central and southern Luzon and Bicol.
	(d) The Visayas region is directly south of Luzon and comprise a group of islands with considerable navigable water. The largest islands are Cebu, Leyte, Negros, Bohol, Samar and Antique.
	(e) Mindanao, the second largest island has a surface area of 102,058 square kilometers. The coast is very irregular with numerous bays and peninsulas. In the interior there are a group of mountain chains with some volcanoes and navigable rivers.
Vietnam, Rep. of	(a) A series of plateaus 500 to 1000 m above sea level which consist of Indosinias granite, basalt and metamorphic rocks.
	(b) Eroded piedmont of the extreme southern end of the Annamitic mountain chain and of the Central Plateau. Consists of a coastal band about 30 km wide bordered, along the coast, by sand dunes and lagoons. The granite and metamorphic formations are well developed.
	(c) Alluvial plain of recent orgin with several Permian limestone and granite hills emerging from the plain.
Portuguese Timor	(a) Includes eastern end of Timor Island, enclave of Ocussi and volcanic island of Atauro. The Peruvian stratigraphic series are folded and rest on Tertiary volcanics. The Peruvian Cribas Series comprises shale and sandstone with calcareous beds. In the Triassic-Jurassic complex flysch facies predominate. Important calcareous beds also occur. In the Tertiary an Eocene unconformity is the major tectonic element. There are several oil seeps, and oil exploration and drilling has resulted in oil discoveries.
	(b) Geologically mapped to scales of 1:500,000 and 1:40,000
Southwest Asia	
Turkey	(a) The structural characteristics of the Anatolian mountain ranges are divided, from north to south, into four tectonic units. The first are the North and Northwest Anatolian Ranges (Pontids) which were raised above sea level as islands at the beginning of the Mesozoic. The second are the Inner Anatolian Ranges (Anatolids) which were developed at the end of the the Cretaceous. The igneous intrusions of this unit were completed at the beginning of the Tertiary. The third unit is the South and East Anatolian Ranges (Taurids) which occurred at the end of Oligocene. The last is the border folds of the Southeast Anatolian Ranges which were developed during the Pliocene.
	(b) The geologic maps of Turkey are on scales of 1:500,000 and 1:200,000. The area of each geographical region has not been determined exactly.
	(c) In Thrace the major rocks are sandtone, marl and limestone of Tertiary age. In the Kocaeli peninsula the major rocks are limestone, conglomerate and clayey schist of Devonian, Permian and Triassic age. In southern Marmora the major rocks are metamorphic schist and continental sediment of the Paleozoic and Tertiary periods, respectively.
	(d) In the northern part of the region the major rocks are andesite, basalt and a very few metamorphic schists of Permo-carboniferous and Paleozoic age, respectively. In the southern part of the region the major rocks are metamorphic schist and gneiss of Paleozoic age and marl, limestone, sandstone and clay of the Neogene period. In the inner part of the region the major rocks are conglomerate with clay, marl, and marl-limestone of the Neogene period.

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.
ASIA	
Southwest Asia	
Turkey	(e) The major rocks in this area are dolomite-limestone and limestone with some conglomerate in the western part and slate in the eastern part. Rocks in the west are of Mesozoic age and in the east, from the Tertiary period.
	(f) In this area the major rocks are continental sediments and lacustrine deposits with clay and gravel in the western part, and gypsiferous series and basic intrusives in the eastern part, all of Neogene age.
	(g) In this region the major rocks are limestone, marl conglomerate and basaltic series all of Tertiary age.
	(h) The major rocks in this area are basaltic series of Tertiary age and deposits of marl and tuffite of the Neogene period.
	(i) In the Karadeniz Region the major rocks are limestone of the ophiolit series large granite intrusions in the east from the Upper Cretaceous.
Israel	(a) Israel has three physiographic regions: the Mediterranean Coastal Plain in the west, the Negev Desert area in the south, and the Hill Region in the east.
Bahrain	(a) Salt dome structure. Lower and middle Eocene in the centre of the island (limestone, dolomite, gray marl). The coastal area is made up of Quaternary deposits.
EUROPE	
Western Europe	
Germany, F.R. of	(a) About 50% of Germany is mapped to a scale of 1:25,000, 10% to scales of 1:50,000 or 1:100,000, 20% to 1:200,000 and the remainder to scales of 1:300,000 or 1:500,000
	(b) Continuation of the geological features of the North German plains.
	(c) Tertiary and Quaternary cover over slightly folded Mesozoic clastic and carbonate rocks with Permian salt diapirs.
	(d) Paleozoic, Varistian folded slates, partly with volcanic greywackes and limstones, of Varistian origin. Slightly to unfolded, but faulted young Paleozoic and Mesozoic rocks.
	(e) Strongly folded Mesozoic rocks, folded Tertiary, Molasse foredeep with unfolded Tertiary. Alpidec origin.
Netherlands	(a) All mapping has been carried out on a 1:50,000 scale. Mapping covers only surficial geology to a depth of 100-200m. Some special subsurface maps exist. Inland waters have not been mapped.
	(b) The Groningen concession, covering the province of Groningen in the NE of the country has been entered separately, because separate gas reserve figures are available for this area.
	(c) Basement rocks are unknown. The geological information starts with the Carboniferous, which is present in the subsurface throughout most of the country. The geology is represented by faulted and gently folded Palaeozoic and Mesozoic strata, locally strongly deformed by salt tectonics, overlain by relatively undisturbed Tertiary and Quaternary deposits with thin layers towards the south and east. Major unconformities are Asturian to Saalian, late Kimmerian and Subhereynian to Laramide. Present topographic relief is small, the elevation being in general close to sea level.
Austria	(a) Geological Maps are available at scales of 1:1,000,000, 1:500,000, 1:75,000, 1:50,000, and 1:25,000.
	(b) Peneplained platform, metamorphics and granites, small relics of Tertiary sedimentary cover, 0 to 100 m thick.
	(c) Flat lying or folded, imbricated Tertiary sediments of widely differing thicknesses up to 3000 metres. Generally flat to hilly.
	(d) Vienna basin and adjacent areas. Styrian basin and other small intraalpine basins. Maximum thickness 5000 m (Vienna B.), 3000 m (Styrian B.)
	(e) Mountain ranges and plateaus, nappe structures, several thousand meters of sedimentary rocks.
	(f) Early to late Paleozoic phyllites, greenschists and limestones of variable thickness. Nappe structures and mountainous terrain.
	(g) Phyllites, gneiss, amphibolites, etc. plus granitic rocks. Nappe structure and mountain ranges.
Southern Europe	
Italy	(a) Scale of Italian geologic mapping is 1:100,000
	(b) Outcrops of igneous and metamorphic rocks
	(c) Rocks range from Upper Carboniferous to Lower Triassic and are mainly clastics from middle Triassic to Cretaceous with prevalence of carbonates. During the Tertiary, they are essentially clastic rocks.
	(d) Quaternary (Pliocene) beds.
	(e) Triassic evaporites, Jurassic and Cretaceous evaporites, Miocene limestones, and Pliocene sandstones.
	(f) Postorogenic conglomerates and sandy clays.
	(g) Mesozoic carbonate clastic formations of Tertiary, Oligo-miocene sandstones of Flysch.
	(h) Crystalline bed showing strips of Paleozoic and Mesozoic formations, with bunching of Miocene and Pliocene sediments.
	(i) Pliocene-quaternary beds
	(j) Pliocene sands.
	(k) Miocene conglomerates and sands.
	(l) Mesozoic limestones.
	(m) Miocene and Pliocene sediments.
Spain	(a) All geological maps are on a scale of 1:50,000.
	(b) Hercynian basement of igneous and metamorphic rocks.
	(c) Strongly deformed Paleozoic rocks. Coal-producing Carboniferous rocks.
	(d) Slightly deformed Paleozoic and Mesozoic rocks.
	(e) Neogene marine sedimentary rocks unconformable on a pre-Alpine substratum.
	(f) Mesozoic and Paleogenic sediments with strong tectonics, over thrusts and crystalline-Paleozoic axial zone, tertiary vulcanism in the eastern part.
	(g) ENE-WSW axis, with Paleozoic and Mesozoic sediments and crystalline basement.
	(h) Post-orogenic continental Tertiary rocks over the Hercynian basement.
	(i) NW-SE axis with Paleozoic and Mesozoic sediments, slight tectonics.
	(j) Post-orogenic continental Tertiary rocks over Cenozoic, Mesozoic and Paleozoic substratum.
	(k) Post-orogenic continental Tertiary rocks over the Hercynian basement.
	(l) Slightly deformed Neogene marine sedimentary rocks and Mesozoic platform sedimentary rocks.

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.	
EUROPE		
Southern Europe		
Spain	(m)	Neogene marine sedimentary rocks unconformable on Mesozoic substratum. Neogene volcanics.
	(n)	Hercynian basement of igneous and metamorphic rocks. Coal producing Carboniferous. Vulcanism in the eastern part.
	(o)	Strongly folded Mesozoic and Tertiary sedimentary rocks and unconformably overlain by Neogene rocks.
	(p)	Marine Neogene.
	(q)	Paleozoic and Mesozoic sedimentary rocks with overlying unconformable marine Neogene rocks. Strong tectonic deformation with overthrusting. Some vulcanism.
	(r)	Marine Neogene unconformable over the crystalline basement. Tertiary vulcanism.
	(s)	Marine Neogene rocks in the north unconformable over Mesozoic rocks with slight deformation. In the south, Neogene rocks unconformable over Paleogene and Mesozoic sedimentary rocks with some overthrusting
	(t)	Volcanic rocks.
Portugal	(a)	Geological maps of Portugal are to a scale of 1:50,000.
	(b)	Igneous basement, mainly granitic intrusives into Precambrian and Paleozoic crystalline rocks. Residual morphology of large mountains permits steps along the fundamental hydrographic units, with open valleys, that permits the building of dams.
	(c)	The volcanic morphology of the Atlantic Island provinces of Portugal formed small fluvial basins with steep slopes that permit small lakes.
Northern Europe		
United Kingdom	(a)	Continental shelf of Scotland to 200 m. depth, or to median line with bordering countries on the east. Continental Shelf around England, Wales and Northern Ireland taken as south of 56 deg. N. latitude between Ireland and Scotland, and upon an estimated or actual median line with all bordering countries.
	(b)	Surface of England is covered mainly by Paleozoic, Mesozoic and Tertiary sedimentary rocks up to 11.2 km thick with variable cover of unconsolidated Quaternary glacial or fluvial deposits. Igneous rocks mainly confined to extreme S.W. and N.W., granite most widespread. Structure of Wales complicated but S. & E. Wales relatively simple. Surface of S. Wales mainly younger Palaeozoic and Mesozoic, central and N. mainly folded older Palaeozoic, igneous mainly in N. and W. Paleozoics cut by large structures not affecting Mesozoics.
	(c)	Highlands and islands, approx. 2/3 of total land area, comprise metamorphic and igneous rocks. Midland Valley, approx. 1/6 of land total, is of Upper Paleozoic and Mesozoic rocks, Southern Uplands, remaining 1/6, is of Lower Paleozoic. Continental Shelf is about 3/4 underlain by Upper Paleozoic, Mesozoic and Tertiary rocks.
	(d)	Bulk of country, from N.W., to S.E. consists of granite, metamorphics, Tertiary basalts, and Silurian granites, leaving a central ridge of Lower Devonian sandstones with Carboniferous strata on each side.
	(e)	Permian, Mesozoic and Tertiary Basins, resting on a basement of Carboniferous or older rocks. Carboniferous strata, containing coals is of unknown thickness.
	(f)	England and Wales are fully mapped at a scale of 1:63360 and 65% at 1:10560. About 96% of the land area of Scotland is mapped at 1:10560, 4% is mapped and at 1:625000. About 120,000 sq km of offshore Scotland is mapped at 1:100000. Mapping of the continental shelf of England, Wales and Northern Ireland is of variable quality
	(g)	The British National Committee of the WEC reports that there are no significant proved energy resources within the dependent territories of the UK which are as follows: Bahamas (until June 1973), Bermuda, British Antarctic Territory, British Honduras, British Indian Ocean Territory, British Solomon Islands Protectorate, British Virgin Islands, Cayman Island, Falkland Islands, Gibraltar, Gilbert and Ellice Islands Colony, Hong Kong, Montserrat, Condominium of New Hebrides (jointly administered by U.K. and France), Pitcairn Island, St. Helena, Seychelles, and Turks & Caicos Islands. (Source: Foreign and Commonwealth Office, London, SW1, England.)
Sweden	(a)	Boundaries of the continental shelf areas are taken according to the principle of equidistance between countries as given in SOU 1972:43 Department of Industry, Stockholm.
	(b)	Geological maps have been prepared mainly to a scale of 1:50000 but maps at scales of 1:100000 and 1:200000 are also available.
	(c)	Horsts of Precambrian crystalline rocks surrounded by Phanerozoic sedimentary rocks.
	(d)	Peneplained Precambrian bedrock with remnants of overlying Paleozoic sedimentary rocks.
	(e)	Peneplained Precambrian rocks which, on part of the east coast and in the Baltic Sea, are overlain by Phanerozoic rocks.
	(f)	Precambrian peneplain with the overriding Caledonian Mountains along the western border. About 30,000 sq km of thin sedimentary cover exists in the Gulf of Bothnia.
Denmark	(a)	Level land covered by glacial deposits. The Prequaternary section comprises sedimentary basin deposts (mainly marine). The Paleozoic section is known only in part. Study of the Mesozoic and the Cenozoic sections are nearly complete. Sandstone (sand) and shale (clay) are the dominating rocks while limestone and salt occur in certain sections.
Finland	(a)	The area of the continental shelf has not been officially calculated, however, the boundary lines have been defined and mapped.
	(b)	The entire country has been geologically mapped to a scale of 1:400,000. About 20% of the nation has been mapped to a scale of 1:100,000. General mapping to a scale of 1:20,000 will be completed about 1975.
	(c)	Precambrian highly metamorphic migmatites, gneisses, shists and plutonic rocks, mainly granites.
Norway	(a)	The North Sea Area was divided between Denmark, UK and Norway by the midline method. The border was settled midway between basic sea territorial limits of two opposite countries. The border between Sweden and Norway was defined in the same way in the Skagerak. The area was delineated in the north by the 62 deg. latitutde. The part of the Norwegian Continental Shelf north of 62 deg. N has not been delineated with borderlines between the basin areas. The continental shelf area of Svalbard is negligible since it includes only shelf area inside the territorial limit which is four nautical miles off the baseline of the coast
	(b)	About one-third of Norway is mapped to scales of 1:100,000 and 1:50,000, ten percent is mapped to 1:250,000. Svalbard has been mapped to a scale of 1:500,000
	(c)	Largely granites, gneisses and schists of Precambrian or Caledonian age. Sediments of Precambrian to Jura age occur at several places.

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.
EUROPE	
Northern Europe	
Norway	(d) Part of the North Sea basin. (e) Parts of the North Sea basin, More basin, Troms basin and Barents basin (f) All islands between 10 degree and 35 degree longitude and between 74 and 81 degree latitude
Ireland	(f) All islands between 10 degree and 35 degree longitude and between 74 and 81 degree latitude (a) Major intrusions and extrusions of igneous rocks cover 2200 sq km of Ireland's surface, metamorphic rocks above greenschist facies in the NW and SE cover 7000 sq km, Lower Paleozoic rocks, generally of scattered geosynclinal sediments, cover 10,600 sq km, Devonian and Old Red Sandstones in clastic sequence molasse facies cover 8200 sq km, and wideranging coal-containing limestone sequences of Carboniferous age cover 42,300 sq km. Volume of onshore sediments estimated to 2 km depth. (b) Volume of offshore sediments estimated to 1.5 km depth.
Iceland	(a) The area of the continental shelf is to a depth of 400 m. (b) Geological maps at a scale of 1:250,000 are available for most parts of the country.
Eastern Europe	
Poland	(a) Data on offshore area are not available, since the limits of offshore areas between Poland, Denmark and Sweden are not yet established. (b) All of Poland is geologically mapped to a scale of 1:300,000. Approximately 1/3 of the country is geologically mapped at 1:50,000 for economically important regions. (c) Morphologically, Poland slopes down from the Tatra and Karpaty Mts. in the south to the Baltic coast in the north. In this relatively small area the geological structure is complex and diversified, as a result of the junction of three main European geological provinces: the East-European platform, the area of Paleozoic folding and the area of Mesozoic and Cenozoic (Alpine) folding. The first forms the northeastern area of Poland, and is built up of a crystalline basement overlain with unfolded Paleozoic-Mesozoic-Cenozoic sedimentary cover and Quaternary sands, loams and gravels. In the southeastern part of this area large, hard coal deposits have been discovered recently. The southwestern part of Poland, belonging to the Central and West-European platform, consists of folded Paleozoic formations overlain with a cover of Zechstein-Mesozoic and Cenozoic deposits. In some parts of this area (the Sudety Mts., the Upper Silesian and the Swietokrzyskie Mts.) this cover is absent and the folded Paleozoic basement is exposed at the surface. The main mineral energy resources discovered here are: in the lower Silesian region - hard and brown coal, in the Upper Silesian region - rich hard coal deposits, and in other parts of the Paleozoic platform - natural gas and brown coal. The area of Alpine foldings and of adjacent foredeeps is the youngest geological unit of Poland, formed in Cretaceous to Tertiary orogenies. These regions are known principally for their natural gas and oil deposits.
Bulgaria	(a) Mountainous and hilly country with limestones and sandstones of the Paleozoic and Mesozoic periods. (b) Bulgaria has been geologically mapped at scales of 1:25,000, 1:50,000 and 1:200,000
NORTH AMERICA	
Northern America	
United States	(a) For convenience the U.S. is divided into five regions, called PAD districts, the outlines of which are based upon state (political) boundaries. Therefore the various geological entities included in each PAD District are approximations, as are the sedimentary areas and volumes. However, the total land areas, water areas, continental shelf areas, and areal mapping areas are given with greater precision. Total area does not include the U.S. share of the Great Lakes. (b) Geological mapping is to a scale of 1:250,000 or larger. (c) Appalachian basin is composed of folded and faulted Paleozoic metamorphic and sedimentary rocks in the extreme south and in the west. Mesozoic sedimentary rocks and coastal plain deposits occur in the east. Local granitic intrusions also occur. Petroleum occurs in the Appalachian basin, Atlantic Coastal Plain, Florida, and off the Atlantic coast. Coal is plentiful in the Appalachian basin and hydraulic resources exist in New England and the Middle and South Atlantic areas. Thorium occurs in the Piedmont and South Atlantic Coast region. (d) The North Central area consists of cratonic Paleozoic rocks principally metamorphic rocks in the north-central part and sedimentary rocks elsewhere. Petroleum occurs most extensively in the Cincinatti arch, Michigan, Illinois, Williston, Salina, Sedgwick, Cherokee, and Anadarko basins, Chatauqua Platform and Nemaha and Central Kansas uplifts. Coal exists in the Eastern and Western Interior basins and some bituminous sands are known. Hydraulic resources are predominantly in the eastern and west-north-central regions. Uranium occurs in the Western Interior basin. (e) The South-central region consists of Permian basin Paleozoic rocks toward the west and Mesozoic sedimentary rocks and coastal plain deposits in the east and south. Petroleum occurs in the Gulk Coast basin and offshore, and in the Arkla, East Texas, Permian, Palo Duro, and San Juan basins. Coal, some bituminous sands, hydraulic resources and uranium occur mainly in the western part of the region. (f) The Northern Rocky Mountain region includes the Paleozoic and Mesozoic sedimentary and metamorphic rocks of the northern Colorado Plateau and Rocky Mountains. Petroleum occurs in the Paradox, Denver, Uinta, Green River, Powder River, and western Williston basins and in the Sweetgrass and Las Animas arches. Coal exists extensively throughout much of the region and large oil shale deposits and some bituminous sands are known. The region also has large hydraulic, uranium, and thorium resources. (g) The western region includes Basin and Range Paleozoic rocks of the Cordilleran geosyncline, and Sierra Nevada metamorphic rocks and granites, coastal sedimentary rocks, and vocanic rocks. The region also includes Alaska and Hawaii. Petroleum occurs in the Los Angeles, Ventura, San Joaquin, Sacramento and Coastal basins, in the Alaskan Arctic slope, and off the coasts of California, Cook Inlet (Alaska) and north Alaska. Coal exists along the Pacific coast and in Alaska, and the area has some bituminous sands. This region has a large fraction of U.S. hydraulic resources, small uranium resources and most of the nations geothermal resources.
Canada	(a) All land areas of Canada have been geologically mapped.
Greenland	(a) Most figures are order-of-magnitude estimates from inadequate data. (b) Continental Shelf includes waters surrounding the island of Greenland to 500 m depth plus glacially eroded areas of greater depth. Limited partly by median lines.

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.	
NORTH AMERICA		
Northern America		
Greenland	(c)	Land areas between Frederikshabs Isblink and Lindenows Fjord. Gently rolling to alpine terrain. Predominantly Precambrian crystalline rocks.
	(d)	Generally shelf areas to about 500 m depth, some glacial trenches to 1000 m. Large areas covered by seasonal or permanent pack ice. Sediments are Paelozoic to Tertiary.
	(e)	Land areas north of a line joining Steenstrup Geltscher to Nordostrundingen. Mainly plains and dissected tableland. Area includes single geosyncline, Proterozoic to Silurian, largely carbonate rocks.
	(f)	Includes Disko, Nugssuaq, Ubekendt Ejland and Svartenuk Halvo. Deeply dissected glacial terrain. Mesozoic to Tertiary sediments overlain by plateau basalts.
	(g)	Land areas between Lindenows Fjord and Nordostrundingen. Alpine glacial terrain, sediments from Upper Permian to Tertiary overlying a Caledonian geosyncline.
Middle America		
Mexico	(a)	Entire national territory is covered by geological mapping at a scale of 1:100,000. The CETENAL (Government department) is developing a set of geological maps at a scale of 1:20,000. About 25% of this work has been completed.
	(b)	Deltaic sediments from the Red (Colorado) river form outwash plain at the northeast corner of the peninsula. Mountain masses of granite on the east side of the peninsula are covered to the west by sedimentary rock. The rocks are dislocated by the San Andreas fault. Hydrothermal activity is exploited at the geothermal camp of Cerro Prieto which is located in the deltaic outwash plain.
	(c)	Igneous rock intrusives and extrusives (granites, rhyolites, andesites and basalt) of Tertiary and Quaternary Age are part of the Sierra Madre Occidental. The flanks of this Sierra are covered by sedimentary rocks, in which are located desert areas in the low parts, and outwashes toward the seashore. The Carboniferous basin of Santa Clara and San Marcial are located in the central portion. This area contains uraniferous deposits.
	(d)	This area is part of the Sierra Madre Occidental. Exposed granitic rocks occur near the shore. Volcanic flows partially cover the marine sediments of Cretaceous Age. Hydrothermal manifestations occur in the higher parts of this area.
	(e)	an east-west mountainous zone ending at the Pacific Ocean is included in the physiographic province of the Balsas Basin. The high portion, located toward the north is formed by volcanic rocks of the Tertiary, Quaternary and Recent Age, and corresponds to the volcanic axis. In the central and southern parts of this region Cretaceous and Tertiary sedimentary marine and continental rocks predominate.
	(f)	Paleozoic metamorphic rocks (schists and gneisses) and granitic intrusions of Tertiary Age predominate near the shore of the Gulf of Tehuantepec. Toward the east calcareous rocks of Jurassic-Cretaceous Age which appear in the seashore outwash of the Gulf marine sediments, permit the accumulation of hydrocarbons and deposits of sulphur.
	(g)	South of the Bravo (Rio Grande) River marine rocks of the Cretaceous predominate and form ridges orientated along a northwest-southeast axis along the Sierra Madre Oriental. Sedimentary basins (sands and shale) which form productive horizons of gas and oil exist in the lower Bravo (Rio Grande) River basin and geological conditions propitiated the formation of coal. This coal area is the most important in Mexico.
	(h)	This area is part of the outwash seashore of the Gulf of Mexico. It includes calcareous reefs, sands and shale of Tertiary Age which contain hydrocarbons. These rocks constitute the most important petroleum district of Mexico.
	(i)	This area extends from the Sierra Madre in the south toward the outwash seashore and includes sedimentary marine rocks of Jurassic and Cretaceous Age, with the most recent sediments in the outwash. The rocks are partially covered with recent pyroclastic materials and alluvium. At the southeast coal crops out and noncommercial deposits of uranium occur. Hydrothermal activity also exists.
	(j)	This region consists mainly of sedimentary rocks deformed by intrusives of the Chiapas which formed tectonic depressions that drain toward the Gulf of Mexico. These depressions are characterized by sands and shale horizons of the Tertiary. Toward the south are sedimentary rocks of the Paleozoic, Jurassic and Cretaceous. Petroleum deposits are located in this region.
	(k)	Extensive calcareous outwash deposits of Tertiary Age, its superior cover (200 m approx.) penetrates into the sea with soft hanging. Superficially, it is established subterranean drainage which ends at the Gulf of Mexico.
	(l)	This region includes mountainous land which is part of Sierra Madre Occidental and is composed of intrusive and volcanic rocks. Toward the north it changes an outwash of Cretaceous rocks covered by recent continental clastics.
	(m)	This area is composed mainly of igneous volcanic rocks of the Tertiary and Quaternary which are representative of neovolcanic axis structures. In outwashes and valleys continental clastics that sometimes cover the Cretaceous rocks predominate. Because this region is part of the Chapala's graben, there are numerous localized hydrothermal manifestations.
	(n)	Volcanic region composed of basaltic and andesitic rocks of the Tertiary and Recent mountain erosion has formed the valleys of Mexico and Puebla. In the north area out crops of sedimentary rocks of Jurassic and Cretaceous Age. Hydrothermal activity is also present.
Guatemala	(a)	All geological mapping is to a scale of 1:500,000.
	(b)	Alluvial material from Pacific volcanic chain.
	(c)	Volcanic rocks with a dense filling of Tobas Puniferas.
	(d)	Metamorphic and sedimentary rocks and granite batholiths, of Paleozoic age. Mesozoic sedimentary and serpentine rocks also occur.
	(e)	Carbonate rocks and Cretaceous and Tertiary evaporites.
Costa Rica	(a)	Geological mapping is to a scale of 1:750,000.
	(b)	Predominantly rugged mountains and hills and numerous scattered small plains. Numerous small and mostly hilly islands. This area comprises about 4/5 of country and extends northwest-southeast about 484 km. Width is from a few kilometers to about 115 km. Major parts of division include Cordilleras de Guanacaste, Central de Tilaran, de Talamanca and fringing hills. Smaller highlands in Peninsulas de Nicoya and Osa parallel the main highlands chain.

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.	
NORTH AMERICA Middle America Costa Rica	(c)	Predominantly flat and smooth lowlands containing several small scattered hills and hillocks. Comprising about 1/5 of country, lowlands consist mainly of Llanura de Guatuso, Llanura de San Carlos, Llanura de Sarapiqi, Llanura de Tortuguaro and Llanura de Santa Clara. Orientation of lowlands are northwest-southeast and continuous from Nicaraguan border to Panama. Interstream areas generally trend northeast-southwest. Maximum width about 80 km narrowing in extreme southeast and northwest to about 10 km.
Panama	(a)	Areas between 77 and 79 degree W, 80 degree 30 minutes and 81 degree 15 minutes W and 82 and 83 degree W longitude have been geologically mapped on a scale of 1:250,000.
	(b)	Central Panama has low to high mountains characterized by high peaks, narrow valleys and rough topography. The rocks in this region are principally of volcanic orgin and some shallow intrusives. These rocks range in age from Cretaceous to Pleistocene. Structurally the region presents a series of concentric structural arcs cut by a series of trans-isthmian faults. The coastal plains, valleys and low hills are mainly of sedimentary origin. The rocks range in age from Upper Cretaceous to Recent.
SOUTH AMERICA Tropical South America Brazil	(a)	In the northern region 225,000 sq km are mapped at 1:250,000 and 114,000 sq km at 1:100,000
	(b)	In the northeast 287,000 sq km are mapped at 1:250,000, 27,000 sq km at 1:100,000, 91,400 sq km at 1:50,000 and 207,800 sq km at 1:25,000.
	(c)	In the southeast 312,000 sq km are mapped at 1:250,000, 10,000 sq km at 1:100,000 and 2,500 sq km at 1:50,000.
	(d)	In the south 286,400 sq km are mapped at 1:250,000, and 2,350 sq km at 1:100,000.
	(e)	In the central-west region 909,000 sq km are mapped at 1:250,000, and 1,175 sq km at 1:100,000.
	(f)	Plains and plateaus of the eroded Precambrain Brazilian and Guyanian shields are overlain by Pliocene rocks with narrow strips of outcrops of Paleozoic crystalline rocks, occurring both north and south of the Amazon Basin. Structurally the area is characterized by a Paleozoic intracratonic basin with gentle dips toward its center, and is covered discordantly by Pliocene deposits of continental characteristics.
	(g)	Coastal plains and plateaus with outcrops of Pliocene sediments (permoconsolidated sandstones) laying over Mesozoic sediments deposited in Ritz-Graben type basins. Erosion planed areas, with remains of Mesozoic sedimentary layers over large crystalline shield plains. Mid-North Basin contains outcrops of Mesozoic and Paleozoic sediments deposited in an intracratonic basin, with gentle dips without tectonic features.
	(h)	Complex or arched crystalline layers, raised to high levels (2,500 m), and intensely denuded by erosion. Some outcrops of Pliocene sediments occur in the coastal border, laying over Mesozoic deposits in Ritz-Graben type basins.
	(i)	Generally low relief. Coastal border contains outcrops of Tertiary sediments over the crystalline shield. Inland, a succession of crystalline and sedimentary areas, these occurring in an intracratonic basin, only slightly deformed, with extensive basaltic flows.
	(j)	Northward, the relief was planed by erosion of large areas of crystalline and sedimentary rocks. Southward, includes part of Parana sedimentary basin (Paleozoic-Mesozoic) with deposits over intracratonic basin, lightly perturbed, with extensive basaltic lava flows. Westward, the Paraguayan flood-plains, with recent sediments of Quaternary age.
Colombia	(a)	About 58000 sq km have been mapped to a scale of 1:100000 (Ingeominas - A.I.D.), 46544 sq km have been mapped to a scale of 1:200000 (S.G.N. Inminero), 29000 sq km have been mapped to a scale of 1:250000 - 1:50000 (Fotogeologicos-Ingeominas), and 118000 sq km have been mapped to a scale of 1:100,000 (Fotogeologicos - SGN), in addition, several oil companies posses geological maps of several areas of the country done on a larger scale.
	(b)	The western and northwestern parts of Colombia are occupied by the terminal ranges of the great Andean system. The Macizo de Pasto emerge from the Western and Central cordilleras of the triple-spurred Colombian Andes. The Eastern cordillera originates in a secondary knot in the central range northward from the Macizo de Pasto. The Western cordillera parallels the Pacific coast, terminating in three low, wooded spurs which merge into the Caribbean coastal plain. The Central cordillera is separated from the eastern and western Andean ranges by the Magdalena River on the west and its principal tributary, the Cauca, on the east and terminates in low hills near the confluence of the two rivers. It has a series of lofty volcanoes, some of them perpetually snowcapped. The Eastern cordillera crosses the country in a northeasterly direction until it divides into a northern spur to the Caribbean to form the Guajira peninsula, and an eastern one to form the Sierra de Merida in western Venezuela. The Orinoco basin, the so-called Llanos, is a region of open tropical plains, alternately flooded and parched with the changing seasons. The Amazon basin is a region largely unexplored and covered by nearly impenetrable jungle growth. The Pacific lowlands comprise a narrow, rain-drenched littoral between the western cordillera and the 800 km Pacific coastline. The Caribbean lowlands comprise an extensive zone of low, rolling hills, marine terraces and alluvial plains lying between the northern Andes and the long Caribbean coast line.
	(c)	The Magdalena lower basin consists mainly of sedimentary rocks and some igneous rocks of Paleozoic to Lower Tertiary age. The Cesar Basin contains Quaternary deposits and some Cretaceous to Tertiary sediments. The Sierra Nevada de Santa Marta is mainly intrusive and volcanic rocks of Precambrian to Paleozoic age. The Guajira Basin contains mainly Quaternary and Tertiary sediments. The two contain principal faults, the so-called Oca fault through the Sierra Nevada de Santa Marta, and the Coastal and Cuisa faults in the Guajira Peninsula.
	(d)	Pacific Coastal Range is made up of Upper Cretaceous rocks and some Lower Tertiary formations. The Pacific Coastal Basin includes lower and upper Tertiary sediments. The principal fault is the Atrato fault which lies generally in a north-south direction.

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.	
SOUTH AMERICA Tropical South America Colombia	(e)	The Western Cordillera are of Mesozoic age and include igneous and metamorphic rocks, and some sediments. Cauca River Basin contains sedimentary rocks, mainly of Tertiary age. The Central Cordillera consists of igneous and metamorphic rocks of Cambrian to Paleozoic ages. The Upper Magdalena Basin is of Tertiary rocks, and of igneous formations in the source area of the Magdalena river. The Middle Magdalena Basin also consists of Tertiary rocks. The Eastern Cordillera is of Middle Tertiary age and includes mainly sedimentary rocks, and some igneous rocks in the Santander massif. The Serrania de La Macarena consists mainly of Cambro-Ordovician rocks with some Precambrian formations. The Serrania de Perija is composed of Jurassic and Paleozoic, igneous and metamorphic rocks. The principal faults are the Otu, Palestina, Romeral and Cimitarra in the Central Cordillera.
	(f)	The Orinoco basin consists mainly of Precambrian rocks of the Guayanas shield.
	(g)	The Amazon basin area includes Lower and Upper Tertiary rocks.
	(h)	Island territories in the Caribbean are mainly Upper Tertiary limestone rocks.
Venezuela	(a)	Geological mapping has been done to scales of 1:100,000, 1:200,000, 1:250,000 and 1:500,000 but principally to 1:100,000. Areas of economic interest have been mapped at 1:10,000 or 1:25,000. Photointerpretation and radar is done at scales of 1:100,000 and 1:250,000, respectively.
	(b)	Located in southeastern Venezuela. Includes the states of Apure, Barinas, and Portuguesa. Petroleum accumulations in Barinas and in Cretaceous and Eocene sediments in anticlines and stratified and structural traps.
	(c)	Small sedimentary basins in the valleys of the Crodillera de la Costa. The major portion of this region is submarine basins on the continental shelf at the Fosa de Cariaco. This is a Tertiary basin with large accumulations of sediment, which may contain commercial accumulations of petroleum.
	(d)	Located at the northeast of the Cuenca de Maracaibo and separated from it by the Falcon Occidental Mountains. Extends toward the east on the continenetal shelf. In the Golfo de la Vela, the CVP has begun the first commercial production of crude oil on the continental shelf of Venezuela. The open country of the Falcon Basin is of Oligo&Miocene age.
	(e)	Located in the northeast and divided into an interior and exterior zone. The interior zone is totally surrounded by the Venezuelan coast. Large sedimentary deposits of the Cretaceous and Tertiary eras. Some anticlines and faults detected by seismographic work, but not yet drilled.
	(f)	Limited by the Paraja Mountains in the west and by the eastern slopes of the Andes and the Trujillo ridge in the east. This area contains tectonic depressions of Cretaceous sediment as far as Peciente and contains the richest petroleum basin of South America. The most important production is in the Eocene, Mio-Oligocene, Cretaceous and basement strata.
	(g)	Contains the most important orogenic structures in the country. Consists chiefly of metamorphic and igneous rocks of the Paleozoic and Mesozoic eras.
	(h)	Sedimentary basin in the states of Cojedes, Guarico, Anzoategui, Monagas, and the Amacuro Delta territory. Second in petroleum production to the Maracaibo area. Accumulations are in anticline, and in structural and stratigraphic traps of the Cretaceous and Tertiary.
	(i)	Varied and extensive geocline with more than 10,000 meters of sediment.
	(j)	Province located south of the Orinoco River. Occupies 45% of the national territory. Igneous, metamorphic, and sedimentary rocks of Precambrian age.
Temperate South America Argentina	(a)	This region comprises the southern mainland, Tierra del Fuego, and Argentine Antarctica. In the first two areas, the metamorphic basement is probably Precambrian or Lower Paleozoic. Marine strata, and some Craboniferous glacial beds occur in the west and are overlain by Permian, Triassic, and Lower Jurassic continental and marine sedimentary rocks. Some interbedded extrusives and intrusives. To the east, Cretaceous sedimentary rocks are overlain by younger sediments, including some volcanics. In the west, the beds are folded with differing degrees of intensity. Fault-block structures are common in the east.
	(b)	The basement is metamorphic probably largely Paleozoic, affected by repeated intrusive processes which lasted until the Triassic. In the northwest are folded marine sediments of Permo-Carboniferous age. During the Triassic there was intense volcanic activity, throughout a large part of the area. The various basins are filled with sediments of Silurian to Quaternary age. The region is folded to the west of meridian 70W. Toward the east a somewhat fractured base appears gradually. In the Sierra Grande zone are remains of ancient folds.
	(c)	Precambrian metamorphic base, repeatedly intruded during the Paleozoic, covered in the premountain ridge zone by Cambrian and Devonian marine sediments. Above are Carboniferous and lower Permian marine and continental sediments. Then the sedimentation becomes continental except in the region at the Chilean boundary where Jurassic and Cretaceous marine sediments appear, heavily folded. The Permian and Triassic continental sediments alternate, with important volcanic accumulations and local intrusions. The sedimentary basins have continental sedimentary fillings from the Triassic and upper Tertiary to Quaternary eras. The region shows heavy folds, locally with running structures in the Andes region, while in the east the rigid base is fractured in blocks extending predominantly from north to south, and limited by parallel compressional faults.
	(d)	Precambrian metamorphic base repeatedly intruded in the Paleozoic. Overlain by continental sediments of Carboniferous, Permian, Triassic, and, in the San Luis Province, Jurassic age. In the western part of Rioja are Permo-Carboniferous marine sediments which possibly also exist in the subsurface of the northeast part of Cordoba Province. The structural panorama is similar to the Cuyo region. There are folds in the western part of Rioja and fracture blocks in the rest of this province, San Luis, and the central and western part of Cordoba. In the eastern part of Cordoba the base is somewhat fractured by tensional faults.
	(e)	The oldest rocks are Precambrain metamorphic and igneous rocks on which are deposited Paleozoic sediments, chiefly marine, and affected locally by intrusions. In a large part of the area there are upper Cretaceous and Tertiary sediments, primarily marine. On these are a thick covering of Upper Tertiary and Quaternary. The region is heavily folded and compressed to the west except for the Puna block. In the central part the folding, bearing predominantly north-south, is moderate. In the east the sediments are subhorizontal on a locally fractured base.

TABLE 1B. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1B. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.	
SOUTH AMERICA Temperate South America Argentina		
	(f)	The oldest rocks known in this region are the Paleozoic sediments, predominantly marine, and covered by Triassic continental deposits. Above are Cretaceous sediments, also continental, which alternate in a large part of the area with basaltic rocks, and which are covered by Tertiary and Quaternary strata. Part of the former is marine. The region is characterized by a base that is locally fractured by tensional faults on which the sediments and volcanic rocks are deposited in a subhorizontal arrangement. Most of this region is occupied by part of the Chaco and Parana basins.
	(g)	The Precambrian metamorphic and intrusive base of this region contains the oldest rocks so far found in the country. In the Septentrionales mountains of the Province of Buenos Aires, radiometric methods have shown them to be 2200 million years old. Locally there are Paleozoic marine sediments (Buenos Aires Province), generally marine. In Santa Fe and Entre Rios ("Between the Rivers") are found Paleozoic and Mesozoic sediments of the Chaco and Parana basins. In the subsoil of the northern and central parts of the area are Cretaceous basalts and locally Jurassic diabases. Structurally, except for mountains where folds are found, the rest of the area shows a base fractured by tensional faults, on which there is nearly horizontal sedimentary covering.
Chile	(a)	The Chilean Antarctic Territory has an area of 1.25 million square kilometers.
	(b)	About 45% of the total area covered by geological mapping is mapped to a scale of 1:250000 or larger.
	(c)	Northern Chile, above 33 degrees S latitude, is a zone of deserts. The general morphology consists of a coastal mountain range, an intermediate depression and the Los Andes mountain range. A tranverse valley system develops between 27 degrees S and 33 degrees S latitude. Volcanic Jurassic, Cretaceous and Tertiary rocks with inserts of marine sediments are deposited in the Andean Geosyncline. The oldest rocks are of Precambrian, Paleozoic and Triassic ages. Granites crop out in mountain ranges.
	(d)	Central Chile, between 33 degrees S and 42 degrees S, is the zone of the central valley. General morphology consists of the Central Valley and the Los Andes mountain range. Geological characteristics are similar to the northern zone but Precambrain and Paleozoic rocks predominate in the coast range and igneous and granitic rocks predominate in Los Andes south of 39 degrees.
	(e)	Southern Chile, below 42 degrees S latitude, is the region of fiords. It conserves the general morphology of the coastal mountain range, intermediate depression and Los Andes mountain range but with most of the valley region submerged below sea level.
Uruguay	(a)	Uruguay has been subdivided into five fossil fuel regions covering about half of the total land area of 187,000 sq km. In addition, subdivision has also been reported on the basis of river basin areas.
	(b)	Continuation of the Pelotas basin of Brazil into eastern Uruguay. Probably Cretaceous in origin with some indication of Tertiary and Quaternary strata. Some strain tectonics. Limited in the west and south by crystalline substructures.
	(c)	Sediments in southern Uruguay to a maximum depth of 2500 metres. Deep valleys bordered by faults of Cretaceous origin. Limited by crystalline basement in the north, east, and south but penetrates to the Rio de la Plata in the west.
	(d)	The Paleozoic basin of the Parana terminates in the north of Uruguay. Eastern part of this area is covered with about 55,000 sq km of basalt.
	(e)	Extends eastward beyond the coast to a depth of 200 metres. Tertiary sedimentation near the coast. Some deep grabens bounded by 2000- to 3000-metre faults with sediments on the bottom that are possibly Paleozoic and Cretaceous in the central part. Strain tectonics are also evident.
	(f)	Materials of recent formation still being deposited on a granite base overlapping the Pleistocene.
	(g)	Petroleum exploration is in progress off the eastern shore. Peat of recent origin has been found in southern Uruguay and is being further explored.
OCEANIA Australia & New Zealand Australia		
	(a)	Geologic mapping has been done to a scale of 1:250,000
	(b)	Block-faulted and warped mainly Permian and Mesozoic basins (Perth, Carnarvon) beneath narrow coastal plain in west. Slightly warped and faulted Ordovician to Mesozoic (Canning) and Lower and Middle Paleozoic (Officer) basins beneath mainly desert in east.
	(c)	Flat-lying mainly carbonate lower Paleozoic basins in the north (Daly, Wiso, Georgina), moderately folded Paleozoic basins in the centre (Ngalia, Amadeus) and, in the southeast, two moderately folded Paleozoic basins (Arckaringa, Arrowie) unconformably overlain by flat-lying Mesozoic clastics.
	(d)	Gently to moderately folded basins mainly of Devonian to Triassic clastics unconformably overlain by more widespread gently folded to flat-lying Jurassic and younger clastics.
	(e)	Mostly block faulted and warped but some folded late Paleozoic and Mesozoic clastics and Cenozoic carbonates. Several evaporite diapirs in northeast.
	(f)	Mainly gently folded, block-faulted late Paleozoic and Mesozoic clastics.
	(g)	Gently folded Mesozoic and overlying, mainly flat-lying Cenozoic clastics, block-faulted in part.
	(h)	Gently folded Permian to Triassic clastics in the south (Sydney Basin), elsewhere mainly flat-lying to gently folded late Mesozoic to Cenozoic clastics.
	(i)	Gently folded to flat-lying late Mesozoic and Cenozoic clastics, in part block-faulted.
New Zealand	(a)	Areas do not sum to total national area of 269,000 sq km. There is some overlapping of coal and oil-and-gas areas. Some sedimentary areas include both onshore and offshore components.
	(b)	New Zealand is completely mapped geologically to scale of 1:250,000.
	(c)	Low hills mainly up to 200m, but some up to 1000 m, and valleys. Trias-Jurassic greywacke basement overlain by Upper Cretaceous and Tertiary sediments. Coal of Lower Tertiary age.
	(d)	Steep topography with basement of Precambian and Paleozoic age, on which rests coal measures of Lower Tertiary age.
	(e)	Basement of Upper Paleozoic-Lower Mesozoic schist - greywacke, containing coal measures of Upper Cretaceous-Lower Tertiary age. Low hills and aggradation plains in Canterbury and Southland flanking Southern Alps (3600 m) with schist plateau (1200 m) in Otago and Southland.

TABLE IB. NOTES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU IB. NOTES SUR LES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Note No.
OCEANIA	
Australia & New Zealand	
New Zealand	(f) Basement of Permian-Jurassic greywacke on southern and eastern sides, with Cretaceous-Tertiary sediments thickening westwards. Relief up to about 1000 m.
	(g) Upper Tertiary-Quaternary marine- andesitic sediments thickening westwards, resting on Paleozic-Mesozoic basement.
	(h) Basement of Permian- Lower Cretaceous greywacke on western side. Upper Cretaceous-Upper Tertiary sediments thickening eastwards. Structure of Cenozoic sediments much confused.
	(i) Basement of Paleozoic-Mesozoic metamorphic and igneous rocks, unconformable overlain by Tertiary marine and terrestrial sediments, much faulted and folded.
	(j) Basement of Triassic-Jurassic greywacke overlain by Cretaceous-Quaternary marine and terrestrial sediments, now faulted and folded.
	(k) Basement highs of Paleozoic-Mesozoic metamorphic and igneous complexes, separated by basins containing Tertiary -Quaternary terrestrial-marine sediments.
	(l) Quaternary acid-basic volcanics resting on Jurassic greywacke in a NE trending graben.
Melanesia	
Papua-New Guinea	(a) Geologic mapping has been done to a scale of 1:250,000
	(b) The Papuan Basin contains Mesozoic and Cenozoic clastics and carbonates strongly folded and thrust into the mountainous north. The northern New Guinea Basin and adjacent islands contain slightly to moderately folded and faulted Cenozoic clastics and carbonates.
	(c) Thick Mesozoic clastics exist in the Gulf of Papua and Torres Strait areas, elsewhere there are mainly Cenozoic clastics, carbonates and volcanics.
Polynesia	
Fiji Islands	(a) About 95% of land area has been mapped at a scale of 1:50,000, 5% of area has not yet been mapped.
	(b) Territorial limits are currently under review
	(c) Tertiary volcanics, minor intrusives and thin sediments.
	(d) Commonly fringed by reefs and sediments of unknown thickness.
Western Samoa	(a) Western Samoa includes 2 main islands and 7 islets, all of volcanic origin. Continental shelf is to the 50 fathom line and is only approximate.

TABLE 1C. REFERENCES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1C. SOURCE DES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Ref. No.	
AFRICA		
Western Africa		
Nigeria	1.	Geological Survey of Nigeria Bulletins Nos. 8, 24 & 28, South-Eastern Nigeria
	2.	Geological Survey of Nigeria Bulletins Nos. 3, 23 & 31, South-Western Nigeria
	3.	Geological Survey of Nigeria Bulletins Nos. 18, 27 & 30, Northern Nigeria
Ghana	1.	Khan, Mohsin H. et. al., "Exploration for Petroleum and Gas in Ghana." Ghana Geol. Survey Report, Accra., 1967
	2.	Cudjoe, J.E. and Khan, Mohsin H., "A Preliminary Report on the Geology of the Continental shelf of Ghana." Marine Fishery Research Report No. 4, Fishery Research Unit, Tema., 1972
Eastern Africa		
Ethiopia	1.	Jelenc A. Danilo, "Mineral Occurrence of Ethiopia". Published by the Ministry of Mines. Addis Ababa, 1966
	2.	"Ethiopia. Statistical Abstract 1971." Published by the Imperial Ethiopian Government. Central Statistical Office. Addis Ababa, 1971
Malawi	1.	Malawi Geological Survey Department
Middle Africa		
Zaire	1.	Musee Royal de l'Afrique Centrale, 1971, Explanation of the geological map of the Congo, Scale 1:1,000,000. No. 6, Appendices 2 and 3.
	2.	Service Geologique Kinshasa, 1974, Explanatory notice of mineral deposit map of Republic of Zaire.
	3.	A. le Bail et M. Buchstein, 1968, Mineral and Thermomineral Resources of the Democratic Republic of the Congo. Int. Geol. Congr., Mineral waters of overseas countries, Prague, 1969.
Angola	1.	Servicos de Geologia e Minas de Angola
Southern Africa		
South Africa	1.	Geological Survey, Private Bag X112, Pretoria, South Africa
	2.	Department of Mines, Private Bag X59, Pretoria, South Africa
ASIA		
East Asia		
Japan	1.	Geological Survey of Japan, Ministry of International Trade and Industry
	2.	"Survey of Areas of Japan by Prefectures, cities, towns and villages, 1972", published by Geographic Survey Institute, Ministry of Construction, Japan.
	3.	"A basic Map for coastal development planning, 1971", compiled by the Geographical Survey Institute, Ministry of Construction, Japan.
Taiwan	1.	Mining Research and Service Organization, Ministry of Economic Affairs, Republic of China
Middle South Asia		
India	1.	Office of the Registrar General, The Census Commission of India - Census of India 1971, India, 2A, Man Singh Road, New Delhi-11
Bangladesh	1.	Geological Survey of Bangladesh
	2.	World Energy Conference - Bangladesh National Committee
	3.	Bangladesh Mineral, Oil & Gas Corporation
	4.	Bangladesh Atomic Energy Commission
	5.	Bangladesh Water Development Board.
Southeast Asia		
Philippines	1.	National Power Corporation
Vietnam, Rep. of	1.	Service de Prospection Miniere
Malaysia	1.	Statistics Department of the Malaysian Government
Southwest Asia		
Turkey	1.	The geology department of E.I.E.I.
	2.	Bulletins of the Mineral Research and Exploration Institute of Turkey, Numbers 54, 66, 148.
	3.	The Department of Geography of the University of Ankara.
EUROPE		
Western Europe		
Germany, F.R. of	1.	Federal Geological Survey, Germany, F.R. of
Netherlands	1.	Netherlands Geological Survey
	2.	Netherlands Central Bureau of Statistics
Austria	1.	Bundesministerium fur Handel, Gewerbe und Industie BMfHGI) Geologische Bundesanstalt (GBA)
	2.	"Osterreichisches Montan-Handbuch", yearly, Wien (Vienna)
	3.	"Verhandlungen" und "Jahrbuch" der Geologischen Bundesanstalt, yearly, Wein (Vienna)
Southern Europe		
Italy	1.	Ministero Industria, Commercio e Artigianato - Direzione Generale delle Miniere.
	2.	Istituto Centrale di Statistica (ISTAT)
Spain	1.	Auxini - Departamento Investigaciones Petroliferas
Northern Europe		
United Kingdom	1.	Institute of Geological Sciences, London, England.
	2.	Times World Atlas, Comprehensive Edition, 1968.
Sweden	1.	Geological Survey of Sweden, Stockholm 50
Norway	1.	Stortingsproposition nr. 112 Om Samtykke Til Tiltredelse av Genevekonventionen av 29. April 1958 Om Kontinentalsokkelen. 1970-71 Page 3, Section 1, 2 April 1971.
	2.	The Norwegian Polar Institute
Ireland	1.	Column 5 - U.S.G.S. Professional Paper 817
	2.	Column 6 - Geol Survey of Ireland
	3.	Column 7 - G.S.I. Volume onshore estimated to a depth of 2 km, Volume offshore estimated to a depth of 1.5 km
Eastern Europe		
Poland	1.	B. Krupinski, Mineral Raw Materials and Mining in Poland
	2.	Rocznik Statystyczny 1972, Polska
Germany, D.R. of	1.	Statistisches Jahrbuch 1973 der Deutschen Demokratischen Republik. Staatliche Zentralverwaltung fur Statistik, Berlin 1973.
NORTH AMERICA		
Northern America		
United States	1.	U.S. Geological Survey Prof. Paper 800-A.
	2.	Rand McNally Cosmopolitan World Atlas.
Greenland	1.	Gronlands Geologiske Undersogelse, published and confidential material.

TABLE 1C. REFERENCES ON GEOGRAPHICAL AND GEOLOGICAL DATA
TABLEAU 1C. SOURCE DES INFORMATIONS GEOGRAPHIQUES ET GEOLOGIQUES

Name of Continent, Region and Country	Ref. No.
NORTH AMERICA	
Middle America	
Mexico	1. Mexican National Committee, World Energy Conference
	2. Comision Federal de Electricidad.
	3. Departamento de Geologia
Panama	1. Direccion General de Recursos Minerales, Ministerio de Comercio e Industrias, Apartado, 8515, Panama 5, Panama
SOUTH AMERICA	
Tropical South America	
Brazil	1. Fundacao Instituto Brasileiro de Geografia E Estatsitica
	2. Petroleo Brasileiro S.A.-Petrobras
Colombia	1. Instituto Geografico Agustin Codazzi, Atlas de Colombia, 2nd ed. (1969)
	2. Ministerio de Minas y Petroleos, Mapa Geologica General de Colombia, (1969)
	3. Roberto Martinez J., Situacion del Petroleo y Gas en Colombia (1973)
	4. Instituto Nacional de Investigaciones Geologicas-Mineras (Ingeominas)
Venezuela	1. "Croquis de las cuencas sedimentarias de Venezuela". Escala 1: 800.000, Republica de Venezuela, Ministerio de Minas e Hidrocarburos, Direccion de Geologia (1961)
	2. Cuadro Demostrativo de las areas de cuencas sedimentarias de Venezuela en tierra firme, area lacustre y plataforma continental en Km2, Republica de Venezuela, Ministerio de Minas e Hidrocarburos, Direccion de Geologia
	3. Atlas de Venezuela (1969), Republica de Venezuela, Ministerio de Obras Publicas, Direccion de Cartografia Nacional
Temperate South America	
Argentina	1. Subsecretaria de Energia, Centro de Investigaciones Energeticas
Chile	1. Instituto de Investigaciones Geologicas.
Uruguay	1. Administracion Nacional de Combustibles, Alcohol y Portland, Departamento de Investigaciones Tecnologicas.
	2. Administracion Nacional de las Usinas y los Telefonos del Estado, Division Generacion y Transmision de Energia.
	3. Faculatad de Ingenieria y Agrimensura
OCEANIA	
Australia & New Zealand	
Australia	1. Department of Minerals and Energy, Bureau of Mineral Resources, Geology and Geophysics, Australia
New Zealand	1. New Zealand Geological Survey
Melanesia	
Papua-New Guinea	1. Department of Minerals and Energy, Bureau of Mineral Resources, Geology and Geophysics, Australia.
Polynesia	
Fiji Islands	1. Fiji I. Mineral Resources Division

Appendix 2—Solid Fossil Fuels
Annexe 2–Combustibles Fossiles Solides

This appendix summarizes all data on solid fossil fuels which were received from both World Energy Conference members and nonmember nations as a part of this latest survey on energy resources. These data together with data from other sources for nonreporting nations are presented in Tables III-12 and 12A of the main text.

Appendix 2 is organized as follows: all general explanations and definitions are given in the remainder of this introductory text; Table 2 presents all statistical data from Part A of the questionnaire; Table 2A gives fuel rank definitions for those nations that provided such data from Part B of the questionnaire; Table 2B gives data on the forms, quantities, and energy content of noncommercial solid fuels such as wood, dung, and agricultural and municipal carbonaceous wastes used as fuel; Table 2C gives the notes and Table 2D the references provided by reporting nations in part B of the questionnaire. Reporting nations are arranged, in all of these tables, by continent and region according to the scheme discussed earlier.

Before the definitions used for the present survey are given, the definitions used in the 1968 WEC Survey are reviewed briefly in order to: (1) provide a better basis for comparison between data in the

Cette annexe résume toutes les données fournies sur les combustibles fossiles solides par les pays membres de la Conférence Mondiale de l'Energie et aussi par plusieurs pays non-membres en vue de la présente enquête sur les ressources énergétiques. On trouvera ces données ainsi que celles provenant d'autres sources pour les pays nonrapporteurs aux tableaux III-12 et 12A du chapitre III.

Nous allons donner dans cette annexe 2 des explications et des définitions générales; le tableau 2 présente toutes les statistiques demandées dans la partie A du questionnaire; le tableau 2A les caractèristiques des types de combustibles indiqués en réponse à la partie B du questionnaire; le tableau 2B des informations sur l'aspect, les quantités et le pouvoir calorifique des combustibles solides non-industrialisés tels que le bois, le fumier et les déchets carbonés d'origine agricole et municipale utilisés comme combustibles; le tableau 2C les notes et le tableau 2D les références fournies par les pays rapporteurs en réponse à la partie B du questionnaire. Dans tous ces tableaux les pays rapporteurs sont groupés par continent ou par région selon le schéma étudié précédemment.

Avant de donner les définitions utilisées pour la présente enquête il semble bon de passer en revue brièvement celles prévues pour l'enquête de la CME de 1968 afin: 1°) de pouvoir mieux comparer les two surveys and (2) point out possible differences in Table III-12 where data from the 1968 report were used when necessary in lieu of new information. In the 1968 survey information was requested for three categories of solid fossil fuels: (1) coals, (2) brown coal and lignite, and (3) peat. Resource data for the first two were to include total measured reserves and indicated and inferred reserves, the sum of which was reported as total reserves; the economically recoverable part of measured reserves was reported on a percentage basis. For peat, only data on total reserves were requested. All data were to be provided on standard bases of minimum seam thickness and maximum deposit depth of:

30 centimetres and 1200 metres for coals,
30 centimetres and 500 metres for brown coal and lignite, and
50 centimetres for peat (no maximum depth given).

The 1968 survey also reported actual unit heating values in kilocalories/kilogram and the then current values of average annual production.

In the present survey a more detailed separation of data by fuel rank and by national subdivision was requested, if available. Information on known (measured) reserves-in-place was sought on the same basis as in the earlier survey with one exception, namely, that only those minimum seam thicknesses and maximum depths of deposits currently regarded as economic be reported in the particular nation. Recoverable quantities were requested on a tonnage, rather than a percentage, basis. The fractions of recoverable reserves (1) currently obtainable by strip mining and (2) of coking quality were requested on a percentage basis. Additional resources were to be reported on a basis such that total resources were synonymous with total economic geological resources.

The new survey also requested qualitative information on relative heat and sulfur contents of fuels and the average carbon, volatile matter, and moisture and ash content of fuels of the various ranks reported. Data on recent annual production were to include year and quantity of production by fuel rank. Finally, data on the use of noncommercial

chiffres des deux enquêtes; 2°) d'indiquer les différences possibles dans le tableau III-12 où l'on a utilisé les chiffres de 1968 lorsque l'on ne possèdait pas d'informations plus récentes. Pour l'enquête de 1968 on avait demandé des renseignements sur trois catégories de combustibles fossiles solides: 1°) les charbons, 2°) la houille brune et le lignite, et 3°) la tourbe. Les chiffres des deux premières ressources devaient comprendre les réserves mesurées totales et les réserves indiquées et présumées, leur addition constituant les réserves totales; la proportion économiquement récupérable des réserves mesurées était donnée en pourcentage. Pour la tourbe, on n'avait demandé que les chiffres des réserves totales. Tous les chiffres devaient être fournis sur des bases normalisées de l'épaisseur minimum et de la profondeur maximum des gisements, soit:

30 cm et 1200 m pour les charbons
30 cm et 500 m pour la houille brune et le lignite
50 cm pour la tourbe (sans profondeur maximum)

Pour l'enquête 1968 on avait donné les pouvoirs calorifiques réels en kcal/kg et les chiffres de la production annuelle moyenne.

Pour la présente enquête il a été demandé de répartir, si possible, les informations à la fois par type de combustible et par subdivision nationale. Les chiffres des réserves in situ connues (mesurées) devaient être donnés sur la même base que pour la dernière enquête mais avec une exception, à savoir que ces chiffres se rapportent seulement aux épaisseurs minima et aux profondeurs minima des gisements considérés actuellement comme économiques dans le pays concerné. Il a été demandé d'indiquer les quantités récupérables d'après leur tonnage plutôt qu'en pourcentage. Les fractions des réserves récupérables 1°) que l'on peut extraire normalement à ciel ouvert, et 2°) qui sont cokéfiables, devaient être données en pourcentage. Il a été demandé que les ressources additionnelles soient indiquées de sorte que les ressources totales correspondent à la totalité des ressources géologiques économiques.

Pour l'enquête actuelle il a été demandé aussi des informations qualitatives sur les relatives teneurs en soufre et pouvoirs calorifiques des combustibles, et les teneurs moyennes en carbone, en matières volatiles, en humidité et en cendres, des combustibles des divers types. Pour les chiffres de la production annuelle la plus récente il fallait indiquer l'année de la production et les chiffres de production par type de combustible. Enfin, les forms of solid fuels, such as wood, dung, and carbonaceous waste materials, were to include type of material, recent annual amount, burned, approximate energy content, and plans for future utilization.

In the remainder of this introductory section, definitions of the various data requested from reporting nations are provided. The general definition for solid fuels is: "Solid fuels include the high- and low-ranking coals, peat, and nonconventional solid fuels such as wood, waste, etc. National standards vary for each rank of coal, and no attempt has been made to arrive at universally acceptable definitions of rank. However, national standards currently in use are listed.*[11] Peat was defined in the 1968 WEC survey: "as a mass of organic origin which has passed through a process of transformation and which contains, when completely dehydrated, not less than 50% organic matter. Estimates of peat reserves and resources refer only to deposits that are economically suitable for and likely to be used as fuel."

In most cases national subdivisions (Table 2, Column 1) are the same as those described in Appendix 1 and shown on Map A. In a few cases, however, the nations were subdivided differently, as shown on Map B. When data on solid fuels could not be reported with precisely the same geographical breakdown used in Appendix 1, other subdivisions that conformed as closely as possible with those of Appendix 1 were employed.

Reported information was requested from the most recent authoritative sources or references available. The year of reference (Column 2) applies to the year the resource studies or surveys were prepared.

Rank of solid fuel (Column 3) is identified by type of deposit, using the specific codes shown below:

*Quotations are from instructions to 1974 WEC energy resource questionnaires.

informations sur l'utilisation des formes nonindustrialisées des combustibles solides, tels que le bois, le fumier et les matières de déchets carbonés devaient comprendre le type du combustible, la quantité annuelle brûlée au cours de l'année la plus récente, l'équivalent approximatif en énergie et les projets concernant leur utilisation dans l'avenir.

Nous donnons ci-après les principales définitions des diverses informations demandées aux pays rapporteurs. La définition générale pour les combustibles solides est la suivante: "Les combustibles solides comprennent les charbons de qualité supérieure et inférieure, la tourbe, et les combustibles solides non-classiques tels que le bois, les déchets, etc. Les normes nationales varient pour chaque qualité de charbon et l'on n'a pas éssaye de trouver des définitions acceptables pour tout le monde. Toutefois on a donné la liste des normes nationales d'usage courant.[11]* La tourbe a été définie pour l'enquête de 1968 comme "une matière d'origine organique qui a subi un processus de transformation et qui contient, après déshydratation complète, au moins 50% de matières organiques. Les estimations de réserves et de ressources de tourbe ne concernent que des gisements économiquement exploitables pour pouvoir être utilisés comme combustibles."

Dans la plupart des cas les subdivisions géographiques (tableau 2, colonne 1) sont les mêmes que celles décrites à l'annexe 1 et qu'indique la carte A. Dans quelques cas, toutefois, les subdivisions des pays ont été différentes comme le montre la carte B. Quand il n'a pas été possible de donner des chiffres de combustibles solides avec précisément la même répartition que celle de l'annexe 1, on s'est servi d'autres subdivisions qui se rapprochent aussi près que possible de celles de l'annexe 1.

On a demandé de donner des informations provenant autant que possible des sources ou références les plus autorisées et les plus récentes. L'année de la référence (colonne 2) est celle a laquelle se rapportent les études ou enquêtes sur la ressource.

Les qualités des combustibles solides (colonne 3) sont identifiées par type de gisement en utilisant les codes spécifiques ci-dessous:

*Les citations sont extraites des instructions données pour répondre au questionnaire de l'enquête de la CME de 1974 sur les ressources énergétiques.

AN–Anthracite
BT–Bituminous
SB–Subbituminous
BC–Brown coal
LN–Lignite
P–Peat
HC–High-ranking solid fuels
N–Solid fuels in general where no subdivision is possible
LC–Low-ranking solid fuels

Categories HC, LC, and N were to be used only when more specific categorization was unavailable. Due to the winde variation in national standards, no attempt has been made to define the different ranks on a common worldwide standard. Instead, classifications are based on the various countries' standards currently in use as summarized in Table 2A, which gives explicit reference to ash, carbon, moisture, and volatile matter content.

All data on known (measured) reserves of solid fossil fuels are given in Columns 4 to 12 of Table 2. Total reserves-in-place (Column 4) are defined as: "Estimated quantity of solid fuels in-place in known deposits based on specific sample data, measurements of the deposits, and detailed knowledge of the quality or grade of the deposits including that part of total solid fuels in-place normally remaining in the ground due to extraction requirements (for example, retaining walls used as support for roofs)."

Economically recoverable reserves (Column 5) include: "The portion of the total amount of known reserves considered to be actually recoverable under current economic conditions and using current mining technology. The percent of recoverable reserves which can probably be mined by opencast or surface methods is given in Column 6, and the percent of recoverable reserves is defined in Table 2D."

As already noted, total known reserves include only those quantities of materials in each nation considered economically recoverable under current economic and operating conditions from seams of the thickness indicated in Column 8 or greater and at depths up to the limits given in Column 9. Since

AN = anthracite
BT = bitumineux
SB = subbitumineux
BC = houille brune
LN = lignite
P = tourbe
HC = combustibles solides de qualité supérieure
LC = combustibles solides de qualité inférieure
N = combustibles solides en général quand aucune répartition n'est possible

Les catégories HC, LC et N ne devaient être utilisées que lorsqu'on ne pouvait pas se servir de catégories plus précises. Etant donné la large variation des normes nationales, on n'a pas essayé de définir les différentes qualités d'après des normes communes au monde entier. Les classifications sont donc basées sur les normes couramment employées dans les divers pays, telles qu'elles sont données au tableau 2A qui se réfère explicitement aux teneurs en cendres, carbone, humidité et matières volatiles.

Tous les chiffres des réserves connues (mesurées) de combustibles fossiles solides se trouvent dans les colonnes 4 à 12 du tableau 2. Les réserves totales in situ (colonne 4) sont définies comme: "Quantités estimées de combustibles solides se trouvant dans les gisements connus sur la base de l'étude d'échantillons, des dimensions des gisements, et de la connaissance spécifique de la qualité ou de la teneur des gisements, y compris la partie de la totalité des combustibles solides restant normalement dans le sol par suite des conditions d'extraction (par exemple les murs de retenue utilisés pour soutenir les toits)."

Les réserves économiquement récupérables (colonne 5) comprennent: "La partie du montant total des réserves connues considérée comme étant effectivement récupérable dans les conditions économiques actuelles et en utilisant la technologie courante d'extraction. Le pourcentage des réserves récupérables qui pourrait probablement être extrait à ciel ouvert, ou par d'autres méthodes à partir de la surface, est donné à la colonne 6, et le pourcentage des réserves récupérables au tableau 2D."

Comme déjà dit les réserves totales connues comprennent seulement les quantités de chaque pays actuellement considérées comme économiquement récupérables, dans les conditions économiques et d'exploitation actuelles, dans les gisements de l'épaisseur indiquée à la colonne 8 ou plus épais, et a des profondeurs allant jusqu'aux limites données à la colonne 9. Comme les charbons à faible teneur en soufre sont maintenant des combustibles très low sulfur coals are now premium fuels for environmental reasons, the following categorization is used in Column 10 to classify sulfur content:

A–Less than 1% sulfur by weight
B–Between 1 and 3% sulfur by weight
C–More than 3% sulfur by weight.

Heat value of producible fuel is indicated in Column 11 by the following semiquantitative designations:

L–Less than 20 MJ/kg (<4778 kcal/kg)
M–From 20 to 30 MJ/kg (4778 to 7167 kcal/kg)
H–More than 30 MJ/kg (>7167 kcal/kg)

Column 12 indicates whether heat content is on an as-mined (AM) or as-burned (AB) basis.

Additional resources (Column 13) include: "Indicated and inferred resources additional to those known deposits reported in Column 4 which could exist in unexplored extensions of known deposits or in undiscovered deposits in known fuel-bearing areas. The estimates of additional resources are extended to include those inferred through knowledge of geological conditions favorable for the occurrence of the resource based on the results of geological and exploratory information about an area or on evidence of duplication or parallelism of geologic conditions that occur in known deposits." Total resources (Column 14) are the sum of the quantities given in Columns 4 and 13.

Data on recent annual production are provided in Columns 15-17 of Table 2. Column 15 gives the year to which the production data applies; such data were requested for calendar year 1972 or for the most recent earlier period available. Actual quantities produced are given in Column 16 by specific fuel rank if available. Column 17 specifies whether production quantities are gross (before washing and processing) or net (ready for sale).

recherchés pour des raisons d'environnement, ils sont classés selon leur teneur en soufre dans la colonne 10 où

A = moins de 1% de soufre en poids
B = entre 1 à 3% de soufre en poids
C = plus de 3% de soufre en poids

Le pouvoir calorifique des combustibles pouvant être extraits est indiqué dans la colonne 11 par les désignations semi-quantitatives suivantes:

L = moins de 20 millions de joules/kg (4778 kcal/kg)
M = de 20 à 30 millions de joules/kg (4778 à 7167 kcal/kg)
H = plus de 30 millions de joules/kg (7167 kcal/kg)

Dans la colonne 12 est donné le pouvoir calorifique estimé à l'extraction (AM) ou à la combustion (AB).

Les ressources additionnelles (colonne 13) comprennent: "Les réserves, indiquées ou présumées, en plus de celles des gisements connus de la colonne 4, qui pourraient exister dans des extensions non-prospectées de gisements connus, ou dans des gisements non-découverts de régions susceptibles d'en réceler. Les estimations de ressources additionnelles comprennent celles que l'on suppose exister parce que l'on sait que les conditions géologiques sont favorables à l'existence de la ressource. Les estimations doivent être fondées sur les résultats des renseignements géologiques et des prospections faites dans la région, ou sur la similitude des conditions géologiques avec celles des gisements connus." Les ressources totales (colonne 14) sont la somme des quantités données dans les colonnes 4 et 13. Des informations sur la production annuelle récente sont données dans les colonnes 15-17 du tableau 2. La colonne 15 donne l'année de la production; ces chiffres ont été demandés pour l'année 1972 ou l'année la plus récente possible. Les quantités réelles produites sont indiquées dans la colonne 16 pour chaque type de combustible que l'on connait. Dans la colonne 17 on a spécifié si les quantités de production sont brutes (avant lavage et traitement) ou nettes (prêtes à la vente).

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves: Total Amount in Place (megatonne)	Known Reserves: Economically Recoverable Reserves: Amount (megatonne)	Known Reserves: Economically Recoverable Reserves: By Surface Mining (%)	Known Reserves: Economically Recoverable Reserves: Of Coking Quality (%)	Known Reserves: Deposits: Maximum Depth (m)	Known Reserves: Deposits: Minimum Seam Thickness (m)	Known Reserves: Sulphur Content	Known Reserves: Heat Value: Heat Value	Known Reserves: Heat Value: Basis (As Mined or as Burned)	Additional Resources (megatonne)	Total Resources (megatonne)	Recent Annual Production: Year	Recent Annual Production: Amount (kilotonne)	Recent Annual Production: Basis (Gross or Net)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
AFRICA																
Western Africa																
Nigeria (a)																
South-East	1963	SB	358.7	U	U	0	290.0	1.300	A	L	AB	U	358.7	-	609.6	Net
South-West	1957	LN	90.40	U	18.0	0	150.0	2.400	B	L	AB	U	90.40	-	N	Net
TOTAL Nigeria	-	-	449.1	-	-	-	-	-	-	-	-	-	449.1	-	609.6	-
Ghana																
Entire Nation	-		0	0	-	-	-	-	-	-	-	0	0	-	0	-
Eastern Africa																
Ethiopia (a,b)																
Begemder (c)	1966	LC	U	U	U	U	250.0	0.100	A	L	-	0.197	U	-	0	-
Wollega, Didessa R.	1966	LC	U	U	U	U	140.0	0.150	U	L	-	U	U	-	0	-
Wollega, Karsa Creek	1966	LN	U	U	U	43.0	U	2.000	U	L	-	U	U	-	0	-
Wollo	1966	LC	U	U	U	U	U	U	U	U	-	U	U	-	0	-
Shoa	1966	LC	U	U	U	U	U	0.100	U	U	-	0.300	U	-	0	-
Eritrea	1966	LC	U	U	U	U	U	0.250	U	L	-	0.008	U	-	0	-
Sidamo	1966	LC	U	U	U	U	U	U	U	U	-	U	U	-	0	-
TOTAL Ethiopia	-	LN	-	-	-	-	-	-	-	-	-	-	-	-	0	-
	-	LC	-	-	-	-	-	-	-	-	-	0.505	-	-	0	-
TOTAL ALL RANKS	-	-	-	-	-	-	-	-	-	-	-	0.505	-	-	0	-
Mozambique (a)																
Entire Nation	1969	BC	100.0	80.00	80.0	40.0	600.0	1.300	-	-	-	300.0	400.0	-	400.0	-
Malawi																
Northern	1960	HC	U	U	U	U	U	U	U	U	-	38.00	38.00	-	0	-
Zambia (a)																
Kazinze, Maamba	1973	BT	46.00	41.00	100	0	150.0	2.000	B	L	AM	-	46.00	1973	900.0	Net
Izuma, Maamba	1973	BT	28.00	10.00	100	0	150.0	2.000	B	L	AM	-	28.00	1973	-	Net
Malungwa & Maze-Sinakumbe	1973	BT	U	U	-	-	-	-	-	-	AM	80.00	154.0	1973	-	Net
TOTAL Zambia	-	BT	74.00	51.00	-	-	-	-	-	-	-	80.00	228.0	-	900.0	-
Middle Africa																
Zaire (a,b,c)																
Southeast	1920	SB	-	720.0	-	-	-	2.000	B	L	-	-	-	1972	130.0	-
Angola																
Cuanza Basin	1916	LN	U	U	-	-	U	U	-	-	AB	U	U	-	0	-
	1926	P	U	U	-	-	U	U	-	L	AB	U	U	-	0	-
Lungue Bungo	1965	LN	U	U	-	-	U	U	-	-	AB	U	U	-	0	-
TOTAL Angola	-	LN	-	-	-	-	-	-	-	-	-	-	-	-	0	-
	-	P	-	-	-	-	-	-	-	-	-	-	-	-	0	-
TOTAL ALL RANKS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-
Southern Africa																
South Africa (a,b)																
Entire Nation	1969	AN	181.0	100.0	0	0	914.0	2.740	A	H	AB	0	181.0	-	1100	Net
	1969	BT	24043	10484	5.00	1.30	914.0	2.740	A	M	AB	20115	44158	-	53300	Net
TOTAL ALL RANKS	-	-	24224	10584	-	-	-	-	-	-	-	20115	44339	-	54400	-
ASIA																
East Asia																
Japan (a)	1973	AN	74.00	11.00	0	0	285.0	1.200	B	M	AM	0	11.00	1972	500.0	Net
	1973	BT	6210	780.0	2.00	50.0	1000	1.400	B	M	AM	0	780.0	1972	-	Net
	1973	SB	1159	142.0	2.00	50.0	1000	1.400	B	M	AM	0	142.0	1972	27600	Net
	1973	BC	1004	75.00	2.00	50.0	1000	1.400	B	M	AM	0	75.00	1972	-	Net
	1973	LN	181.0	18.00	0	0	150.0	0.900	A	L	AM	0	18.00	1972	110.0	Net
TOTAL ALL RANKS	-	-	8628	1026	-	-	-	-	-	-	-	0	1026	-	28200	-
Korea, Rep. of																
North-West Region	1974	AN	815.0	502.0	0	0	1000	0.600	A,B	L,M	-	560.0	1375	-	37.00	Net
North-East Region	1974	AN	23.00	9.000	0	0	1000	0.600	A,B	L,M	-	0	23.00	-	11911	Net
South-West Region	1974	AN	52.00	33.00	0	0	1000	0.600	A,B	L,M	-	0	52.00	-	455.0	Net
TOTAL Korea, Rep. of	-	AN	890.0	544.0	0	0	-	-	-	-	-	560.0	1450	-	12403	-
Taiwan (a)																
Entire Nation	1965	BT	478.5	260.7	-	38.0	2000	0.250	ABC	M,H	AB	181.3	659.9	-	4000	Net
Middle South Asia																
India (a,b)																
West Bengal	1972	HC	4038	2019	U	24.0	600.0	1.200	A	M	AM	15581	19619	1971	17064	Net
Bihar	1972	HC	10590	5295	U	75.0	600.0	1.200	A	M	AM	24640	35230	1971	33197	Net
Madhya Pradesh	1972	HC	4247	2123	U	2.00	600.0	1.200	A	M	AM	11236	15482	1971	12760	Net
Orissa	1972	HC	895.4	447.7	U	0	600.0	1.200	A	M	AM	4221	5117	1971	1488	Net
Maharashtra	1972	HC	477.9	238.9	U	0	600.0	1.200	A	M	AM	2144	2622	1971	1938	Net
Andhra Pradesh	1972	HC	978.0	489.0	U	0	600.0	1.200	A	M	AM	1077	2055	1971	4450	Net
Assam (c)	1972	HC	139.0	69.50	U	0	600.0	1.200	C	M	AM	688.6	827.6	1971	579.0	Net
Jammu and Kashmir	1972	HC	U	U	U	0	600.0	1.200	A	M	AM	U	U	1971	23.00	Net
	1972	LC	0	0	U	0	600.0	1.200	U	L	AM	8.400	8.400	1971	0	Net
Tamil Nadu	1972	LC	1717	858.5	U	0	600.0	1.200	A	L	AM	202.0	1919	1971	3660	Net
Rajasthan	1972	LC	0	0	U	0	600.0	1.200	B	L	AM	20.30	20.30	1971	0	Net
Gujarat (d)	1972	LC	77.56	38.78	U	0	600.0	1.200	C	L	AM	0	77.56	1971	0	Net
TOTAL India	-	HC	21365	10683	-	42.1	-	-	-	-	-	59588	80952	-	71499	-
	-	LC	1795	897.3	-	-	-	-	-	-	-	230.7	2025	-	3660	-
TOTAL ALL RANKS	-	-	23160	11580	-	-	-	-	-	-	-	59818	82977	-	75159	-

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves: Total Amount in Place (mega-tonne)	Known Reserves: Economically Recoverable Reserves: Amount (mega-tonne)	Economically Recoverable Reserves: By Surface Mining (%)	Economically Recoverable Reserves: Of Coking Quality (%)	Deposits: Maximum Depth (m)	Deposits: Minimum Seam Thickness (m)	Sulphur Content	Heat Value: Heat Value	Heat Value: Basis (As Mined or as Burned)	Additional Resources (mega-tonne)	Total Resources (mega-tonne)	Recent Annual Production: Year	Recent Annual Production: Amount (kilo-tonne)	Recent Annual Production: Basis (Gross or Net)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
ASIA																
Middle South Asia																
Bangladesh (a)																
Bogra-Rajshahi	1965	BT	777.2	517.4	0	M	1172	1.520	A	M	AB	711.3	1488	-	0	-
Sylhet (b)	1963	SB	3.048	1.829	0	0	310.8	0.910	B	M	AB	U	3.048	-	0	-
Faridpur	1957	P	30.48	27.37	100	0	3.770	0.080	-	L	AB	96.53	127.0	-	0	-
Khulna	1962	P	8.128	7.316	100	0	2.070	0.080	-	L	AB	22.35	30.48	-	0	-
TOTAL Bangladesh	-	BT	777.2	517.4	-	-	-	-	-	-	-	711.3	1488	-	0	-
	-	SB	3.048	1.829	-	-	-	-	-	-	-	0	3.048	-	0	-
	-	P	38.61	34.69	-	-	-	-	-	-	-	118.9	157.5	-	0	-
TOTAL ALL RANKS	-	-	818.9	553.9	-	-	-	-	-	-	-	830.1	1649	-	0	-
Iran																
Kerman (a)	1972	HC	331.0	-	-	-	150.0	0.500	B	M	-	-	331.0	-	340.0	-
Elburz	1972	HC	36.30	-	-	-	100.0	0.400	B&C	M	-	-	36.30	-	500.0	-
Other Areas	1972	HC	17.70	-	-	-	100.0	0.400	B&C	M	-	-	17.70	-	160.0	-
TOTAL Iran	-	HC	385.0	-	-	-	-	-	-	-	-	-	385.0	-	1000	-
Southeast Asia																
Indonesia (a,b)																
West Sumatra	1972	BT	60.00	37.00	15.0	50.0	300.0	2.000	A	L	AB	140.0	200.0	-	90.00	Net
South Sumatra	1972	SB	54.00	43.00	100	-	85.00	2.000	A	L	AB	270.0	324.0	-	100.0	Net
	1920	LN	1872	U	100	-	U	U	A	L	AB	-	1872	-	-	Net
	1950	BC	88.00	U	100	U	U	U	A	L	AB	-	88.00	-	-	Net
East Kalimantan	1964	BT	38.00	U	U	U	200.0	1.000	A	L	AB	-	38.00	-	-	Net
South Kalimantan	1962	BT	11.00	U	-	U	200.0	1.500	A	L	AB	-	11.00	-	-	Net
TOTAL Indonesia	-	BT	109.0	37.00	15.0	50.0	-	-	-	-	-	140.0	249.0	-	90.00	-
	-	SB	54.00	43.00	-	-	-	-	-	-	-	270.0	324.0	-	100.0	-
	-	BC	88.00	-	-	-	-	-	-	-	-	-	88.00	-	0	-
	-	LN	1872	-	-	-	-	-	-	-	-	-	1872	-	0	-
TOTAL ALL RANKS	-	-	2123	80.00	-	-	-	-	-	-	-	410.0	2533	-	190.0	-
Philippines																
Luzon	1973	BC	20.19	U	U	U	U	U	U	U	-	U	U	-	U	-
Visayas	1973	BC	58.09	U	U	U	U	U	U	U	-	U	U	-	U	-
Mindanao	1973	BC	12.84	U	U	U	U	U	U	U	-	U	U	-	U	-
TOTAL Philippines	-	BC	91.12	-	-	-	-	-	-	-	-	-	-	-	-	-
Vietnam, Rep. of																
Central Plateau	U	N	12.00	U	U	U	U	U	BC	M	-	U	U	-	U	-
Mekong Delta	U	N	U	U	U	U	4.000	U	A	M	-	U	U	-	U	-
TOTAL Vietnam, Rep. of	-	N	12.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Malaysia																
Entire Nation	1973	N	N	N	-	-	-	-	-	-	-	-	-	-	N	-
Southwest Asia																
Turkey (a,b)																
Black Sea	1972	HC	191.0	133.7	0	80.0	1200	0.800	A	M	-	1100	1291	-	7862	Gross
	1972	LC	2.426	U	U	0	U	U	B	L	-	119.8	122.2	-	533.0	Gross
Marmora	1972	LC	164.1	U	U	0	U	U	B	L	-	232.4	396.5	-	89.00	Gross
Aegean	1972	LC	561.5	U	U	0	U	U	B	L	-	415.8	977.3	-	8856	Gross
Mediterranean	1972	LC	1770	U	U	0	U	U	B	L	-	1412	3182	-	0	Gross
Inner Anatolia	1972	LC	199.7	U	U	0	U	U	B	L	-	1051	1250	-	233.0	Gross
Southeastern Anatolia	1972	LC	0	U	U	0	U	U	B	L	-	1.800	1.800	-	0	Gross
Eastern Anatolia	1972	LC	4.660	U	U	0	U	U	B	L	-	56.82	61.48	-	103.0	Gross
TOTAL Turkey	-	HC	191.0	133.7	0	80.0	-	-	-	-	-	1100	1291	-	7862	-
	-	LC	2702	-	-	-	-	-	-	-	-	3289	5991	-	9814	-
TOTAL ALL RANKS	-	-	2893	133.7	-	-	-	-	-	-	-	4389	7283	-	17676	-
Israel																
Entire Nation	1972		0	0	-	-	-	-	-	-	-	0	0	-	0	-
EUROPE																
Western Europe																
Germany, F.R. of (a,b)																
Ruhr	1971	HC	39001	26000	0	60.0	1500	0.600	A/B	-	AM	175003	214003	1972	83281	-
Saar	1971	HC	3000	2800	0	60.0	1500	0.600	A/B	-	AM	2500	5500	1972	10429	-
Aachen	1971	HC	1700	900.0	0	60.0	1500	0.600	A/B	-	AM	8800	10500	1972	6247	-
Ibbenburen	1971	HC	300.0	300.0	0	60.0	1500	0.600	A/B	-	AM	-	300.0	1972	2513	-
Rheinland	1973	BC	55001	9400	100	-	450.0	6.000	A	L	AM	-	55001	1972	95700	-
Hessen	1972	BC	60.00	45.00	80.0	-	100.0	3.000	A/B	L	AM	-	60.00	1972	3700	-
Niedersachsen	1972	BC	400.0	66.00	100	-	100.0	1.000	B	L	AM	330.0	730.0	1972	4800	-
	1972	P	-	640.0	100	2.50	12.00	2.000	A	L	AM	-	640.0	1972	300.0	-
Bayern	1972	BC	60.00	60.00	100	-	50.00	2.000	A	L	AM	-	60.00	1972	6200	-
Other	1972	P	-	260.0	100	1.00	12.00	2.000	A	L	AM	-	260.0	1972	100.0	-
TOTAL Germany, F.R. of	-	BC	55521	9571	99.9	-	-	-	-	-	-	330.0	55851	-	110400	-
	-	P	-	900.0	-	2.07	-	-	-	-	-	-	900.0	-	400.0	-
	-	HC	44001	30000	-	60.0	-	-	-	-	-	186303	230303	-	102470	-
TOTAL ALL RANKS	-	-	99521	40472	-	-	-	-	-	-	-	186633	287054	-	213270	-
France (a)																
Nord Pas-de-Calais	1973	HC	477.5	67.00	0	46.0	1100	1.000	A	M	AB	U	U	1972	12593	Net
Lorraine	1973	HC	811.4	342.0	0	90.0	1250	0.700	A	M	AB	U	U	1972	10939	Net
Centre-Midi	1973	HC	91.49	34.00	12.0	30.0	1000	2.000	A	M	AB	U	U	1972	6210	Net

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
EUROPE																
Western Europe																
France																
Provence	1973	BC	26.87	15.00	-	-	600.0	2.000	B	L	AB	U	U	1972	1510	Net
TOTAL France	-	BC	26.87	15.00	0	0	-	-	-	-	-	-	-	-	1510	-
	-	HC	1380	443.0	0.92	78.7	-	-	-	-	-	-	-	-	29742	-
TOTAL ALL RANKS	-	-	1407	458.0	-	-	-	-	-	-	-	-	-	-	31252	-
Netherlands (a)																
South Limberg (b)	1972	AN	U	3.200	0	U	500.0	0.500	A	U	-	0	U	1972	2800	Gross
(c)	1973	BT	3255	1615	0	U	1200	0.500	A	U	-	0	3255	1972	0	Gross
Eastern Gelderland	1955	BT	450.0	275.0	0	U	1400	0.500	A	U	-	0	450.0	1972	0	Gross
TOTAL Netherlands	-	AN	-	3.200	-	-	-	-	-	-	-	0	0	-	2800	-
	-	BT	3705	1840	-	-	-	-	-	-	-	0	3705	-	0	-
TOTAL ALL RANKS	-	-	3705	1843	-	-	-	-	-	-	-	0	3705	-	2800	-
Belgium																
Bassin du Sud (a)	1973	HC	25.75	-	-	-	-	-	-	-	-	-	-	-	2645	-
Bassin de Campine (b)	1973	HC	227.1	-	-	-	-	-	-	-	-	-	-	-	7100	-
TOTAL Belgium	-	HC	252.9	-	-	-	-	-	-	-	-	-	-	-	9745	-
Austria (a)																
Bohemian Massif	1972	BC	2.300	0.100	100	0	20.00	0.500	B	L	AB	0.300	2.600	1972	0	Gross
Tertiary Foreland	1972	BC	52.10	27.80	0	0	200.0	1.200	A	L	AB	3.100	55.20	1972	1130	Gross
Tertiary Basins	1972	BC	92.25	35.61	13.0	0	1500	1.000	B	L	AB	22.90	115.2	1972	2630	Gross
Palaogene Mesozoic Alps	1972	SB	1.050	0	0	0	1200	0.400	B	M	AB	3.100	4.150	1972	0	Gross
TOTAL Austria	-	SB	1.050	0	0	0	-	-	-	-	-	3.100	4.150	-	0	-
	-	BC	146.7	63.51	7.45	0	-	-	-	-	-	26.30	173.0	-	3760	-
TOTAL ALL RANKS	-	-	147.7	63.51	-	-	-	-	-	-	-	29.40	177.1	-	3760	-
Southern Europe																
Italy (a)																
Mainland	1972	LN	70.00	32.80	100	0	150.0	3.00	A	L	AM	0	32.80	1972	1390	Gross
Sardinia (b)	1972	LC	40.00	N	0	0	N	N	C	L	AM	0	N	1972	200.0	Gross
TOTAL Italy	-	-	110.0	32.80	-	-	-	-	-	-	-	0	32.80	-	1590	-
Spain																
Zocalo Herniciano	1970	LN	360.0	325.0	100	0	200.0	200.0	C	L	-	54.00	414.0	1972	450.0	-
Astur Pirenaica	1970	AN	442.0	346.0	0	0	500.0	0.400	A	M	-	227.0	669.0	1972	2860	-
	1970	BT	140.0	99.00	3.00	20.0	300.0	0.500	B	M	-	244.0	384.0	1972	1510	-
	1970	SB	676.0	453.0	0	46.0	900.0	0.500	B	M	-	624.0	1300	1972	5930	-
Costera Catalana	1970	LN	160.0	120.0	0	0	500.0	1.200	C	L	-	0	160.0	1972	630.0	-
Iberica	1970	LN	300.0	210.0	5.00	0	300.0	1.400	C	L	-	150.0	450.0	1972	1780	-
Valle del Ebro	1970	AN	1.500	1.000	0	0	200.0	0.600	U	U	-	1.500	3.000	1972	0	-
	1970	LN	40.00	30.00	0	0	200.0	0.700	C	L	-	0	40.00	1972	90.00	-
Sierra Morena	1970	AN	10.00	7.000	0	0	300.0	0.600	A	M	-	0	10.00	1972	160.0	-
	1970	SB	2.000	1.000	0	0	500.0	1.000	A	L	-	2.000	4.000	1972	30.00	-
	1970	BC	23.00	15.00	38.0	0	400.0	3.800	A	L	-	9.000	32.00	1972	580.0	-
Baleares	1970	LN	15.00	10.00	0	0	200.0	1.500	C	L	-	15.00	30.00	1972	120.0	-
Betica	1970	LN	32.00	26.00	20.0	0	100.0	1.800	B	L	-	34.00	66.00	1972	0	-
TOTAL Spain	-	AN	453.5	354.0	0	0	-	-	-	-	-	228.5	682.0	-	3020	-
	-	BT	140.0	99.00	3.00	20.0	-	-	-	-	-	244.0	384.0	-	1510	-
	-	SB	678.0	454.0	0	45.9	-	-	-	-	-	626.0	1304	-	5960	-
	-	BC	23.00	15.00	38.0	0	-	-	-	-	-	9.000	32.00	-	580.0	-
	-	LN	907.0	721.0	47.3	0	-	-	-	-	-	253.0	1160	-	3070	-
TOTAL ALL RANKS	-	-	2202	1643	-	-	-	-	-	-	-	1361	3562	-	14140	-
Yugoslavia																
Entire Nation	1971	SB	82.00	70.00	-	-	500.0	0.500	C	M	-	22.00	104.0	1972	600.0	-
	1971	BC	1761	1500	20.0	-	400.0	1.500	B	L	-	273.0	2034	1972	9200	-
	1971	LN	16133	15300	80.0	-	130.0	20.00	B	L	-	3480	19613	1972	21200	-
TOTAL ALL RANKS	-	-	17976	16870	-	-	-	-	-	-	-	3775	21751	-	31000	-
Portugal (a)																
Entire Nation	1972	AN	15.00	U	U	0	300.0	1.000	A	L	-	U	U	1972	250.0	Net
	1972	LN	27.00	25.00	93.0	0	100.0	1.000	B	M	-	U	U	1972	0	Net
TOTAL ALL RANKS	-	-	42.00	25.00	-	-	-	-	-	-	-	-	-	-	250.0	-
Northern Europe																
United Kingdom (a,b)																
Scotland,onshore	1973	BT	9896	240.8	30.0	12.0	1220	0.610	A	M	AB	0	9896	1973	11176	Net
Scotland,offshore	1973	BT	1971	54.86	0	10.0	1220	0.610	A	M	AB	1676	3647	1973	1930	Net
Northern England,onshore	1973	BT	5730	174.8	32.0	58.0	1220	0.610	B	M	AB	3556	9286	1973	10566	Net
Northern England,offshore	1973	BT	5283	384.0	0	66.0	1220	0.610	B	M	AB	1554	6838	1973	10160	Net
Central,onshore	1973	BT	43028	2591	5.00	38.0	1220	0.610	B	M	AB	47173	90201	1973	90221	Net
Central,offshore	1973	BT	182.9	12.19	0	71.0	1220	0.610	B	M	AB	904.2	1087	1973	203.2	Net
Southern Wales,onshore	1973	AN	5598	69.09	24.0	0	1220	0.610	A/B	H	AB	0	5598	1973	3353	Net
	1973	BT	19528	290.6	8.00	70.0	1220	0.610	B	M	AB	0	19528	1973	10363	Net
Southern Wales,offshore	1973	AN	0	0	-	-	1220	0.610	-	-	AB	355.6	355.6	1973	0	Net
Southern England,onshore	1973	AN	10.16	0	-	-	1220	0.610	B	M	AB	0	10.16	1973	0	Net
	1973	BT	7610	53.85	0	93.0	1220	0.610	B	M	AB	8291	15900	1973	1118	Net
Southern England,offshore	1973	AN	10.16	0	-	-	1220	0.610	B	H	AB	60.96	71.12	1973	0	Net
	1973	BT	30.48	0	-	-	1220	0.610	B	M	AB	365.8	396.2	1973	0	Net
TOTAL United Kingdom	-	AN	5618	69.09	24.0	0	-	-	-	-	-	416.6	6035	-	3353	-

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
EUROPE																
Northern Europe																
United Kingdom																
TOTAL United Kingdom	-	BT	93259	3802	7.39	43.0	-	-	-	-	-	63520	156779	-	135737	-
TOTAL ALL RANKS	-	-	98877	3871	-	-	-	-	-	-	-	63937	162814	-	139090	-
Sweden																
Entire Nation (a)	1967	SB	60.00	30.00	0	0	190.0	0.750	A	L	AM	30.00	90.00	-	0	-
(b)	1952	P	9400	-	-	-	-	-	-	-	AM	-	-	-	-	-
TOTAL Sweden	-	-	9460	30.00	-	-	-	-	-	-	-	30.00	90.00	-	0	-
Denmark (a)																
Central Jutland (b)	1970	BC	0.020	0.020	100	0	10.00	2.000	BC	L	-	0	0.020	1972	0	-
(c)	1958	P	561.0	0	0	0	3.500	0.300	A	L	-	0	561.0	1972	0	-
Funen	1958	P	0	0	-	-	-	-	-	-	-	0	0	1972	0	-
Seeland	1958	P	0	0	-	-	-	-	-	-	-	0	0	1972	0	-
TOTAL Denmark	-	BC	0.020	0.020	00.0	0	-	-	-	-	-	0	0.020	-	0	-
	-	P	561.0	0	0	0	-	-	-	-	-	0	561.0	-	0	-
TOTAL ALL RANKS	-	-	561.0	0.020	-	-	-	-	-	-	-	0	561.0	-	0	-
Finland (a,b,c)																
Entire Nation	1972	P	33000	4290	100	U	3.000	1.000	A	L	AB	0	33000	1972	165.0	Net
Norway (a)																
Svalbard	1972	BT	2.000	1.600	0	100	500.0	0.600	B	H	AM	150.0	152.0	1972	430.0	Net
Ireland																
Entire Nation	1970	AN	U	U	U	U	U	U	U	U	-	U	U	1970	79.74	-
	1970	SB	U	U	U	U	U	U	U	U	-	U	U	1970	75.24	-
TOTAL ALL RANKS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	155.0	-
Iceland (a)																
Entire Nation	1973	P	U	-	-	-	-	-	-	-	-	-	-	-	-	-
	1973	LN	U	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ALL RANKS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eastern Europe																
Poland (a,b)																
Entire Nation	1972	HC	C	C	0	30.0	1000	1.000	B	H	-	C	C	1972	150700	Gross
	1972	BC	C	C	99.5	0	300.0	1.000	B	H	-	C	C	1972	38200	Gross
TOTAL ALL RANKS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	188901	-
Germany, D.R. of																
Cottbus	1972	BC	C	C	100	0	150.0	2.000	B	L	-	0	C	-	124000	-
Halle-Leipzig	1972	BC	C	C	100	0	150.0	2.000	C	L	-	0	C	-	122000	-
Nordraum	1972	BC	0	0	-	0	-	-	-	-	-	C	C	-	0	-
TOTAL Germany, D.R. of	-	BC	-	-	-	-	-	-	-	-	-	-	-	-	246000	-
Bulgaria																
East	1972	BT	29.00	29.00	-	-	3.000	0.500	B	L	-	5.000	34.00	-	500.0	-
West	1972	BC	346.0	346.0	-	-	20.00	0.700	B	L	-	110.0	456.0	-	8000	-
South-East	1972	LN	4012	4012	100	-	15.00	10.00	C	L	-	730.0	4742	-	20000	-
TOTAL Bulgaria	-	-	4387	4387	-	-	-	-	-	-	-	845.0	5232	-	28500	-
EUROPE-ASIA																
Northern																
USSR	-		-	-	-	-	-	-	-	-	-	-	-	1971	641002	-
Entire Nation	1971	HC	165802	U	U	U	1000	0.600	ABC	M	-	3827554	3993357	1971	U	-
	1971	LC	107402	U	U	U	430.0	0.800	ABC	L	-	1612922	1720324	1971	U	-
TOTAL USSR	-	-	273204	-	-	-	-	-	-	-	-	5440476	5713681	-	641002	-
NORTH AMERICA																
Northern America																
United States (a,b,c)																
Appalachian Basin	1972	AN	11428	5714	50.0	0	305.0	0.700	A	M	AM	7478	18906	1971	7891	-
	1972	BT	113919	56960	8.00	65.0	305.0	0.700	ABC	M	AM	176132	290251	1971	338855	-
Eastern Interior	1972	BT	83081	41541	10.0	1.00	305.0	0.700	ABC	M	AM	244110	327192	1971	115733	-
Western Interior	1972	AN	63.49	31.75	0	0	305.0	0.700	BC	M	AM	326.5	390.0	1971	U	-
	1972	BT	15419	7710	12.0	8.00	305.0	0.700	ABC	M	AM	114885	129904	1971	7891	-
	1972	LN	6168	3084	38.0	0	305.0	1.500	BC	M	AM	12602	18769	1971	2268	-
Northern Rocky Mountains	1972	BT	4354	2177	U	0	305.0	0.700	A	M	AM	54419	58773	1971	13424	-
	1972	SB	53694	26847	59.0	0	305.0	1.500	ABC	M	AM	592322	646017	1971	U	-
	1972	LN	39908	19954	26.0	0	305.0	1.500	ABC	M	AM	579040	618948	1971	5805	-
Southern Rocky Mountains	1972	AN	18.14	9.070	-	0	305.0	0.700	A	M	AM	56.23	74.37	1971	U	-
	1972	SB	8707	4354	52.0	0	305.0	1.500	A	M	AM	150873	159581	1971	1088	-
	1972	BT	17414	8707	7.00	14.0	105.0	0.700	ABC	M	AM	350853	368268	1971	17505	-
Pacific Coast	1972	AN	-	-	-	-	-	-	-	-	AM	4.535	4.535	1971	U	-
	1972	BT	281.2	140.6	-	16.0	305.0	0.700	A	M	AM	13738	14020	1971	997.7	-
	1972	SB	1088	544.2	23.0	0	305.0	1.500	A	M	AM	30866	31955	1971	U	-
	1972	LN	36.28	18.14	U	0	305.0	1.500	U	M	AM	991.4	1028	1971	22.67	-
Alaska	1972	BT	907.0	453.5	100	0	305.0	0.700	A	M	AM	35067	35974	1971	634.9	-
	1972	SB	7075	3537	100	0	305.0	1.500	A	M	AM	197380	204454	1971	U	-
TOTAL United States	-	AN	11510	5755	49.6	0	-	-	-	-	-	7866	19375	-	7891	-
	-	BT	235376	117688	9.09	33.4	-	-	-	-	-	989005	1224380	-	495040	-
	-	SB	70565	35282	61.7	0	-	-	-	-	-	971441	1042006	-	1088	-
	-	LN	46112	23056	27.6	0	-	-	-	-	-	592634	638746	-	8095	-
TOTAL ALL RANKS	-	-	363562	181781	-	-	-	-	-	-	-	2560942	2924503	-	512114	-
Canada (a)																
British Columbia	1970	BT	6340	3613	7.00	U	-	1.524	A	M	AM	46720	53060	1972	5938	Net

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves: Total Amount in Place (mega-tonne)	Known Reserves: Economically Recoverable Reserves: Amount (mega-tonne)	Known Reserves: Economically Recoverable Reserves: By Surface Mining (%)	Known Reserves: Economically Recoverable Reserves: Of Coking Quality (%)	Known Reserves: Deposits: Maximum Depth (m)	Known Reserves: Deposits: Minimum Seam Thickness (m)	Known Reserves: Sulphur Content	Known Reserves: Heat Value: Heat Value	Known Reserves: Heat Value: Basis (As Mined or as Burned)	Additional Resources (mega-tonne)	Total Resources (mega-tonne)	Recent Annual Production: Year	Recent Annual Production: Amount (kilo-tonne)	Recent Annual Production: Basis (Gross or Net)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
NORTH AMERICA																
Northern America																
Canada																
British Columbia	1970	LN	308.4	246.7	100	0	-	0.914	A	L	AM	548.2	852.6	1972	-	Net
Alberta	1970	BT	888.9	507.0	7.00	0	-	1.524	A	M	AM	32942	33831	1972	3736	Net
	1970	SB	1107	885.2	75.0	0	-	0.914	A	L	AM	7873	8979	1972	4449	Net
Saskatchewan	1970	LN	263.0	210.4	100	0	-	0.914	A	L	AM	10621	10884	1972	2978	Net
New Brunswick	1973	BT	9.070	7.256	100	0	-	0.305	C	M	AM	-	9.070	1972	389.6	Net
Nova Scotia	1973	BT	117.9	67.12	0	U	-	0.914	B	M	AM	1043	1161	1972	1293	Net
TOTAL Canada	-	BT	7356	4195	7.05	-	-	-	-	-	-	80705	88061	-	11356	-
	-	SB	1107	885.2	75.0	-	-	-	-	-	-	7873	8979	-	4449	-
	-	LN	571.4	457.1	100	-	-	-	-	-	-	11165	11737	-	2978	-
TOTAL ALL RANKS	-	-	9034	5537	-	-	-	-	-	-	-	99743	108777	-	18783	-
Greenland (a)																
Entire Nation	1972	HC	U	0	0	0	-	-	U	U	-	U	U	-	4.300	-
Middle America																
Mexico (a)	-	HC	-	-	-	-	-	-	-	-	AB	-	12000	1971	3563	Gross
Sabinas	1973	HC	1860	366.9	U	U	550.0	1.500	B	M	AB	U	U	1971	U	Gross
Esperanzas	1973	HC	436.0	53.30	U	U	1200	1.500	B	M	AB	U	U	1971	U	Gross
Saltillo-Lampacitos	1973	HC	1435	208.7	U	U	1150	1.200	B	M	AB	U	U	1971	U	Gross
Las Adjuntas-Monclova	1973	HC	555.0	U	U	U	U	U	B	M	AB	U	U	1971	U	Gross
San Patricio	1973	HC	825.0	U	U	U	U	U	B	M	AB	U	U	1971	U	Gross
Fuente	1973	HC	90.00	U	U	U	U	U	B	M	AB	U	U	1971	U	Gross
Yaqui	1973	HC	20.00	U	U	U	U	U	B	M	AB	U	U	1971	U	Gross
Mixteca	1973	HC	95.00	U	U	U	U	U	B	M	AB	U	U	1971	U	Gross
TOTAL Mexico	-	HC	5316	628.9	-	-	-	-	-	-	-	-	12000	-	3563	-
Guatemala																
Entire Nation	U	LN	U	U	U	U	U	U	ABC	U	-	U	U	-	0	-
Panama																
Entire Nation	-		0	0	-	-	-	-	-	-	-	0	0	-	0	-
SOUTH AMERICA																
Tropical South America																
Brazil																
Southeast	1972	SB	1.000	U	U	U	U	U	U	U	AB	U	1.000	1972	0	Gross
South	1972	SB	3255	U	U	U	300.0	0.600	C	M	AB	U	3255	1972	5860	Gross
TOTAL Brazil	-	SB	3256	-	-	-	-	-	-	-	-	-	3256	-	5860	-
Colombia (a)	-	BT	-	-	-	-	-	-	-	-	AB	-	-	1971	3800	Gross
Caribbean Coast	1971	SB	110.0	81.00	100	N	700.0	1.200	A	H	AB	115.0	225.0	1971	0	Gross
Andes	1971	BT	40.00	28.00	N	U	U	0.600	A	H	AB	3220	3260	1971	U	Gross
	1971	SB	U	U	U	U	U	U	B	H	AB	615.0	615.0	1971	U	Gross
	1971	LC	U	U	U	0	U	U	D	L	AB	1230	1230	1971	U	Gross
TOTAL Colombia	-	BT	40.00	28.00	-	-	-	-	-	-	-	3220	3260	-	3800	-
	-	SB	110.0	81.00	-	-	-	-	-	-	-	730.0	840.0	-	0	-
	-	LC	0	0	-	-	-	-	-	-	-	1230	1230	-	0	-
TOTAL ALL RANKS	-	-	150.0	109.0	-	-	-	-	-	-	-	5180	5330	-	3800	-
Venezuela																
Zulia	1972	SB	-	-	-	U	500.0	0.500	A	H	-	780.0	780.0	-	-	-
Anzoategui (a)	1953	SB	10.00	-	0	60.0	400.0	0.500	B	H	-	45.00	55.00	-	-	-
Tachira	1972	SB	4.000	-	90.0	50.0	100.0	1.000	A	H	-	6.000	10.00	-	30.00	-
Aragua	1953	LN	-	-	0	0	150.0	1.000	B	H	-	1.000	1.000	-	-	-
Guarico	1953	LN	-	-	0	0	200.0	0.500	B	H	-	25.00	25.00	-	-	-
TOTAL Venezuela	-	SB	14.00	-	-	-	-	-	-	-	-	831.0	845.0	-	30.00	-
	-	LN	0	-	-	-	-	-	-	-	-	26.00	26.00	-	0	-
TOTAL ALL RANKS	-	-	14.00	-	-	-	-	-	-	-	-	857.0	871.0	-	30.00	-
Temperate South America																
Argentina (a,b,c)																
Patagonia	1972	SB	150.0	100.0	66.0	N	600.0	8.000	A	M	AB	400.0	550.0	1972	1200	-
(c)	1972	P	90.00	U	U	0	10.00	U	A-B	L	AB	50.00	140.0	1972	0	-
Other	1972	SB	5.000	U	U	N	U	U	A-B	M	AB	U	5.000	1972	0	-
TOTAL Argentina	-	SB	155.0	100.0	66.0	-	-	-	-	-	-	400.0	555.0	-	1200	-
	-	P	90.00	0	-	-	-	-	-	-	-	50.00	140.0	-	0	-
TOTAL ALL RANKS	-	-	245.0	100.0	-	-	-	-	-	-	-	450.0	695.0	-	1200	-
Chile (a)																
Central	1972	BT	45.00	32.00	0	25.0	1000	0.750	B-C	M	AM	245.0	290.0	1972	1500	Net
	1972	SB	2.000	1.000	0	0	100.0	1.000	A	L	AM	3.000	5.000	1972	50.00	Net
Southern	1969	SB	50.00	25.00	2.00	0	500.0	2.000	A	L	AM	3600	3650	1972	0	Net
TOTAL Chile	-	BT	45.00	32.00	0	25.0	-	-	-	-	-	245.0	290.0	-	1500	-
	-	SB	52.00	26.00	1.92	0	-	-	-	-	-	3603	3655	-	50.00	-
TOTAL ALL RANKS	-	-	97.00	58.00	-	-	-	-	-	-	-	3848	3945	-	1550	-
Uruguay (a)																
Coastal Region	1969	P	10.00	10.00	100	-	6.000	0.300	A	L	AM	0	0	1973	0	-
OCEANIA																
Australia & New Zealand																
Australia (a,b,c)																
Western	1972	SB	462.0	349.0	10.0	0	200.0	1.500	A	L	-	0	462.0	-	1200	-

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves: Total Amount in Place (megatonne)	Known Reserves: Economically Recoverable Reserves: Amount (megatonne)	Known Reserves: Economically Recoverable Reserves: By Surface Mining (%)	Known Reserves: Economically Recoverable Reserves: Of Coking Quality (%)	Known Reserves: Deposits: Maximum Depth (m)	Known Reserves: Deposits: Minimum Seam Thickness (m)	Known Reserves: Sulphur Content	Known Reserves: Heat Value: Heat Value	Known Reserves: Heat Value: Basis (As Mined or as Burned)	Additional Resources (megatonne)	Total Resources (megatonne)	Recent Annual Production: Year	Recent Annual Production: Amount (kilotonne)	Recent Annual Production: Basis (Gross or Net)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
OCEANIA																
Australia & New Zealand																
Australia																
Central	1972	SB	46.00	46.00	100	0	100.0	5.000	A	L	-	N	46.00	-	1500	-
	1972	BC	540.0	0	0	0	N		U	L	-	N	540.0	-	0	-
Eastern	1972	BT	25032	13770	17.0	62.0	600.0	1.000	A	M/H	-	86325	111358	-	56800	-
	1973	BC	48261	10160	100	0	200.0	30.00	A	L	-	37901	86161	-	23700	-
TOTAL Australia	-	BT	25032	13770	17.0	62.0	-	-	-	-	-	86325	111358	-	56800	-
	-	SB	508.0	395.0	20.5	0	-	-	-	-	-	0	508.0	-	2700	-
	-	BC	48801	10160	00.0	0	-	-	-	-	-	37901	86701	-	23700	-
TOTAL ALL RANKS	-	-	74341	24325	-	-	-	-	-	-	-	124226	198567	-	83200	-
New Zealand (a,b)																
North	1969	SB	217.0	127.0	65.5	-	305.0	1.200	A-B	M	AM	197.0	414.0	1971	1229	Gross
West (c)	1969	BT	57.50	35.50	0.50	0.30	305.0	1.200	A-C	M-H	AM	73.00	130.0	1971	383.5	Gross
	1969	SB	5.500	1.900	17.0	-	-	1.200	B-C	M	AM	20.00	25.50	1971	74.50	Gross
South	1969	BT	0.010	-	-	-	305.0	1.200	B	M	AM	0.050	0.060	1971	-	Gross
	1969	SB	16.50	7.600	22.7	-	305.0	1.200	A-C	L-M	AM	91.84	108.0	1971	246.0	Gross
	1969	LN	56.50	16.90	87.0	-	305.0	1.500	A-B	L-M	AM	340.0	396.0	1971	158.5	Gross
TOTAL New Zealand	-	BT	57.51	35.50	0.50	0.30	-	-	-	-	-	73.05	130.1	-	383.5	-
	-	SB	239.0	136.5	62.4	-	-	-	-	-	-	308.4	547.5	-	1549	-
	-	LN	56.50	16.90	87.0	-	-	-	-	-	-	340.0	396.0	-	158.5	-
TOTAL ALL RANKS	-	-	353.0	188.9	-	-	-	-	-	-	-	721.5	1078	-	2091	-
Polynesia																
Western Samoa																
Entire Nation	1959	N	N	N	-	-	-	-	-	-	-	N	N	-	N	-

TABLE 2A. DEFINITIONS OF SOLID FUEL RANKINGS

TABLEAU 2A. CARACTERISTIQUES DES TYPES DE COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Higher Ranking Solid Fuels: Rank	Carbon Content (%)	Volatile Matter (%)	Moisture Content (%)	Ash Content (%)	Other	Lower Ranking Solid Fuels: Rank	Carbon Content (%)	Volatile Matter (%)	Moisture Content (%)	Ash Content (%)	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
AFRICA												
Western Africa												
Nigeria	SB	22-51	28-46	3-17	4-43	-	LN	24-37	37-51	8-23	8-25	-
Eastern Africa												
Mozambique	HC	-	16-20	-	14-25	-						
Zambia	BT	-	20-28	-	22	-						
Middle Africa												
Zaire	BT	47-63	31-41	6-7	13-21	-						
Angola							P	8	8	8	8	-
							LN	38	40	15	7	-
Southern Africa												
South Africa	AN	78	7.5	1.5	11	-						
	BT	55	25	2.5	15	-						
ASIA												
East Asia												
Taiwan	BT	69-43	31-57	4-10	6-24	-						
Middle South Asia												
India (e)	HC	<92	14-45	1-15	8-50	-	LC	16-48	24-53	18-53	3.5-20	-
Bangladesh	SB	31.75	41.30	0.92	26.02	-	P	24.00	42.30	17.10	16.60	-
	BT	47.00	31.00	2.5-4	22.40	-	P	24.60	37.82	18.62	18.47	-
Southeast Asia												
Indonesia	HC	40-50	3-45	-	<5	-	LC	40-45	35-40	-	<3	-
Southwest Asia												
Turkey	HC	48-60	25-33	2-13	9-15	-	LC	15-35	21-40	12-38	15-50	-
EUROPE												
Western Europe												
Germany, F.R. of	HC	-	8-45	-	-	-	BC	15-22	17-26	45-60	0.5-8	-
							P	40	40-45	30-40	1-10	-
Southern Europe												
Italy							LN	15-20	16-17	44-45	14-18	-
							LC	37	17	10	36	-
Yugoslavia	SB	-	<40	<10	-	-	BC	-	-	10-30	-	-
							LN	-	-	>30	-	-
Portugal	AN	53	4	4	39	-	LN	17	18	61	4	-
Northern Europe												
United Kingdom	BT	-	9.1-47	-	-	-						
	AN	-	<9.1	-	-	-						
Sweden	SB	-	65	18	17	-						
Denmark							P	59	-	90	1-30	-
Finland							P	50-60	60-70	45	3	-
Norway	BT	83	42.5	2	8	-						
Eastern Europe												
Poland	HC	72-90	20-32	1-25	22-40	-	BC	66-72	52-65	53-54	8-22	-
NORTH AMERICA												
Northern America												
United States	AN	86-98	2-14	-	-	-	LN	-	-	-	-	-
	BT	69-86	14-31	-	-	-						
	SB	-	-	-	-	-						
Canada	SB	<69	>31	-	-	-	LN	<69	>31	-	-	-
	BT	69-92	14-31	-	-	-						
Middle America												
Mexico	HC	53	20	4	23	-						
SOUTH AMERICA												
Tropical South America												
Brazil	SB	35-40	20-32	5-10	30-35	-						
Colombia	AN	>69	2-14	-	-	-	LN	<69	>33	-	-	-
	BT	-	14-33	-	-	-						
	SB	<69	>33	-	-	-						
Venezuela	SB	50-60	35-45	1-8	1-12	-						
Temperate South America												
Argentina	SB	38	32	10	20	-						
Chile	BT	45-55	40-45	2-3	5-10	-						
	SB	35-40	30-35	15-25	10-15	-						
Uruguay							P	26.44	65.08	13.00	7.55	-
OCEANIA												
Australia & New Zealand												
Australia	BT	40-70	10-30	0-10	20-30	-	BC	15-25	10-30	40-70	0-10	-
	SB	25-50	20-50	10-40	10-20	-						
New Zealand	SB	38-45	36-39	8-24	5-14	-	LN	25-37	32-35	19-51	3-14	-
	BT	46-72	22-40	1-12	1-6	-						

TABLE 2B. OTHER SOLID FUELS
TABLEAU 2B. AUTRES COMBUSTIBLES SOLIDES

Name of Continent, Region and Country (1)	Year of Ref. (2)	Type of Material (3)	Amount Burned (Gg) (4)	Approximate Energy Content Unit (MJ/kg) (5)	Approximate Energy Content Total (TJ) (6)	Comments on Plans for Future Use (7)
AFRICA						
Western Africa						
Nigeria	U	Wood	U	U	U	-
Eastern Africa						
Ethiopia	1971	Wood	25036	U	U	-
	1971	Dung	U	U	U	-
Zambia	-	charcoal	U	U	U	Wood and Charcoal are used by indigenous people. Amounts used are unknown.
	-	wood	U	U	U	-
Southern Africa						
South Africa	-	All	N	-	N	-
ASIA						
Middle South Asia						
India (f)	1969	Dung	49400	U	544000	-
	1969	Firewood	142000	U	3728000	-
	1969	Veg. waste	34200	U	900000	-
Bangladesh	1972	Wood	U	U	U	-
	1972	Bagasse	U	U	U	-
	1972	Jute stick	U	U	U	-
	1972	Cow-dung	U	U	U	-
Southwest Asia						
Turkey	1971	Wood	12189	12.60	153600	Efforts are being made to substitute lignite with a low heat value for wood and dung in the future.
	1971	Dung	14604	9.600	140200	-
EUROPE						
Western Europe						
Austria	1972	Wood	1620	-	24100	Burning of wastes for the production of thermal energy has been started and will increase. No details are available.
Northern Europe						
Finland	-	Wood pulping waste (c)	-	-	67000	-
	-	Municipal Waste (c)	-	-	600.0	-
Eastern Europe						
Poland	1972	Peat and Wood	1400	29.30	41000	-
NORTH AMERICA						
Northern America						
United States	-	All	-	-	N	-
SOUTH AMERICA						
Tropical South America						
Brazil	1972	Timber	38819	8.000	310552	-
	1972	Charcoal	1436	25.90	37192	-
	1972	Bagasse	5779	13.00	75127	-
Colombia	1971	Wood, bagasse	U	U	108000	-
Temperate South America						
Uruguay	1973	U	U	-	U	-
OCEANIA						
Australia & New Zealand						
Australia	1972	Bagasse (Eastern Region)	5810	7.700	44560	Increasing amounts of wood and some bagasse will be diverted from fuel to paper manufacture.
	1972	Wood (Western Region)	410.0	15.90	6530	-
	1972	Wood (Central Region)	300.0	16.30	4890	-
	1972	Wood (Eastern Region)	1630	16.00	26100	-
Polynesia						
Western Samoa	1972	Wood Trash	N	N	N	Slightly increased use anticipated.

TABLE 2C. NOTES ON SOLID FUELS
TABLEAU 2C. NOTES SUR LES COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Note No.
AFRICA	
Western Africa	
Nigeria	(a) Includes total resources of 62 million tonnes at the Enugu mines and 73 million tonnes at the Okaba mine
Eastern Africa	
Ethiopia	(a) The search for solid fossil fuels is in the exploration stage. Assessment of the economic potential of solid fuels & their exploratation will follow. Early exploitation will depend on the availability of capital for the development of the mines, cheap transportation costs and the development of industries.
	(b) Begemder, Wollega, Wollo and Eritrea provinces are entirely on the Ethiopian Plateau. Shoa Province is in both the Ethiopean Plateau and Rift Valley and Sidamo in both the Harrar Plateau and Rift Valley.
	(c) Additional resources reported as 196,500 m3.
Mozambique	(a) Economically recoverable reserves are determined by the general geology and experience in existing mines in the Moatize Area of Tete District.
Zambia	(a) Economically recoverable reserves include all coal with a heat content of 5260 kcal/kg or more and in seams over 2m in thickness with stripping ratios of 18:1 or less. Coal has a swelling index of 1 to 2. Coals are in class 411 of International System. Maamba deposits are of better quality.
Middle Africa	
Zaire	(a) Coal occurs in the Kuga and Luena Basins of Southeastern Zaire. Production is from the Luena Basin deposits.
	(b) The heating value of as-mined coal is 4500-5000 kcal/kg. After treatment, dried coal containing 15% ash has a heating value of 5800-6100 kcal/kg.
	(c) Several industrial petrochemical projects have been established.
Southern Africa	
South Africa	(a) Economically recoverable reserves are based on existing economic and technological conditions
	(b) Data in column 7 does not include blend coking coal.
ASIA	
East Asia	
Japan	(a) Economically recoverable reserves are coal-in-place times safety ratio (20-30%) times recovery ratio (40-60%). Total amount in place includes all proved, probable and estimated reserves in coal fields where mining is done. Reserves in closed mines which cannot actually be recovered are excluded.
Taiwan	(a) Known reserves also include subbituminous coal
Middle South Asia	
India	(a) Solid fuel resources are reported by states
	(b) The determination of economically recoverable reserves is based on thickness and grade, lay and disposition of the deposit, wall - rock/roof - floor strata condition, sub-surface structure and method of mining to be adopted, etc.
	(c) includes Meghalaya, Arunachal Pradesh (NEFA), and Nagaland. Data in column 10 and 16 for Assam only.
	(d) Data in column 10 for Kutch District only.
	(e) Data in Table 2A are from reference 3, p. 426-452
	(f) Data in column 6 of Table 2B originally given in coal equivalents. Heat value of 27.6 MJ/Kg for coal assumed for firewood.
Bangladesh	(a) Economically recoverable reserves determined by conventional menthods. The coal fields will be developed as soon as national resources permit and will be used for industrialisation, production of power, domestic consumption, etc. The peat fields are not likely to be developed as they will dislocate the most fertile rice growing fields.
	(b) Sylhet reserves include both subbituminous coal and lignite.
Iran	(a) Data for Kerman includes information from ten mining areas.
Southeast Asia	
Indonesia	(a) All bituminous deposits contain some subbituminous coal. South Sumatran brown coal deposit also contains some subbituminous coal.
	(b) Economically recoverable reserves are given as minable reserves, and not as saleable reserves and are determined according to the mining method applicable. During the Second Five Year National Plan (1974 - 1979), the Government of Indonesia plans to use Bukit Asam Coal and Ombilin Coal for a large steam power plant at the mining site in Sumatra.
Southwest Asia	
Turkey	(a) Values for economically recoverable reserves of higher ranking fuels are derived from practive. Values for lower ranking fuels are not available. It is not possible to give average figures for columns 6, 8, and 9 for total and regional total lignite deposits in Turkey because they are scattered and in different densities
	(b) The estimation of heat value is based on A.S.T.M. specifications.
EUROPE	
Western Europe	
Germany, F.R. of	(a) Economically recoverable reserves of higher ranking coals are based on seam thickness of more than .60 M, maximum depth of 1500m, for exposed shaft zones and shaft reserve coal fields. Reserves of brown coal are set according to the current opencast mining technology.
	(b) Produced quantities of brown coal are gross, and of higher ranking coal and peat, net.
France	(a) Recoverable quantities of known reserves are based on economically exploitable tonnages except for mines that are to be closed in about 10 years where recoverable amounts are those expected to be recovered up to time of shutdown.
Netherlands	(a) Coal specifications are as follows: Anthracite, 0-10% volatile matter-Mager Cool, 10-12% Esskool, 12-20% (1/4 Vet, 12-14%- 1/2 Vet, 14-17%, 3/4 Vet 17-20%), Vetcool, 20-30% and Gascool 30-40%.
	(b) Presently producing area. Estimated production figures for 1973 and 1974 are 3.2 x 10⁶ tonnes. These coal mines will be closed down on December 31st, 1974 and the remaining amounts of coal in the closed, drowned, robbed and collapsed collieries, are to be considered as lost from a technical mining point of view.
	(c) Presently non-producing, potential mining area. Includes 580 million tonnes-in-place of anthracite coal.
Belgium	(a) The Bassin du Sud coal resources include 16.7 Tg as certain, 5.0 Tg as probable and 4.0 Tg as

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TABLEAU 2C. NOTES SUR LES COMBUSTIBLES SOLIDS

Name of Continent, Region and Country	Note No.	
EUROPE		
Western Europe		
Belgium		possible.
	(b)	The Bassin de Campine coal resources include 114.6 Tg as certain, 54.2 Tg as probable and 58.3 Tg as possible.
Austria	(a)	Economically recoverable reserves are based on present economic and technological conditions.
Southern Europe		
Italy	(a)	Economically recoverable reserves are determined by comparison with the heat content cost of heavy fuel oil delivered to Italian coastal storehouses
	(b)	Sulcis-type coal (piceous lignite).
Portugal	(a)	Recoverable amounts of anthracite coal of poor quality based on mining experience. Lignite recovery based on feasability studies which show that there is a possibility of extracting one million tonnes per year.
Northern Europe		
United Kingdom	(a)	Economically recoverable reserves were determined for each seam at each producing or planned colliery, of each parcel of reserves considered to be technologically workable in the light of geological, and current mining and economic constraints, including appropriate deductions for faults, washouts and losses in processing.
	(b)	Small quantities (precise figures not available) of anthracite are included in the bituminous reserves of Scotland and Northern England. Seams 0.45-0.6 m. thick are included for parts of northern and southern England where they have been customarily worked.
Sweden	(a)	Economically recoverable reserves are set by underground costs caused by low coal/waste ratio in seam at Hoganas.
	(b)	Liklihood of using peat resources is decreasing.
Denmark	(a)	Peat cannot compete with foreign solid fuels at present. In case of emergency the peat could be used as fuel. A small amount is used in horticulture.
	(b)	Brown coal reserves are 20 million kilograms
	(c)	Carbon content is on dried basis while moisture content is on in-place basis.
Finland	(a)	Economically recoverable reserves include peatlands deeper than 1 m and situated south of 65N latitude (for drying reasons).
	(b)	Based on a government decision the annual production of peat fuel will reach 10 million cubic meters (3.3 million tonnes) by the end of the 1970's.
	(c)	Spent wood pulping liquor from several mills in Finland is concentrated by evaporation and used as fuel in steam boilers to generate steam at elevated pressures (up to 10.8 MN/m2) for the manufacturing process and for by-product power generation in back-pressure turbines. Municipal waste in Helsinki, Turku and Lahtiare used as steam boiler fuel for district heating and generation of electricity.
Norway	(a)	All Resources are in Svalbard (Spitzenbergen Islands) between 10 and 35 degrees E longitude and 74 and 81 degrees N latitude and exclude Soviet owned mine area. Recovery has been 80% by longwall underground mining.
Iceland	(a)	The peat deposits of Iceland are no longer exploited. Iceland also has minor lignite deposits but they are not used.
Eastern Europe		
Poland	(a)	Economically recoverable reserves of hard coals have a minimum seam thickness of 0.4-1.0 m depending on ash content (20-40%), a limiting seam dip of approximately 35 degrees, heat value of more than 12.6 MJ/kg (3,000 kcal/kg), and depths up to 1,000 m. Brown coals have a minimum seam thickness of 3m, a linear ratio of cover to coal of 8.3:1, heat value more than 6.6 MJ/Kg (1,600 kcal/kg), and depths up to 300 m.
	(b)	Production quantities are as mined.
NORTH AMERICA		
Northern America		
United States	(a)	Economically recoverable reserves are based on an overall recovery factor of 50 percent of reserves-in-place. Data on reserves and production are net. Data on additional resources are gross.
	(b)	34% of Appalachian Basin bituminous coal is low sulfur (<1%) coal, as is 1% of Eastern Interior bituminous coal, 3% of Western Interior bituminous coal, 98% of Northern Rocky Mountain subbituminous coal and 93% of lignite, and 90% of Southern Rocky Mountain bituminous coal.
	(c)	Coal is classified by rank according to percentage of fixed carbon, and heat content, calculated on mineral-matter-free basis. Medium and low volatile bituminous coal has a heat value of 32.5 MJ/Kg, high volatile bituminous coal, 24.3-32.5 MJ/Kg, subbituminous coal 19.2-26.5 MJ/Kg and lignite 14.6-19.2 MJ/Kg.
Canada	(a)	Economically recoverable reserves are theoretical estimates only.
Greenland	(a)	Production decreased gradually from 32,400 tonnes in 1967 to 4,300 tonnes in 1972, when production ceased.
Middle America		
Mexico	(a)	Economically recoverable reserves include only deposits at 0-300m of depth and cleaned coal (50%). Development of deposits at 300-1200m depth could provide furture production at a cost of $60.00 Mexican Pesos/tonne approx. for power generation purposes. National Subdivisions are by coal basins.
SOUTH AMERICA		
Tropical South America		
Colombia	(a)	Several non-related methods were used in determining economically recoverable reserves. Resources have been estimated in a conservative way. Data on the number of known deposits is scanty and most of Colombia has not been properly explored. A general trend toward increasing the exploitation of solid fuels over use of crude oil and natural gas is in progress.
Venezuela	(a)	Coking coal from Anzoategui obtained by mixing (30%) with low-volatile bituminous coal.
Temperate South America		
Argentina	(a)	Economically recoverable reserves are taken as 65% of coal-in-place. The bulk of Argentina's subbituminous coal occurs in Yacimiento Rio Turbio, Santa Cruz, and 36% on a net basis.
	(c)	Estimates for peat based on 200kg peat/m3.
Chile	(a)	Economically recoverable reserves in the Central Zone are based on use of current mining technology for seam thickness of 75cm or more. In the Southern Zone only open cast or surface methods are used where seam thicknesses between 2 and 14m are exploited. Production in the Southern Zone is expected to be 5 million tonnes per year.

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Name of Continent, Region and Country	Note No.	
SOUTH AMERICA		
Temperate South America		
Uruguay	(a)	The peat resource covers 40 km^2. Average thickness is 1.8m and maximum thickness 3.5m. Dried density is 0.145-0.180 g/cm^3 and heat value <19 MJ/Kg. This resource is currently not economic, in the future it may be feasible to build a 40 MW mine-mouth power plant to use this resource.
OCEANIA		
Australia & New Zealand		
Australia	(a)	Economically recoverable reserves includes coal which is economically mineable after allowing for mining and washing losses. Rankings are based on ASTM D388-38
	(b)	Additional resources have not been estimated for the Central Region or for Queensland in the Eastern Region
	(c)	Heat values are based on an as-burned basis for Queensland and on an as-mined basis elsewhere. Production is on a net basis for Queensland and on a gross basis elsewhere.
New Zealand	(a)	Economically recoverable reserves include measured and indicated reserves, for which tonnage is computed from dimensions revealed in outcrops, trehches, workings and drill holes. Grade is computed from the results of detailed sampling. The sites of inspection, sampling and measurements are so closely spaced and the geologic character is so well defined that the size, shape, and content are well-established.
	(b)	Percent of coal available for strip mining based on 1969 production.
	(c)	Reserves of coking coal are estimated to be 118,187 tonnes.

TABLE 2D. REFERENCES ON SOLID FUELS
TABLEAU 2D. REFERENCES SUR LES COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Ref. No.
AFRICA	
Western Africa	
Nigeria	1. Geological Survey of Nigeria, Bulletin No. 28, 1963 2. Records of Geological Survey of Nigeria, 1957
Eastern Africa	
Ethiopia	1. Jelenc A. Danilo "Mineral Occurences of Ethiopia, Ministry of Mines. Addis Ababa 1966 2. "Ethiopia, Statistical Abstract 1971" Imperial Ethiopian Government Central Statistical Office". Addis Ababa, 1971
Mozambique	1. Mines and geology department of Mozambique.
Malawi	1. Malawi Geological Survey Department.
Middle Africa	
Zaire	1. A. Jamotte, 1951, le Gisements Charbonniers du Katanga des l'Carde Africain, 50:Ann CSK, T2,V2.
Angola	1. Ocorrencias minerals - Servicos de Geologia e Minas, 1965 2. Recursos energeticos das Provincias Ultramarinas, 1963
Southern Africa	
South Africa	1. Coal Advisory Board, South Africa's Coal Resources, February 1969 2. Coal, Gold and Minerals, Vol. 21 No. 2, April 1973 3. Bulletin of Statistics, Quarter ending June, 1972.
ASIA	
East Asia	
Japan	1. Mining and Coal Bureau, Ministry of International Trade and Industry, Japan
Taiwan	1. Mining Research and Service Organization, Ministry of Economic Affairs, Republic of China
Middle South Asia	
India	1. Ministry of Steel & Mines, Department of Mines, New Delhi, India 2. Steering Group for Assessment of Natural Resources, Planning Commission, Task Force on Coal and Lignite, New Delhi, India., Report - April, 1972. 3. Memoirs of the Geological Survey of India, Vol. 88, 1971
Bangladesh	1. Geological Survey of Bangladesh 2. World Energy Conference, Bangladesh National Committee
Southeast Asia	
Indonesia	1. Ministry of Mines, Indonesia 2. Indonesian National Committee, World Energy Conference
Philippines	1. Bureau of Mines, Department of Agriculture and Natural Resources.
Vietnam, Rep. of	1. Service de Prospection miniere
Southwest Asia	
Turkey	1. Report for W.E.C. Turkish National Committee. Turkiye'nin Genel Enerji Durumu ve Problemleri Ankara 1972, by Oktay Apaydin 2. Turkish Coal Board (T.K.L.) 3. Mineral Research and Exploration Institute of Turkey (M.T.A.)
EUROPE	
Western Europe	
Netherlands	1. The Netherlands Geological Survey 2. The Netherlands Central Bureau of Statistics
Belgium	1. Administration des Mines, Ministere des Affaires Economiques.
Austria	1. Bundesministerium fur Handel, Gewerbe und Industrie - Oberste Berghehorde 2. Geologische Bundesanstalt
Southern Europe	
Italy	1. Ministero Industria, Commercio ed Artigianato - Direzione Generale delle Miniere. 2. Ente Nazionale per l'Energia Elettrica, (ENEL).
Spain	1. Ministerio de Industria - Direccion General de la Energia - Seccion de Carbones: "Plan Nacional de Explotacion Minera", 1970, "Estadistica de Carbones", 1971, and "Monografia de la Mineria del Carbon", 1960.
Yugoslavia	1. "Raw Material Base of Yugoslavia in Solid Fossil Fuels and Possibilities for its Further Development and Exploitation", Prof. Momcilo Simonovic, Serbian Academy of Science, Belgrade, Yugoslavia
Portugal	1. General-Direction of Mines Archives
Northern Europe	
United Kingdom	1. Headquaters, Geological Branch of the National Coal Board. 2. "Final Report of the Royal Commission on Coal Supplies", 1905. 3. National Coal Board, 1952 and 1973. 4. 1972 National Coal Board survey of economically workable reserves, with adjustments for subsequent extraction to 28th March, 1973. 5. Coalfield Papers of the Geological Survey of Great Britain: No.1: The Economic Geology of the Stirling and Clackmannan Coalfield, Scotland. Area North of the River Forth.Francis, E.H. and others. (Edinburgh: H.M.S.O., 1956) No.2: The Economic Geology of the Stirling and Clackmannan Coalfield, Scotland. Area South of the River Forth.Read, W.A. and others. (Edinburgh: H.M.S.O., 1959). Detailed descriptions are given of the coal seams, properties of the coals and reserves. 6. Geological Survey of Great Britain, Wartime Pamphlets:XXII Geology of the Leicestershire and South Derbyshire Coalfield, Mitchell, G.H. and Stubblefield, C.J.(London: H.M.S.O., 2nd Edition. 1948): XXV Geology of the Warwickshire Coalfield. Mitchell, G.H. (1948): XXVII Oil Shale of the Lothians, Richey, J.E. (1942-1943): XXXVI Peat Deposits of Scotland, Fraser, G.K. (1943-1948): XLII Economic Geology of the Canonbie Coalfield. Barrett, B.H. and others (1945): XLIII Geology of the Northern Part of the South Staffordshire Coalfield. Mitchell, G.H. (1945). These wartime pamphlets give information on the geology and classification of deposits, together with data on the physical and chemical properties of the minerals. 7. Physical and Chemical Survey of the National Coal Resources. Department of Scientific and Industrial Research, Fuel Research. (London: H.M.S.O., 1922-1946). Fifty-eight separately published papers giving general descriptions of coalfields, their geology and seams, and the physical and chemical properties of the coals determined by standard methods. 8. Rapid Survey of Coal Reserves. Department of Scientific and Industrial Research, Fuel Research Paper No. 58. (London: H.M.S.O., 1946). Figures are given of the developed reserves with percentages of different classes of coal for the period 1942 to 2042 for coalfields in England, Scotland and Wales.

TABLE 2D. REFERENCES ON SOLID FUELS
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Name of Continent, Region and Country	Ref. No.
EUROPE	
Northern Europe	
United Kingdom	9. Regional Survey Reports: North Eastern (Yorkshire) Coalfield, North Western Coalfield, North Midland Coalfield, Coalfields of the Midland Region, Durham Coalfield, Northumberland and Cumberland Coalfield, Kent Coalfield, South Wales and Pembrokeshire Coalfield, Forest of Dean Coalfield, and Bristol and Somerset Coalfield. Ministry of Fuel and Power. (London): H.M.S.O., 1945-1946). Descriptions are given of the coalfields, properties of the seams, production, reserves and estimated life of the collieries.
	10. Seam Maps. National Coal Board, Coal Survey. (London: National Coal Board, 1962 onwards). These maps and tables give current information on location, depth, thickness, structure and general characteristics of seams, physical and chemical properties of coals, areas of working, reserves, output and analyses. The series of maps is not complete.
	11. Mapping and Appraisal of the Characteristics of British Coal Seams, Fenton, G.W., Rumsby, P.C. (Mining Engineer, April 1962, Vol. 121, No. 19 454-467)
	12. Coalfields of Great Britain, Trueman, A.E. (London: Edward Arnold, 1954). An account of the geology of coal and of the structure and resources of the coalfields of Great Britain, intended for mining engineers and students of mining and geology..Fully documented.
	13. British Coal Seams - A Review of their Properties with Suggestions for Research, Wandless, A.M., Paper A-1 to the Conference on Science in the Use of Coal, (London: Institute of Fuel, 1958). A review of the characteristics of the seams, and the chemical, physical and mechanical properties of the coals as these affect their marketing.
	14. Coal the World's Major Fossil Fuel. Armstrong, G. (Colliery Guardian, Nov. 1972, Vol. 220, No. 11, 521-522, 527-530). U.K. reserves of coal are assessed from the industrial and commercial viewpoint.
	15. Exploration for Coal off the Coast of Country Durham and its Significance for the Carbonising Industry, Magraw, D., Edwards, A.H. (Coke Oven Managers Yearbook, 1965, 136-152.)
	16. The Oxfordshire Coalfield, Poole, E.G. (Nature, 6.8.1971, Vol. 232, No. 5310, 394-395)
	17. Coal Reserves in the Selby Area, Goosens, R.F. (Mining Engineer, Feb. 1973, No. 149, 237-246)
	18. Scottish Coalfields. The Report of the Scottish Coalfields Committee, Scottish Home Department (Edinburgh: H.M.S.O., 1944). The report includes a description of the coalfields, their geology and characteristics of the coal measures, with figures for reserves and output.
	19. Energy Resources and Utilisation, Section 8 of the Symposium on Natural Resources in Scotland (Edinburgh: Scottish Council. 1961). Scottish reserves of coal. oil, water power and peat are estimated.
	20. The Mineral Wealth of Wales, Thomas, T.M. (Edinburgh: Oliver & Boyd, 1961). Information is given on general geological features, properties of seams and coal, reserves, opencast mines and concealed coal measures in Wales.
	21. The Seams of the South Wales Coalfield - a Monograph, Adams, H.F. (London: Institution of Mining Engineers, 1967).
	22. Concealed Coalfields, Wills, L.J. (London: Blackie, 1956). A Palaeogeographical study of the stratigraphy and tectonics of mid-England in relation to coal reserves.
	23. Transaction of the Institution of Mining Engineers, (London: the Institution, 1889 onward). From time to time papers are published giving information on the progress of coalfield surveys in the U.K. and revising previously published information.
	24. Journal of the Institute of Fuel, (London: the Institute, 1928 onward). Prior to 1950 paper were published periodically giving reviews of the geology, seam characteristics, coal properties, and estimated reserves of various U.K. coalfields.
	25. Establishing the Reliability of Deep Coal Reserves, Rees, P.B. Group IA, Paper No. 4 to Sixth International Mining Congress (Madrid: 1970).
	26. Second Report of the Scottish Peat Committee, Department of Agriculture and Fisheries for Scotland (Edinburgh: H.M.S.O., 1962). The report includes information on Scottish peat resources.
Sweden	1. Hoganas AB, Hoganas
	2. Geological Survey of Sweden
	3. Energiprognosutredningens lagesrapport juli 1973 (Status Report, July 1973, of the ad hoc Government Committee on Energy Forecasting). In Swedish. Reviews Swedish and world energy resources in light of domestic energy forecasts to 1995.
	4. Electricity Supply in Sweden 1975-1990. 1972 Study. In English. Report by Centrala Driftledningen, CDL (Central Operating Management), a joint organization of the fourteen main power producers in Sweden. Survey of proposed types and location of power plants in Sweden.
	5. Angpanneforeningens arsberattelse (Annual report of the Steam Users' Association). In Swedish, 1972. Reviews world resources and prices related to Swedish energy demands. Gives thorough analysis of national energy balance conditions.
	6. Statistisk arsbok for Sverige (Statistical Abstracts of Sweden), Stockholm. Published annually in Swedish (headings also in English) by the Central Bureau of Statistics. Contains general statistical information concerning resources of hydroelectric power, of wood, peat and slate. Latest edition 1973.
Denmark	1. Geological Survey of Denmark
	2. The Danish Heat Society
	3. F. Thogersen. 1942. Danmarks moser. Det danske Hedeselskab.
	4. A. Kroigaard. 1943. Torvemose og torv. Hedeselskabets Tidsskrift
Finland	1. The Report of the Peat Committee 1968. B 63
	2. The State Fuel Center
Norway	1. Sole Norwegian Coal Company.
	2. Norwegian Polar Institute
Ireland	1. Statistical summary of the mineral industry, 1966-1970, I.G.S. London
Eastern Europe	
Poland	1. Ministry of Mining and Energy, Planning Commission of the Council of Ministers, Poland.
Germany, D.R. of	1. Ministerium fur Kohle und Energie der Deutechen Demokratischen Republik
NORTH AMERICA	
Northern America	
United States	1. U.S. Bureau of Mines
	2. U.S. Geological Survey
Canada	1. Mineral Development Sector, Department of Energy, Mines and Resources, Ottawa.

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Name of Continent, Region and Country	Ref. No.
NORTH AMERICA	
Northern America	
Canada	2. Geological Survey of Canada Paper 70-58, 1970.
	3. 1960 Report of Royal Commission on Coal.
	4. An Energy Policy for Canada - 1973, Volume II Appendices
Middle America	
Mexico	1. Mexican National Committee, Data collected and greatly adapted
	2. Consejo de Recursos Naturales no renovalbes Secretaria del Patrimonio Nacional
SOUTH AMERICA	
Tropical South America	
Brazil	1. Conselho Nacional do Petroleo
	2. Biannual Bulletin of the Brazilian National Committee of the WEC
Colombia	1. G. Poveda, Posibilidad de Desarrollo Carbonifero en Colombia, V Congreso Panamericano de Ingerieria Mecanica, Electrica y Ramas Afines (Agosto, 1973)
	2. Stella L. Hincapie y Arturo Diaz Garcia, La Industria del Carbon en Colombia, (1971)
	3. Antonio Barrera Castilla, Energia y Petroleo en Colombia, (Fundacion para la Educacion Superior y Desarrollo, Fedesarrollo, 1973)
	4. Jairo Londono A, Los Carbones de Cerrejon, (Instituto de Fomento Industrial, IFI, 1971)
	5. Instituto Nacional de Investigaciones Geologico-Mineras (Ingeominas).
Temperate South America	
Chile	1. Empresa Nacional del Carbon (Enacar)
Uruguay	1. Usinas y Telefonos del Estado, Division Generacion y Transmision (U.T.E.)
OCEANIA	
Australia & New Zealand	
Australia	1. Department of Minerals and Energy, Australia
	2. Joint Coal Board (N.S.W.), Australia
	3. Queensland Coal Board, Australia
New Zealand	1. New Zealand Geological Survey
	2. New Zealand Mines Department Annual Reports
	3. J.O. Elphuck, "A User's Directory of New Zealand Coals," 1956, N.Z. D.S.I.R. Information Series Bulletin 10

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves									Additional Resources (megatonne)	Total Resources (megatonne)	Recent Annual Production		
			Total Amount in Place (megatonne)	Economically Recoverable Reserves			Deposits		Sulphur Content	Heat Value				Year	Amount (kilotonne)	Basis (Gross or Net)
				Amount (megatonne)	By Surface Mining (%)	of Coking Quality (%)	Maximum Depth (m)	Minimum Seam Thickness (m)		Heat Value	Basis (As Mined or as Burned)					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
AFRICA																
Eastern Africa																
Ethiopia (a,b)																
Begemder (c)	1966	LC	U	U	U	U	250.0	0.100	A	L	-	0.197	U	-	0	-
Wollega, Didessa R.	1966	LC	U	U	U	U	140.0	0.150	U	L	-	U	U	-	0	-
Wollega, Karsa Creek	1966	LN	U	U	U	43.0	U	2.000	U	L	-	U	U	-	0	-
Wollo	1966	LC	U	U	U	U	U	U	U	U	-	U	U	-	0	-
Shoa	1966	LC	U	U	U	U	U	0.100	U	U	-	0.300	U	-	0	-
Eritrea	1966	LC	U	U	U	U	U	0.250	U	L	-	0.008	U	-	0	-
Sidamo	1966	LC	U	U	U	U	U	U	U	U	-	U	U	-	0	-
TOTAL Ethiopia	-	LN	0	0	0	0	-	-	-	-	-	0	0	-	0	-
	-	LC	0	0	0	0	-	-	-	-	-	0.505	0	-	0	-
TOTAL ALL RANKS	-	-	0	0	-	-	-	-	-	-	-	0.505	0	-	0	-
Malawi																
Northern	1960	HC	U	U	U	U	U	U	U	U	-	38.00	38.00	-	0	-
Mozambique (a)																
Entire Nation	1969	BC	100.0	80.00	80.0	40.0	600.0	1.300	-	-	-	300.0	400.0	-	400.0	-
Rhodesia																
Entire Nation	1975	BT	2499	734.0	55.0	58.0	U	U	B	H	-	2500	5000	-	2500	NET
Rwanda (a,b,c)																
Akanyaru	1966	P	1500	-	-	-	35.00	-	-	-	-	-	-	-	-	-
Kabira	1966	P	1.000	-	-	-	7.000	-	-	-	-	-	-	-	-	-
Rugezi	1966	P	500.0	-	-	-	10.00	-	-	L	-	-	-	-	-	-
Cyabaralika	1966	P	3.000	-	-	-	300.0	-	-	L	-	-	-	-	-	-
Kiguhu	1966	P	0.300	-	-	-	3.500	-	-	L	-	-	-	-	-	-
TOTAL Rwanda	-	P	2004	0	0	0	-	-	-	-	-	0	0	-	0	-
Zambia (a)																
Kazinze, Maamba	1974	BT	47.84	26.34	100	0	150.0	2.000	B	L	AM	-	46.00	1974	900.0	NET
Izuma, Maamba	1974	BT	14.00	7.500	100	0	150.0	2.000	B	L	AM	-	28.00	1974	-	NET
Mulungwa & Maze-Sinakumbe	1974	BT	U	U	-	-	-	-	-	-	AM	80.00	154.0	1974	-	NET
TOTAL Zambia	-	BT	61.84	33.84	00.0	0	-	-	-	-	-	80.00	228.0	-	900.0	-
Middle Africa																
Angola																
Cuanza Basin	1916	LN	U	U	-	-	U	U	-	-	AB	U	U	-	0	-
	1926	P	U	U	-	-	U	U	-	L	AB	U	U	-	0	-
Lungue Bungo	1965	LN	U	U	-	-	U	U	-	-	AB	U	U	-	0	-
TOTAL Angola	-	LN	0	0	0	0	-	-	-	-	-	0	0	-	0	-
	-	P	0	0	0	0	-	-	-	-	-	0	0	-	0	-
TOTAL ALL RANKS	-	-	0	0	-	-	-	-	-	-	-	0	0	-	0	-
Zaire (a,b,c)																
Southeast	1920	SB	-	720.0	-	-	-	2.000	B	L	-	-	-	1972	130.0	-
Southern Africa																
South Africa (a,b)																
Entire Nation	1974	AN	118.0	60.00	0	0	500.0	0.700	A	H	AB	626.0	744.0	1974	1435	NET
	1974	BT	32223	13000	11.0	4.00	300.0	1.200	A	M	AB	49051	81274	1974	64621	NET
TOTAL ALL RANKS	-	-	32341	13060	-	-	-	-	-	-	-	49677	82019	-	66056	-
Western Africa																
Ghana																
Entire Nation	-		0	0	-	-	-	-	-	-	-	0	0	-	0	-
Nigeria (a)																
Enugu	1975	SB	35.00	U	0	0	305.0	1.067	A	M	AB	27.00	62.00	1975	258.0	NET
Okaba	1975	SB	54.00	U	20.0	0	305.0	1.067	A	M	AB	19.00	73.00	1975	13.60	NET
TOTAL Nigeria	-	SB	89.00	0	0	0	-	-	-	-	-	46.00	135.0	-	271.6	-
ASIA																
East Asia																
Japan (a)	1973	AN	74.00	11.00	0	0	285.0	1.200	B	M	AM	0	11.00	1974	100.0	NET
	1973	BT	6210	780.0	2.00	50.0	1000	1.400	B	M	AM	0	780.0	1974	-	NET
	1973	SB	1159	142.0	2.00	50.0	1000	1.400	B	M	AM	0	142.0	1974	20200	NET
	1973	BC	1004	75.00	2.00	50.0	1000	1.400	B	M	AM	0	75.00	1974	-	NET
	1973	LN	181.0	18.00	0	0	150.0	0.900	A	L	AM	0	18.00	1974	100.0	NET
TOTAL ALL RANKS	-	-	8628	1026	-	-	-	-	-	-	-	0	1026	-	20400	-
Korea, Rep. of																
Entire Nation	1975	AN	365.5	327.2	U	U	1200	0.500	A	L,M	AM	1068	1434	1974	15199	-
Taiwan (a)																
Entire Nation	1965	BT	659.9	260.7	-	38.0	2000	0.250	ABC	M,H	AB	0	659.9	-	3000	NET
Middle South Asia																
Afghanistan																
Entire Nation	1974		U	U	U	U	U	U	U	U	-	U	U	1974	186.3	-
Bangladesh (a)																
Jarnalganj	1963	BT	688.8	518.6	U	U	357.5	30.50	U	M	-	-	688.8	-	0	-
Faridpur	1957	P	206.6	-	U	U	94.79	1.830	U	-	-	655.3	862.0	-	0	-
Khulna	1962	P	55.10	-	U	U	1.138	1.525	U	-	-	-	55.10	-	0	-
TOTAL Bangladesh	-	BT	688.8	518.6	0	0	-	-	-	-	-	0	688.8	-	0	-
	-	P	261.7	0	0	0	-	-	-	-	-	655.3	917.1	-	0	-
TOTAL ALL RANKS	-	-	950.5	518.6	-	-	-	-	-	-	-	655.3	1606	-	0	-

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves: Total Amount in Place (megatonne)	Economically Recoverable Reserves: Amount (megatonne)	By Surface Mining (%)	of Coking Quality (%)	Deposits: Maximum Depth (m)	Minimum Seam Thickness (m)	Sulphur Content	Heat Value	Heat Value Basis (As Mined or as Burned)	Additional Resources (megatonne)	Total Resources (megatonne)	Recent Annual Production: Year	Amount (kilotonne)	Basis (Gross or Net)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
ASIA																
Middle South Asia																
India (a,b)																
West Bengal	1972	HC	4038	2019	U	24.0	600.0	1.200	A	M	AM	15581	19619	1971	17064	Net
Bihar	1972	HC	10590	5295	U	75.0	600.0	1.200	A	M	AM	24640	35230	1971	33197	Net
Madhya Pradesh	1972	HC	4247	2123	U	2.00	600.0	1.200	A	M	AM	11236	15482	1971	12760	Net
Orissa	1972	HC	895.4	447.7	U	0	600.0	1.200	A	M	AM	4221	5117	1971	1488	Net
Maharashtra	1972	HC	477.9	238.9	U	0	600.0	1.200	A	M	AM	2144	2622	1971	1938	Net
Andhra Pradesh	1972	HC	978.0	489.0	U	0	600.0	1.200	A	M	AM	1077	2055	1971	4450	Net
Assam (c)	1972	HC	139.0	69.50	U	0	600.0	1.200	C	M	AM	688.6	827.6	1971	579.0	Net
Jammu and Kashmir	1972	HC	U	U	U	0	600.0	1.200	A	M	AM	U	U	1971	23.00	Net
	1972	LC	0	0	U	0	600.0	1.200	U	L	AM	8.400	8.400	1971	0	Net
Tamil Nadu	1972	LC	1717	858.5	U	0	600.0	1.200	A	L	AM	202.0	1919	1971	3660	Net
Rajasthan	1972	LC	0	0	U	0	600.0	1.200	B	L	AM	20.30	20.30	1971	0	Net
Gujarat (d)	1972	LC	77.56	38.78	U	0	600.0	1.200	C	L	AM	0	77.56	1971	0	Net
TOTAL India	-	HC	21365	10683	0	42.1	-	-	-	-	-	59588	80952	-	71499	-
	-	LC	1795	897.3	0	0	-	-	-	-	-	230.7	2025	-	3660	-
TOTAL ALL RANKS	-	-	23160	11580	-	-	-	-	-	-	-	59818	82977	-	75159	-
Iran																
Kerman (a)	1972	HC	331.0	-	-	-	150.0	0.500	B	M	-	-	331.0	-	340.0	-
Elburz	1972	HC	36.30	-	-	-	100.0	0.400	B&C	M	-	-	36.30	-	500.0	-
Other Areas	1972	HC	17.70	-	-	-	100.0	0.400	B&C	M	-	-	17.70	-	160.0	-
TOTAL Iran	-	HC	385.0	0	0	0	-	-	-	-	-	0	385.0	-	1000	-
Pakistan (a,b,c)																
Punjab	1972	SB	85.26	85.26	0	0	610.0	0.305	C	L	-	U	85.26	-	272.1	-
Sind	1972	SB	243.1	243.1	0	0	610.0	0.305	C	L	-	U	243.1	-	90.70	-
	1972	BC	243.1	243.1	0	0	610.0	0.305	C	L	-	U	243.1	-	90.70	-
Baluchistan	1972	SB	72.56	72.56	0	0	610.0	0.305	C	L	-	U	72.56	-	725.5	-
NWFP	1972	SB	2.209	1.546	0	0	610.0	0.305	C	L	-	6.893	9.102	-	28.39	-
TOTAL Pakistan	-	SB	403.1	402.4	0	0	-	-	-	-	-	6.893	410.0	-	1117	-
	-	BC	243.1	243.1	0	0	-	-	-	-	-	0	243.1	-	90.70	-
TOTAL ALL RANKS	-	-	646.2	645.5	-	-	-	-	-	-	-	6.893	653.1	-	1207	-
Southeast Asia																
Indonesia (a,b)																
West Sumatra	1974	BT	60.00	37.00	15.0	50.0	300.0	2.000	A	L	AB	140.0	200.0	-	90.00	Net
South Sumatra	1974	SB	144.0	43.00	100	-	85.00	2.000	A	L	AB	270.0	324.0	-	100.0	Net
	1920	LN	1872	U	100	-	U	U	A	L	AB	-	1872	-	-	Net
	1950	BC	88.00	U	100	U	U	U	A	L	AB	-	88.00	-	-	Net
East Kalimantan	1964	BT	38.00	U	U	U	200.0	1.000	A	L	AB	-	38.00	-	-	Net
South Kalimantan	1962	BT	11.00	U	-	U	200.0	1.500	A	L	AB	-	11.00	-	-	Net
TOTAL Indonesia	-	BT	109.0	37.00	15.0	50.0	-	-	-	-	-	140.0	249.0	-	90.00	-
	-	SB	144.0	43.00	00.0	0	-	-	-	-	-	270.0	324.0	-	100.0	-
	-	BC	88.00	0	0	0	-	-	-	-	-	0	88.00	-	0	-
	-	LN	1872	0	0	0	-	-	-	-	-	0	1872	-	0	-
TOTAL ALL RANKS	-	-	2213	80.00	-	-	-	-	-	-	-	410.0	2533	-	190.0	-
Malaysia																
Entire Nation	1973	N	N	N	-	-	-	-	-	-	-	-	-	-	N	-
Philippines																
Luzon	1973	BC	20.19	U	U	U	U	U	U	U	-	U	U	-	U	-
Visayas	1973	BC	58.09	U	U	U	U	U	U	U	-	U	U	-	U	-
Mindanao	1973	BC	12.84	U	U	U	U	U	U	U	-	U	U	-	U	-
TOTAL Philippines	-	BC	91.12	0	0	0	-	-	-	-	-	0	0	-	0	-
Thailand																
Northern	1953	LN	120.0	70.00	58.0	U	U	U	B	L	AB	U	120.0	1975	142.0	NET
	1960	LN	15.00	9.000	60.0	U	U	U	B	M	AB	U	15.00	1975	57.00	NET
Southern	1953	LN	100.0	U	U	U	U	U	C	L	AB	U	100.0	1975	330.0	NET
TOTAL Thailand	-	LN	235.0	79.00	58.2	0	-	-	-	-	-	0	235.0	-	529.0	-
Vietnam, Rep. of																
Central Plateau	U	N	12.00	U	U	U	-	U	BC	M	-	U	U	-	U	-
Mekong Delta	U	N	U	U	U	U	-	U	A	M	-	U	U	-	U	-
TOTAL Vietnam, Rep. of	-	N	12.00	0	0	0	-	-	-	-	-	0	0	-	0	-
Southwest Asia																
Israel																
Entire Nation	1972		0	0	-	-	-	-	-	-	-	0	0	-	0	-
Turkey (a,b)																
Black Sea	1974	HC	191.1	133.7	0	80.0	1200	0.800	A	M	-	1100	1291	-	4965	GROSS
	1974	LC	27.50	U	U	0	U	U	B	L	-	10.00	90.90	-	8.000	GROSS
Marmora	1974	LC	1194	U	U	0	U	U	B	L	-	308.4	1503	-	7239	GROSS
Aegean	1974	LC	161.9	U	U	0	U	U	B	L	-	85.00	246.9	-	80.00	GROSS
Mediterranean	1974	LC	81.37	U	U	0	U	U	B	L	-	33.43	114.8	-	553.0	GROSS
Inner Anatolia	1974	LC	2.300	U	U	0	U	U	B	L	-	2.700	5.000	-	20.00	GROSS
Southeastern Anatolia	1974	LC	3268	U	U	0	U	U	B	L	-	9.500	3277	-	158.0	GROSS
Eastern Anatolia	1974	LC	87.00	U	U	0	U	U	B	L	-	3.900	90.90	-	43.00	GROSS
TOTAL Turkey	-	HC	191.1	133.7	0	80.0	-	-	-	-	-	1100	1291	-	4965	-
	-	LC	4822	0	0	0	-	-	-	-	-	453.0	5328	-	8101	-
TOTAL ALL RANKS	-	-	5013	133.7	-	-	-	-	-	-	-	1553	6619	-	13066	-

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Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves: Total Amount in Place (megatonne)	Known Reserves: Economically Recoverable Reserves: Amount (megatonne)	Economically Recoverable Reserves: By Surface Mining (%)	Economically Recoverable Reserves: of Coking Quality (%)	Deposits: Maximum Depth (m)	Deposits: Minimum Seam Thickness (m)	Sulphur Content	Heat Value: Heat Value	Heat Value: Basis (As Mined or as Burned)	Additional Resources (megatonne)	Total Resources (megatonne)	Recent Annual Production: Year	Recent Annual Production: Amount (kilotonne)	Recent Annual Production: Basis (Gross or Net)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
EUROPE-ASIA																
Northern																
USSR																
Entire Nation	-		-	-	-	-	-	-	-	-	-	-	-	1974	684002	-
	1974	HC	107902	U	U	U	1000	0.600	ABC	M	-	1608822	716710	1974	-	-
	1974	LC	168802	U	U	U	430.0	0.800	ABC	L	-	3824954	3993757	1974	-	-
TOTAL USSR	-	-	276704	0	-	-	-	-	-	-	-	5433776	4710467	-	684002	-
EUROPE																
Eastern Europe																
Bulgaria																
East	1972	BT	29.00	29.00	-	-	3.000	0.500	B	L	-	5.000	34.00	-	500.0	-
West	1972	BC	346.0	346.0	-	-	20.00	0.700	B	L	-	110.0	456.0	-	8000	-
South-East	1972	LN	4012	4012	100	-	15.00	10.00	C	L	-	730.0	4742	-	20000	-
TOTAL Bulgaria	-	-	4387	4387	-	-	-	-	-	-	-	845.0	5232	-	28500	-
Germany, D.R. of																
Cottbus	1974	BC	C	C	100	0	150.0	2.000	B	L	-	0	C	-	133000	-
Halle/Leipzig	1974	BC	C	C	100	0	150.0	2.000	C	L	-	0	C	-	111000	-
TOTAL Germany, D.R. of	-	BC	0	0	0	0	-	-	-	-	-	0	0	-	244000	-
Poland (a,b)																
Entire Nation	1972	HC	C	C	0	30.0	1000	1.000	B	H	-	C	C	1972	150700	Gross
	1972	BC	C	C	99.5	0	300.0	3.000	B	H	-	C	C	1972	38200	Gross
TOTAL ALL RANKS	-	-	0	0	-	-	-	-	-	-	-	0	0	-	188901	-
Northern Europe																
Denmark (a)																
Central Jutland (b)	1970	BC	0.020	0.020	100	0	10.00	2.000	BC	L	-	0	0.020	1972	0	-
(c)	1958	P	561.0	0	0	0	3.500	0.300	A	L	-	0	561.0	1972	0	-
Funen	1958	P	0	0	-	-	-	-	-	-	-	0	0	1972	0	-
Seeland	1958	P	0	0	-	-	-	-	-	-	-	0	0	1972	)	-
TOTAL Denmark	-	BC	0.020	0.020	00.0	0	-	-	-	-	-	0	0.020	-	0	-
	-	P	561.0	0	0	0	-	-	-	-	-	0	561.0	-	0	-
TOTAL ALL RANKS	-	-	561.0	0.020	-	-	-	-	-	-	-	0	561.0	-	0	-
Finland (a,b,c)																
Entire Nation	1975	P	18000	2340	100	U	5.000	1.000	A	L	AB	0	18000	1975	726.0	-
Iceland (a)																
Entire Nation	1973	P	U	-	-	-	-	-	-	-	-	-	-	-	-	-
	1973	LN	U	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL ALL RANKS	-	-	0	0	-	-	-	-	-	-	-	0	0	-	0	-
Ireland																
Entire Nation	1974	AN	10.50	6.500	90.0	10.0	300.0	0.300	A	L	-	6.500	17.00	1974	67.00	-
	1974	SB	18.20	5.000	98.0	2.00	100.0	0.500	A	L	-	20.00	38.20	1974	-	-
TOTAL ALL RANKS	-	-	28.70	11.50	-	-	-	-	-	-	-	26.50	55.20	-	67.00	-
Norway (a)																
Svalbard	1975	BT	30.00	24.00	0	24.0	500.0	0.600	B	H	AM	150.0	180.0	1975	4100	NET
Sweden (a)																
Entire Nation	1975	SB	60.00	200.0	0	0	190.0	0.750	A	L	AM	0	60.00	-	100.0	-
United Kingdom (a,b,c)																
Scotland	1975	BT	11847	246.9	9.00	13.0	1220	0.610	A	M	AB	-	13523	1975	12192	NET
Northern England	1975	BT	10952	455.2	9.00	84.0	1220	0.610	B	M	AB	5110	16063	1975	13283	NET
Central	1975	BT	45110	2812	3.00	52.0	1220	0.610	B	M	AB	46025	91135	1975	84328	NET
South Wales	1975	BT	25105	322.1	7.00	57.0	1220	0.610	B	M,H	AB	355.6	25461	1975	11176	NET
Southern England	1975	BT	7661	50.80	0	93.0	1220	0.610	B	M,H	AB	9733	17394	1975	1016	NET
TOTAL United Kingdom	-	BT	100676	3887	4.38	54.2	-	-	-	-	-	61224	163576	-	127000	-
Southern Europe																
Italy (a)																
Mainland	1972	LN	70.00	30.20	100	0	150.0	0.030	A	L	AM	0	70.00	1974	1963	NET
Sardinia (b)	1972	LC	40.00	N	0	0	U	U	C	L	AM	0	40.00	1974	N	NET
TOTAL Italy	-	-	110.0	30.20	-	-	-	-	-	-	-	0	110.0	-	1963	-
Portugal (a)																
Entire Nation	1972	AN	15.00	U	U	0	300.0	1.000	A	L	-	U	U	1972	250.0	Net
	1972	LN	27.00	25.00	93.0	0	100.0	1.000	B	M	-	U	U	1972	0	Net
TOTAL ALL RANKS	-	-	42.00	25.00	-	-	-	-	-	-	-	0	0	-	250.0	-
Spain																
Zocalo Herniciano	1970	LN	360.0	325.0	100	0	200.0	200.0	C	L	-	54.00	414.0	1972	450.0	-
Astur Pirenaica	1970	AN	442.0	346.0	0	0	500.0	0.400	A	M	-	227.0	669.0	1972	2860	-
	1970	BT	140.0	99.00	3.00	20.0	300.0	0.500	B	M	-	244.0	384.0	1972	1510	-
	1970	SB	676.0	453.0	0	46.0	900.0	0.500	B	M	-	624.0	1300	1972	5930	-
Costera Catalana	1970	LN	160.0	120.0	0	0	500.0	1.200	C	L	-	0	160.0	1972	630.0	-
Iberica	1970	LN	300.0	210.0	5.00	0	300.0	1.400	C	L	-	150.0	450.0	1972	1790	-
Valle del Ebro	1970	AN	1.500	1.000	0	0	200.0	0.600	U	U	-	1.500	3.000	1972	0	-
	1970	LN	40.00	30.00	0	0	200.0	0.700	C	L	-	0	40.00	1972	90.00	-
Sierra Morena	1970	AN	10.00	7.000	0	0	300.0	0.600	A	M	-	0	10.00	1972	160.0	-
	1970	SB	2.000	1.000	0	0	500.0	1.000	A	L	-	2.000	4.000	1972	30.00	-
	1970	BC	23.00	15.00	38.0	0	400.0	0.800	A	L	-	9.000	32.00	1972	580.0	-
Baleares	1970	LN	15.00	10.00	0	0	200.0	1.500	C	L	-	15.00	30.00	1972	120.0	-
Betica	1970	LN	32.00	26.00	20.0	0	100.0	1.800	B	L	-	34.00	66.00	1972	0	-
TOTAL Spain	-	AN	453.5	354.0	0	0	-	-	-	-	-	228.5	682.0	-	3020	-
	-	BT	140.0	99.00	3.00	20.0	-	-	-	-	-	244.0	384.0	-	1510	-

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves: Total Amount in Place (mega-tonne)	Economically Recoverable Reserves: Amount (mega-tonne)	By Surface Mining (%)	of Coking Quality (%)	Deposits: Maximum Depth (m)	Minimum Seam Thickness (m)	Sulphur Content	Heat Value: Heat Value	Basis (As Mined or as Burned)	Additional Resources (mega-tonne)	Total Resources (mega-tonne)	Recent Annual Production: Year	Amount (kilo-tonne)	Basis (Gross or Net)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(15)	(17)
EUROPE																
Southern Europe																
Spain																
TOTAL Spain	-	SB	678.0	454.0	0	45.9	-	-	-	-	-	626.0	1304	-	5960	-
	-	BC	23.00	15.00	38.0	0	-	-	-	-	-	9.000	32.00	-	580.0	-
	-	LN	907.0	721.0	47.3	0	-	-	-	-	-	253.0	1160	-	3070	-
TOTAL ALL RANKS	-	-	2202	1643	-	-	-	-	-	-	-	1361	3562	-	14140	-
Yugoslavia																
Entire Nation	1971	SB	82.00	70.00	-	-	500.0	0.500	C	M	-	22.00	104.0	1972	600.0	-
	1971	BC	1761	1500	20.0	-	400.0	1.500	B	L	-	273.0	2034	1972	9200	-
	1971	LN	16133	15300	80.0	-	130.0	20.00	B	L	-	3480	19613	1972	21200	-
TOTAL ALL RANKS	-	-	17976	16870	-	-	-	-	-	-	-	3775	21751	-	31000	-
Western Europe																
Austria (a)																
Bohemian Massif	1975	LN	3.000	0	100	0	20.00	0.500	B	L	AB	0	3.000	1975	0	GROSS
Tertiary Foreland	1975	BC	72.00	20.00	0	0	200.0	1.200	A	L	AB	25.00	97.00	1975	960.0	GROSS
Tertiary Basins	1975	BC	134.0	84.00	50.0	0	1500	1.000	B	L	AB	134.0	268.0	1975	2440	GROSS
Palaogene Mesozoic Alps	1975	SB	4.000	0	0	0	1200	0.400	B	M	AB	6.000	10.00	1975	0	GROSS
TOTAL Austria	-	SB	4.000	0	0	0	-	-	-	-	-	6.000	10.00	-	0	-
	-	BC	206.0	104.0	40.4	0	-	-	-	-	-	159.0	365.0	-	3400	-
	-	LN	3.000	0	0	0	-	-	-	-	-	0	3.000	-	0	-
TOTAL ALL RANKS	-	-	213.0	104.0	-	-	-	-	-	-	-	165.0	378.0	-	3400	-
Belgium																
Bassin du Sud	1973	HC	21.73	16.69	U	U	U	U	U	U	-	4.023	25.75	-	2645	-
Bassin de Campine	1973	HC	168.8	114.6	U	U	U	U	U	U	-	58.30	227.1	-	7100	-
TOTAL Belgium	-	HC	190.5	131.3	0	0	-	-	-	-	-	62.32	252.9	-	9745	-
France (a)																
Nord	1975	HC	444.7	60.80	0	46.0	1100	1.000	A	M	AM	0	444.7	1974	9000	NET
Lorraine	1975	HC	792.8	343.8	0	90.0	1250	0.700	A	M	AM	0	792.0	1974	9100	NET
Centre-Midi	1975	HC	88.20	59.90	28.0	30.0	1000	2.000	A	M	AM	0	85.20	1974	4800	NET
Provence	1975	SB	24.80	13.20	0	0	600.0	2.000	B	L	AM	0	24.80	1974	1600	NET
Jura	1975	HC	0	0	0	100	1000	2.000	A	M	AM	200.0	200.0	1974	0	NET
TOTAL France	-	SB	24.80	13.20	0	0	-	-	-	-	-	0	24.80	-	1600	-
	-	HC	1326	464.5	3.61	76.5	-	-	-	-	-	200.0	1522	-	22900	-
TOTAL ALL RANKS	-	-	1351	477.7	-	-	-	-	-	-	-	200.0	1547	-	24500	-
Germany, F. R. of (a,b)																
Ruhr	1971	HC	39001	26000	0	60.0	1500	0.600	A/B	-	AM	175003	214003	1975	81800	-
Saar	1971	HC	3000	2800	0	60.0	1500	0.600	A/B	-	AM	2500	5500	1975	9000	-
Aachen	1971	HC	1700	900.0	0	60.0	1500	0.600	A/B	-	AM	8800	10500	1975	6000	-
Ibbenburen	1971	HC	300.0	300.0	0	60.0	1500	0.600	A/B	-	AM	-	300.0	1975	2000	-
Rheinland	1975	BC	55001	9400	100	-	450.0	6.000	A	L	AM	-	55001	1975	107400	-
Hessen	1975	BC	60.00	45.00	80.0	-	100.0	3.000	A/B	L	AM	330.0	60.00	1975	3100	-
Niedersachsen	1975	BC	400.0	66.00	100	-	100.0	3.000	B	L	AM	-	730.0	1975	4900	-
	1972	P	-	640.0	100	2.50	12.00	2.000	A	L	AM	-	640.0	1975	180.0	-
Bayern	1975	BC	60.00	60.00	100	-	50.00	2.000	A	L	AM	-	60.00	1975	8000	-
Other	1972	P	-	260.0	100	1.00	12.00	2.000	A	L	AM	-	260.0	1975	40.00	-
TOTAL Germany, F. R. of	-	BC	55521	9571	99.9	0	-	-	-	-	-	330.0	55851	-	123400	-
	-	P	0	900.0	00.0	2.07	-	-	-	-	-	0	900.0	-	220.0	-
	-	HC	44001	30000	0	60.0	-	-	-	-	-	186303	230303	-	98800	-
TOTAL ALL RANKS	-	-	99521	40472	-	-	-	-	-	-	-	186633	287054	-	222421	-
Netherlands (a)																
Entire Nation	1975		-	-	-	-	-	-	-	-	-	-	-	1975	0	-
NORTH AMERICA																
Middle America																
Guatemala																
Entire Nation	U	LN	U	U	U	U	U	U	ABC	U	-	U	U	-	0	-
Mexico (a)																
Altiplanicie Mexicana	1975	HC	912.0	638.0	0	85.0	500.0	1.000	B	L,M	AB	U	U	1975	6000	GROSS
Litoral de Pacifico	1975	HC	22.00	16.00	0	0	300.0	0.700	B	M	AB	U	U	1975	0	GROSS
Sierra Madre del Sur	1975	HC	63.00	44.00	0	0	300.0	0.700	B	M	AB	U	U	1975	0	GROSS
TOTAL Mexico	-	HC	997.0	698.0	0	77.7	-	-	-	-	-	0	0	-	6000	-
Panama																
Entire Nation	-		0	0	-	-	-	-	-	-	-	0	0	-	0	-
Northern America																
Canada (a)																
British Columbia	1970	BT	6340	3613	7.00	U	-	1.524	A	M	AM	46720	53060	1974	7595	net
	1970	LN	308.4	246.7	100	0	-	0.914	A	L	AM	544.2	852.6	1974	-	net
Alberta	1970	BT	888.9	507.0	7.00	U	-	1.524	A	M	AM	32942	33831	1974	328.8	net
	1970	SB	1107	885.2	75.0	0	-	0.914	A	L	AM	7873	8979	1974	5075	net
Saskatchewan	1970	LN	1107	4114	100	0	-	0.914	A	L	AM	-	5143	1974	3485	net
New Brunswick	1973	BT	5143	7.256	100	0	-	0.305	C	M	AM	-	9.070	1974	376.4	net
Nova Scotia	1973	BT	9.070	67.12	0	U	-	0.914	B	M	AM	1043	1161	1974	1279	net
TOTAL Canada	-	BT	12381	4195	7.05	0	-	-	-	-	-	80705	88061	-	9579	-
	-	SB	1107	885.2	75.0	0	-	-	-	-	-	7873	8979	-	5075	-
	-	LN	1415	4361	00.0	0	-	-	-	-	-	544.2	5995	-	3485	-
TOTAL ALL RANKS	-	-	14902	9441	-	-	-	-	-	-	-	89122	103035	-	18138	-
Greenland (a)																
Entire Nation	1972	HC	U	0	0	0	-	-	U	U	-	U	U	-	4.300	-

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves: Total Amount in Place (megatonne)	Known Reserves: Economically Recoverable Reserves: Amount (megatonne)	Known Reserves: Economically Recoverable Reserves: By Surface Mining (%)	Known Reserves: Economically Recoverable Reserves: of Coking Quality (%)	Known Reserves: Deposits: Maximum Depth (m)	Known Reserves: Deposits: Minimum Seam Thickness (m)	Sulphur Content	Heat Value: Heat Value	Heat Value: Basis (As Mined or as Burned)	Additional Resources (megatonne)	Total Resources (megatonne)	Recent Annual Production: Year	Recent Annual Production: Amount (kilotonne)	Recent Annual Production: Basis (Gross or Net)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
NORTH AMERICA																
Northern America																
United States (a,b)																
New England	1975	AN	0	0	0	0	305.0	0.700	A	M	AM	0	0	1974	0	NET
Mid Atlantic	1975	AN	6458	3229	1.00	0	305.0	0.700	A	H	AM	13870	20328	1974	5442	NET
	1975	BT	21659	10830	5.00	100	305.0	0.700	B	H	AM	39962	61622	1974	72560	NET
South Atlantic	1975	AN	125.2	62.58	0	0	305.0	0.700	A	M	AM	178.7	303.8	1974	0	NET
	1975	BT	40073	20037	14.0	89.0	305.0	0.700	AB	H	AM	65354	105427	1974	126073	NET
E.North Central	1975	BT	88417	44208	18.0	11.0	305.0	0.700	C	M	AM	228028	316445	1974	115193	NET
E.South Central	1975	BT	25834	12917	27.0	48.0	305.0	0.700	B	H	AM	119411	145245	1974	149655	NET
	1975	LN	931.5	465.3	100	0	36.60	1.500	A	L	AM	882.5	1814	1974	0	NET
W.North Central	1975	BT	12480	6240	35.0	0	305.0	0.700	C	M	AM	70824	83304	1974	5442	NET
	1975	LN	14903	7451	100	0	36.60	1.500	A	L	AM	469242	484145	1974	6349	NET
W.South Central	1975	AN	87.07	43.54	0	0	305.0	0.700	B	H	AM	301.1	388.2	1974	0	NET
	1975	BT	1661	829.9	36.0	79.0	305.0	0.700	B	H	AM	29906	31566	1974	2721	NET
	1975	LN	2997	1498	100	0	36.60	1.500	B	L	AM	111959	114956	1974	7256	NET
Mountain	1975	AN	27.21	13.61	0	0	305.0	0.700	A	H	AM	47.16	74.37	1974	0	NET
	1975	BT	19794	9897	6.00	14.0	305.0	0.700	A	M	AM	418185	437979	1974	12698	NET
	1975	SB	141889	70944	39.0	0	305.0	1.500	A	M	AM	1171586	1313474	1974	44443	NET
	1975	LN	6438	3219	100	0	36.60	1.500	A	L	AM	187491	193929	1974	0	NET
Pacific Coast	1975	AN	0	0	0	0	305.0	0.700	A	H	AM	4.535	4.535	1974	0	NET
	1975	BT	228.6	114.3	0	40.0	305.0	0.700	A	M	AM	33264	33493	1974	0	NET
	1975	SB	1538	769.1	29.0	0	305.0	1.500	A	M	AM	11700	13239	1974	3628	NET
	1975	LN	7.256	3.628	100	0	36.60	1.500	B	L	AM	140.6	147.8	1974	0	NET
Alaska	1975	AN	0	0	0	0	305.0	0.700	A	H	AM	0	0	1974	0	NET
	1975	BT	1089	544.2	100	0	305.0	0.700	A	M	AM	48263	49353	1974	0	NET
	1975	SB	9473	4736	50.0	0	305.0	1.500	A	M	AM	181602	191074	1974	907.0	NET
TOTAL United States	-	AN	6697	3349	0.96	0	-	-	-	-	-	14401	21099	-	5442	-
	-	BT	211237	105616	17.4	39.6	-	-	-	-	-	1053197	1264432	-	484338	-
	-	SB	152899	76449	39.6	0	-	-	-	-	-	1364887	1517786	-	48978	-
	-	LN	25276	12637	00.0	0	-	-	-	-	-	769715	794992	-	13605	-
TOTAL ALL RANKS	-	-	396110	198051	-	-	-	-	-	-	-	3202198	3598305	-	552363	-
OCEANIA																
Australia & New Zealand																
Australia (a,b)																
Western	1975	SB	1907	390.0	48.0	0	300.0	2.000	A	L	-	0	1907	-	2100	-
Central	1975	SB	730.0	730.0	100	0	100.0	1.000	B	L	-	2310	3040	-	1900	-
	1975	LN	400.0	400.0	100	0	100.0	1.200	C	L	-	600.0	1000	-	0	-
Eastern	1974	BT	31797	16514	13.0	66.0	600.0	1.000	A	MH	-	180176	211973	-	62700	-
	1974	SB	305.0	200.0	100	0	200.0	4.500	A	L	-	10395	10700	-	0	-
	1975	BC	66701	30000	100	0	700.0	3.000	A	L	-	54501	121202	-	27400	-
TOTAL Australia	-	BT	31797	16514	13.0	66.0	-	-	-	-	-	180176	211973	-	62700	-
	-	SB	2942	1320	84.6	0	-	-	-	-	-	12705	15647	-	4000	-
	-	BC	66701	30000	00.0	0	-	-	-	-	-	54501	121202	-	27400	-
	-	LN	400.0	400.0	00.0	0	-	-	-	-	-	600.0	1000	-	0	-
TOTAL ALL RANKS	-	-	101840	48235	-	-	-	-	-	-	-	247981	349822	-	94100	-
New Zealand (a,b)																
Northern	1974	SB	306.2	139.0	65.5	0	305.0	1.200	A-B	M	AM	232.0	538.0	1973	1579	GROSS
Western	1974		66.30	51.00	72.0	85.0	800.0	1.200	A-C	M-H	AM	63.00	130.0	1973	469.0	GROSS
Southern	1974	BT	-	-	-	100	305.0	1.200	B	M	AM	0.100	0.100	1973	-	GROSS
	1974	SB	79.00	38.00	12.0	0	-	1.200	L-M	L-M	AM	23.00	61.00	1973	298.0	GROSS
	1974	LN	34.00	34.00	100	0	50.00	1.200	A-B	L-M	AM	186.7	152.7	1973	139.0	GROSS
TOTAL New Zealand	-	BT	0	0	0	0	-	-	-	-	-	0.100	0.100	-	0	-
	-	SB	385.2	177.0	54.0	0	-	-	-	-	-	255.0	599.0	-	1877	-
	-	LN	34.00	34.00	00.0	0	-	-	-	-	-	186.7	152.7	-	139.0	-
TOTAL ALL RANKS	-	-	485.5	262.0	-	-	-	-	-	-	-	504.8	881.8	-	2485	-
Polynesia																
Western Samoa																
Entire Nation	1959	N	N	N	-	-	-	-	-	-	-	N	N	-	N	-
SOUTH AMERICA																
Temperate South America																
Argentina (a,b,c)																
Patagonia	1974	SB	150.0	100.0	66.0	N	600.0	8.000	A	M	AB	350.0	500.0	1972	1200	-
(c)	1974	P	90.00	U	U	0	10.00	U	A-B	L	AB	50.00	140.0	1972	0	-
Other	1974	SB	5.000	U	U	N	U	U	A-B	M	AB	U	5.000	1972	0	-
TOTAL Argentina	-	SB	155.0	100.0	66.0	0	-	-	-	-	-	350.0	505.0	-	1200	-
	-	P	90.00	0	0	0	-	-	-	-	-	50.00	140.0	-	0	-
TOTAL ALL RANKS	-	-	245.0	100.0	-	-	-	-	-	-	-	400.0	645.0	-	1200	-
Chile (a)																
Central	1972	BT	45.00	32.00	0	25.0	1000	0.750	B-C	M	AM	245.0	290.0	1972	1500	Net
	1972	SB	2.000	1.000	0	0	100.0	1.000	A	L	AM	3.000	5.000	1972	50.00	Net
Southern	1969	SB	50.00	25.00	2.00	0	500.0	2.000	A	L	AM	3600	3650	1972	0	Net
TOTAL Chile	-	BT	45.00	32.00	0	25.0	-	-	-	-	-	245.0	290.0	-	1500	-
	-	SB	52.00	26.00	1.92	0	-	-	-	-	-	3603	3655	-	50.00	-
TOTAL ALL RANKS	-	-	97.00	58.00	-	-	-	-	-	-	-	3848	3945	-	1550	-

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

Name of Continent, Region, Country and National Subdivision	Year of Ref.	Rank of Fuel	Known Reserves: Total Amount in Place (mega-tonne)	Known Reserves: Economically Recoverable Reserves: Amount (mega-tonne)	Known Reserves: Economically Recoverable Reserves: By Surface Mining (%)	Known Reserves: Economically Recoverable Reserves: of Coking Quality (%)	Known Reserves: Deposits: Maximum Depth (m)	Known Reserves: Deposits: Minimum Seam Thickness (m)	Known Reserves: Sulphur Content	Known Reserves: Heat Value: Heat Value	Known Reserves: Heat Value: Basis (As Mined or as Burned)	Additional Resources (mega-tonne)	Total Resources (mega-tonne)	Recent Annual Production: Year	Recent Annual Production: Amount (kilo-tonne)	Recent Annual Production: Basis (Gross or Net)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOUTH AMERICA																
Temperate South America																
Uruguay (a)																
Coastal Region	1969	P	10.00	10.00	100	-	6.000	0.300	A	L	AM	0	0	1973	0	-
Tropical South America																
Brazil																
Southeast	1974	SB	1.000	U	U	U	U	U	U	U	AB	U	1.000	1974	5490	GROSS
South	1974	SB	3255	U	U	U	300.0	0.600	C	M	AB	U	3255	1974	0	GROSS
TOTAL Brazil	-	SB	3256	0	0	0	-	-	-	-	-	0	3256	-	5490	-
Colombia (a)	-	BT	-	-	-	-	-	-	-	-	AB	-	-	1971	3800	Gross
Caribbean Coast	1971	SB	110.0	81.00	100	N	700.0	1.200	A	H	AB	115.0	225.0	1971	0	Gross
Andes	1971	BT	40.00	28.00	N	U	U	0.600	A	H	AB	3220	3260	1971	U	Gross
	1971	SB	U	U	U	U	U	U	B	H	AB	615.0	615.0	1971	U	Gross
	1971	LC	U	U	U	0	U	U	U	L	AB	1230	1230	1971	U	Gross
TOTAL Colombia	-	BT	40.00	28.00	0	0	-	-	-	-	-	3220	3260	-	3800	-
	-	SB	110.0	81.00	00.0	0	-	-	-	-	-	730.0	840.0	-	0	-
	-	LC	0	0	0	0	-	-	-	-	-	1230	1230	-	0	-
TOTAL ALL RANKS	-	-	150.0	109.0	-	-	-	-	-	-	-	5180	5330	-	3800	-
Ecuador (a)																
Entire Nation	1973		3.000	-	-	-	-	-	-	-	-	-	3.000	1973	0	-
Peru (a)																
Entire Nation	1973	AN	270.0	77.00	U	-	U	1.600	A	M	-	-	281.0	-	-	-
Venezuela (a)																
Nancual	1975	BT	60.00	48.00	-	60.0	350.0	2.000	A	H	AM	-	60.00	1975	15.00	GROSS
Zulia	1975	BT	5000	4000	50.0	80.0	900.0	1.000	A	H	AM	10000	15000	1975	-	GROSS
Los Andes	1975	BT	100.0	80.00	90.0	90.0	20.00	1.300	A	H	AM	100.0	200.0	1975	60.00	GROSS
TOTAL Venezuela	-	BT	5160	4128	50.2	80.0	-	-	-	-	-	10100	15260	-	75.00	-

TABLE 2A. DEFINITIONS OF SOLID FUEL RANKINGS
TABLEAU 2A. CARACTERISTIQUES DES TYPES DE COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Higher Ranking Solid Fuels						Lower Ranking Solid Fuels					
	Rank	Carbon Content (%)	Volatile Matter (%)	Moisture Content (%)	Ash Content (%)	Other	Rank	Carbon Content (%)	Volatile Matter (%)	Moisture Content (%)	Ash Content (%)	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
AFRICA												
Eastern Africa												
Mozambique	HC	-	16-20	-	14-25	-						
Rhodesia	BT	66	23	1	10	-						
Rwanda							P	-	-	-	-	-
Zambia	BT	-	20-28	-	16-25	-						
Middle Africa												
Angola							P	U	U	U	U	-
							LN	38	40	15	7	-
Zaire	BT	47-63	31-41	6-7	13-21	-						
Southern Africa												
South Africa	AN	78	7.5	1.5	11	-						
	BT	55	25	2.5	15	-						
Western Africa												
Nigeria	SB	22-51	28-46	3-17	4-43	-	LN	24-37	37-51	8-23	8-25	-
ASIA												
East Asia												
Taiwan	BT	43-69	25-57	4-10	6-24	-						
Middle South Asia												
Bangladesh	-	-	-	-	-	-	-	-	-	-	-	-
India (e)	HC	<92	14-45	1-15	8-50	-	LC	16-48	24-53	18-53	3.5-20	-
Southeast Asia												
Indonesia	HC	40-50	3-45	-	<5	-	LC	40-45	35-40	-	<3	-
Thailand							LN	68.6	37.4	31.5	15.8	-
							LN	64.1	41.1	28.0	11.0	-
							LN	U	47.1	19.8	8.6	-
Southwest Asia												
Turkey	HC	48-60	25-33	2-13	9-15	-	LC	15-35	21-40	12-38	15-50	-
EUROPE												
Eastern Europe												
Poland	HC	72-90	20-32	1-25	22-40	-	BC	66-72	52-65	53-54	8-22	-
Northern Europe												
Denmark							P	59	-	90	1-30	-
Finland							P	50-60	60-70	45	3	-
Norway	BT	83	42.5	2	8	-						
Sweden	SB	30	20	16	34	-						
United Kingdom	BT	-	9.1-47	-	-	-						
	AN	-	<9.1	-	-	-						
Southern Europe												
Italy							LN	15-20	16-17	44-45	14-18	-
							LC	37	17	10	36	-
Portugal	AN	53	4	4	39	-	LN	17	18	61	4	-
Yugoslavia	SB	-	<40	<10	-	-	BC	-	-	10-30	-	-
							LN	-	-	>30	-	-
Western Europe												
Austria							LN	33-37	30-33	34-37	7-20	-
							BC	41	25-34	8-10	15-35	-
Germany, F. R. of	HC	-	8-45	-	-	-	BC	15-22	17-26	45-60	0.5-8	-
							P	40	40-45	30-40	3-10	-
NORTH AMERICA												
Middle America												
Mexico	HC	32-40	15-18	-	30-35	-						
Northern America												
Canada	SB	<69	>31	-	-	-	LN	<69	>31	-	-	-
	BT	69-92	14-31	-	-	-						
United States	AN	86-98	2-14	-	-	-	LN	-	-	-	-	-
	BT	69-86	14-31	-	-	-						
	SB	-	-	-	-	-						
OCEANIA												
Australia & New Zealand												
Australia	BT	40-70	10-30	0-10	20-30	-	BC	12-25	10-30	40-70	0-10	-
	SB	25-50	20-50	10-40	10-20	-	LN	32	43	12	13	-
New Zealand	SB	38-45	36-39	8-24	5-14	-	LN	25-37	32-35	19-51	3-14	-
	BT	46-72	22-40	1-12	1-6	-						
SOUTH AMERICA												
Temperate South America												
Argentina	SB	38	32	10	20	-						
Chile	BT	45-55	40-45	2-3	5-10	-						
	SB	35-40	30-35	15-25	10-15	-						
Uruguay							P	26.44	65.08	13.00	7.55	-
Tropical South America												
Brazil	SB	35-50	20-40	5-15	15-50	-						
Colombia	AN	>69	2-14	-	-	-	LN	<69	>33	-	-	-
	BT	-	14-33	-	-	-						
	SB	<69	>33	-	-	-						
Venezuela	BT	-	-	-	-	-						

TABLE 2B. OTHER SOLID FUELS
TABLEAU 2B. AUTRES COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Year of Ref.	Type of Material	Amount Burned (Gg)	Approximate Energy Unit (MJ/kg)	Approximate Content Total (TJ)	Comments on Plans for Future Use
(1)	(2)	(3)	(4)	(5)	(6)	(7)
AFRICA						
Eastern Africa						
Ethiopia	1972	Wood	25286	U	U	-
	1972	Dung	U	U	U	-
Rhodesia	1975	Wood	U	U	U	-
Zambia	-	charcoal	U	U	U	Wood and charcoal are intensively used for domestic purposes.
	-	wood	U	U	U	-
Southern Africa						
South Africa	-	All	N	-	N	-
Western Africa						
Nigeria	U	Wood	U	U	U	-
ASIA						
Middle South Asia						
Bangladesh	-	-	-	-	-	-
India (f)	1969	Dung	49400	U	544000	-
	1969	Firewood	142000	U	3728000	-
	1969	Veg. waste	34200	U	900000	-
Southeast Asia						
Thailand	1975	Wood	1100	-	1860	The use of paddy husk, wood and charcoal is expected to decline and be replaced by more plentiful supplies of lignite, oil and electricity.
	1975	Charcoal	200.0	-	1360	-
	1975	Bagasse	3300	-	26300	-
	1975	Paddy Husk	300.0	-	1630	-
Southwest Asia						
Turkey	1974	Wood	14500	12.60	182700	Efforts are being made to substitute lignite with a low heat value for wood and dung in the future.
	1974	Dung	16324	9.600	157700	-
EUROPE						
Eastern Europe						
Poland	1972	Peat and Wood	1400	29.30	41000	-
Northern Europe						
Finland	-	Wood pulping waste (c)	-	-	67000	-
	-	Municipal Waste (c)	-	-	600.0	-
Norway	1975	Peat	-	-	-	Reserves of peat for fuel are estimated at 2000 megatonnes (17600GJ). Annual production amounts to 25000 tonnes (air dried 40-50% moisture) used as growth media and soil improvement. Fuel use is very small.
Sweden	1952	Peat	0	-	-	Peat reserves estimated at 9400 megatonnes are unlikely to be used as fuel.
Western Europe						
Austria	1975	Wood	1200	-	18000	Burning of municipal and other waste for production of thermal energy is expected to increase. Waste burned in 1975=203000 tonnes
NORTH AMERICA						
Northern America						
United States	-	All	-	-	N	-
OCEANIA						
Australia & New Zealand						
Australia	1974	Bagasse	4755	-	79665	Bagasse burned in East Region
	1974	Wood	40.00	-	1873	-
Polynesia						
Western Samoa	-	Wood Trash	N	N	N	Slightly increased use anticipated.
SOUTH AMERICA						
Temperate South America						
Uruguay	1973	U	U	-	U	-
Tropical South America						
Brazil	1972	Timber	38819	8.000	310552	-
	1972	Charcoal	1436	25.90	37192	-
	1972	Bagasse	5779	13.00	75127	-
Colombia	1971	Wood, bagasse	U	U	108000	-
Ecuador	1972	Wood	3.000	-	-	-

TABLE 2C. NOTES ON SOLID FUELS
TABLEAU 2C. NOTES SUR LES COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Note No.	
AFRICA		
Eastern Africa		
Ethiopia	(a)	The search for solid fossil fuels is in the exploration stage. Assessment of the economic potential of solid fuels & their exploratation will follow. Early exploitation will depend on the availability of capital for the development of the mines, cheap transportation costs and the development of industries.
	(b)	Begemder, Wollega, Wollo and Eritrea provinces are entirely on the Ethiopian Plateau. Shoa Province is in both the Ethiopean Plateau and Rift Valley and Sidamo in both the Harrar Plateau and Rift Valley.
	(c)	Additional resources reported as 196,500 m3.
Mozambique	(a)	Economically recoverable reserves are determined by the general geology and experience in existing mines in the Moatize Area of Tete District.
Rwanda	(a)	The bed at Akanyaru is 200 km2, that at Kabira 2 km2, Rugezi is a peat swamp in course of formation, Cyabaralika is a bed of 2.2 km2, Kiguhu is a bed of 5 km2.
	(b)	Maximum depths for Akanyaru in a range 0 to 40 m, at Cyabaralika 200 to 400 m, and at Kiguhu 2 to 5 m.
	(c)	Production capacity of 3 cubic km is estimated for 1980.
Zambia	(a)	Economically recoverable reserves include all coal with a heat content of 5260 kcal/kg or more and in seams over 2m in thickness with stripping ratios of 18:1 or less. Coal has a swelling index of 1 to 2. Coals are in class 411 of International System. Maamba deposits are of better quality.
Middle Africa		
Zaire	(a)	Coal occurs in the Kuga and Luena Basins of Southeastern Zaire. Production is from the Luena Basin deposits.
	(b)	The heating value of as-mined coal is 4500-5000 kcal/kg. After treatment, dried coal containing 15% ash has a heating value of 5800-6100 kcal/kg.
	(c)	Several industrial petrochemical projects have been established.
Southern Africa		
South Africa	(a)	Economically recoverable reserves are based on existing economic and technological conditions
	(b)	Data in column 7 does not include blend coking coal.
Western Africa		
Nigeria	(a)	Data refer only the Mines at Enugu (Anambra State) and Okaba (Benue State).
ASIA		
East Asia		
Japan	(a)	Economically recoverable reserves are coal-in-place times safety ratio (20-30%) times recovery ratio (40-60%). Total amount in place includes all proved, probable and estimated reserves in coal fields where mining is done. Reserves in closed mines which cannot actually be recovered are excluded.
Taiwan	(a)	Known reserves also include subbituminous coal
Middle South Asia		
Bangladesh	(a)	Economically recoverable reserves determined by conventional menthods. The coal fields will be developed as soon as national resources permit and will be used for industrialisation, production of power, domestic consumption, etc. The peat fields are not likely to be developed as they will dislocate the most fertile rice growing fields.
	(b)	Sylbet reserves include both subbituminous coal and lignite.
India	(a)	Solid fuel resources are reported by states
	(b)	The determination of economically recoverable reserves is based on thickness and grade, lay and disposition of the deposit, wall - rock/roof - floor strata condition, sub-surface structure and method of mining to be adopted, etc.
	(c)	includes Meghalaya, Arunachal Pradesh (NEFA), and Nagaland. Data in column 10 and 16 for Assam only.
	(d)	Data in column 10 for Kutch District only.
	(e)	Data in Table 2A are from reference 3, p. 426-452
	(f)	Data in column 6 of Table 2B originally given in coal equivalents. Heat value of 27.6 MJ/Kg for coal assumed for firewood.
Iran	(a)	Data for Kerman includes information from ten mining areas.
Pakistan	(a)	Economically recoverable reserves were determined by detailed geological mapping and drilling.
	(b)	Opportunities exist for increasing the use of local coal in power generation. At present only one power station, located at Quetta in Baluchistan, with an installed capacity of 15 MW (two turbo generators of 7.5 MW capacity each) uses indiginous solid fuel.
	(c)	Total reserves-in-place of solid fuels are greater than recoverable reserves, but actual quantities of former are unknown. Additional resources in Punjab, Sind and Baluchistan are extensive, but have not yet been estimated.
Southeast Asia		
Indonesia	(a)	All bituminous deposits contain some subbituminous coal. South Sumatran brown coal deposit also contains some subbituminous coal.
	(b)	Economically recoverable reserves are given as minable reserves, and not as saleable reserves and are determined according to the mining method applicable. During the Second Five Year National Plan (1974 - 1979), the Government of Indonesia plans to use Bukit Asam Coal and Ombilin Coal for a large steam power plant at the mining site in Sumatra.
Southwest Asia		
Turkey	(a)	Values for economically recoverable reserves of higher ranking fuels are derived from practive. Values for lower ranking fuels are not available. It is not possible to give average figures for columns 6, 8, and 9 for total and regional total lignite deposits in Turkey because they are scattered and in different densities
	(b)	The estimation of heat value is based on A.S.T.M. specifications.
EUROPE		
Eastern Europe		
Poland	(a)	Economically recoverable reserves of hard coals have a minimum seam thickness of 0.4-1.0 m depending on ash content (20-40%), a limiting seam dip of approximately 35 degrees, heat value of more than 12.6 MJ/kg (3,000 kcal/kg), and depths up to 1,000 m. Brown coals have a minimum seam thickness of 3m, a linear ratio of cover to coal of 8.3:1, heat value more than 5.6 MJ/kg (1,600 kcal/kg), and depths up to 300 m.
	(b)	Production quantities are as mined.

TABLE 2C. NOTES ON SOLID FUELS
TABLEAU 2C. NOTES SUR LES COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Note No.
EUROPE	
Northern Europe	
Denmark	(a) Peat cannot compete with foreign solid fuels at present. In case of emergency the peat could be used as fuel. A small amount is used in horticulture.
	(b) Brown coal reserves are 20 million kilograms
	(c) Carbon content is on dried basis while moisture content is on in-place basis.
Finland	(a) Economically recoverable resources include peatlands deeper than 1 m and situated south of 65N latitude (for drying reasons)
	(b) Based on a government decision, the annual production of peat fuel will reach 20 million cubic metres (6.6 million tonnes) by the end of the 1970's
	(c) Spent wood pulping liquor from several mills is concentrated by evaporation and used as fuel in steam boilers to generate steam at elevated pressures (up to 10.8 MN/m2) for the manufacturing process and for by-product power generation in back-pressure turbines. Municipal waste in Helsinki, Turka and Lahtiare used as steam boiler fuel for district heating and generation of electricity.
Iceland	(a) The peat deposits of Iceland are no longer exploited. Iceland also has minor lignite deposits but they are not used.
Norway	(a) All Resources are in Svalbard (Spitzenbergen Islands) between 10 and 35 degrees E longitude and 74 and 81 degrees N latitude and exclude Soviet owned mine area. Recovery has been 80% by longwall underground mining.
Sweden	(a) Economically recoverable reserves are determined by low coal to waste ratio in seams and regard to other utilisation of ground surface in recent legislation.
United Kingdom	(a) Economically recoverable reserves are the proportion of known reserves considered to be recoverable and marketable under current economic conditions and using current mining technology, but at existing collieries and at open cast sites. The amount of any marginal portion included is restricted to those places at which it can be recovered within the limits currently imposed on the amount of marginal recovery allowed by the overall economics of the undertaking.
	(b) An alternative estimate of economically recoverable reserves which is not restricted by access from existing mines, nor, in estimating the marginal portions, are those restricted by coalfield variations in the difference between the average economics in Great Britain and the marginal economics at any locality, this alternative figure is 45000 megatonnes.
	(c) Small quantities of anthracite are included in the reserves of Scotland and Northern England. Seams 0.45 to 0.6 m. thick are included for parts of Northern and Southern England where they have been customarily worked.
Southern Europe	
Italy	(a) Economically recoverable reserves are determined by comparison with the heat content cost of heavy fuel oil delivered to Italian coastal storehouses
	(b) Sulcis-type coal (piceous lignite).
Portugal	(a) Recoverable amounts of anthracite coal of poor quality based on mining experience. Lignite recovery based on feasability studies which show that there is a possibility of extracting one million tonnes per year.
Western Europe	
Austria	(a) Economically recoverable reserves are based on present economic and technological conditions.
Belgium	(a) The Bassin du Sud coal resources include 16.7 Tg as certain, 5.0 Tg as probable and 4.0 Tg as possible.
	(b) The Bassin de Campine coal resources include 114.6 Tg as certain, 54.2 Tg as probable and 58.3 Tg as possible.
France	(a) Recoverable quantities of known reserves are based on economically exploitable tonnages except for mines that are to be closed in the near future where recoverable amounts are those expected to be recovered up to time of shutdown.
Germany, F. R. of	(a) Economically recoverable reserves of higher ranking coals are based on seam thickness of more than .60 M, maximum depth of 1500m, for exposed shaft zones and shaft reserve coal fields. Reserves of brown coal are set according to the current opencast mining technology.
	(b) Produced quantities of brown coal are gross, and of higher ranking coal and peat, net.
Netherlands	(a) No resources from a technical mining point of view.
NORTH AMERICA	
Middle America	
Mexico	(a) Economically recoverable include only deposits to a depth of 500m.
Northern America	
Canada	(a) Economically recoverable reserves are theoretical estimates only.
Greenland	(a) Production decreased gradually from 32,400 tonnes in 1967 to 4,300 tonnes in 1972, when production ceased.
United States	(a) Economically recoverable reserves are based on an overall recovery factor of 50 per cent of reserves in place. Data on reserves and production are net. Data on additional resources are gross.
	(b) Coal is classified by rank according to percentage of fixed carbon, and heat content, calculated on a mineral- matter-free basis. Medium and low volatile bituminous coal has a heat value of 32.5 MJ/Kg, high volatile bituminous coal 24.3 - 32.5 MJ/K , subbituminous coal 19.2 - 26.5 MJ/Kg and lignite 14.6 - 19.2 MJ/Kg.
OCEANIA	
Australia & New Zealand	
Australia	(a) Coal which is economically mineable after allowing for mining and washing losses is considered economically recoverable. Rankings are based on A.S.T.M. - D388-38
	(b) Heat values are based on as burned for Queensland and on as mined elsewhere. Production is on a net basis for Queensland and on a gross basis elsewhere.
New Zealand	(a) Measured recoverable coal for which tonnage is computed from dimensions revealed in outcrops, trenches, workings and drill holes for which the grade is computed from the results of detailed sampling is included as economically recoverable. The sites for inspection, sampling and measurements are so closely spaced and the geological character is defined so well that the size, shape and content are well-established. (b) Reserves of coking coal are estimated at 118,000 tons.

TABLE 2C. NOTES ON SOLID FUELS
TABLEAU 2C. NOTES SUR LES COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Note No.	
SOUTH AMERICA		
Temperate South America		
Argentina	(a)	Economically recoverable reserves are taken as 55% of coal-in-place. The bulk of Argentina's subbituminous coal occurs in Yacimiento Rio Turbio, Santa Cruz, and 36% on a net basis.
	(c)	Estimates for peat based on 200kg peat/m3.
Chile	(a)	Economically recoverable reserves in the Central Zone are based on use of current mining technology for seam thickness of 75cm or more. In the Southern Zone only open cast or surface methods are used where seam thicknesses between 2 and 14m are exploited. Production in the Southern Zone is expected to be 5 million tonnes per year.
Uruguay	(a)	The peat resource covers 40 km2. Average thickness is 1.8m and maximum thickness 3.5m. Dried density is 0.145-0.180 g/cm3 and heat value <19 MJ/Kg. This resource is currently not economic, in the future it may be feasible to build a 40 MW mine-mouth power plant to use this resource.
Tropical South America		
Colombia	(a)	Several non-related methods were used in determining economically recoverable reserves. Resources have been estimated in a conservative way. Data on the number of known deposits is scanty and most of Colombia has not been properly explored. A general trend toward increasing the exploitation of solid fuels over use of crude oil and natural gas is in progress.
Ecuador	(a)	Coal production is uneconomic. Potential wood production is 4.5 million tonnes per annum.
Peru	(a)	Production is in the region of La Libertad (Alto Chicama).
Venezuela	(a)	Nancual mines expect to produce 400000 tonnes in 1976 and in 1977 with a washing plant installed production is estimated at 1 to 1.2 million tonnes.

TABLE 2D. REFERENCES ON SOLID FUELS
TABLEAU 2D. REFERENCES SUR LES COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Ref. No.
AFRICA	
Eastern Africa	
Ethiopia	1. Jelenc A.Danilo "Mineral Occurances of Ethiopia". Ministry of Mines, 1966
	2. "Ethiopia Statistical Abstract 1972" Imperial Ethiopian Government Central Statistical Office. Addis Ababa.
Malawi	1. Malawi Geological Survey Department.
Mozambique	1. Mines and geology department of Mozambique.
Middle Africa	
Angola	1. Ocorrencias minerals - Servicos de Geologia e Minas, 1955
	2. Recursos energeticos das Provincias Ultramarinas, 1963
Zaire	1. A. Jamotte, 1951, le Gisements Charbonniers du Katanga des l'Carde Africain, 50:Ann CSK, T2,V2.
Southern Africa	
South Africa	1. Report of the Commission of Enquiry into the Coal Resources of South Africa
	2. Department of Mines, Mining Statistics 1974.
Western Africa	
Nigeria	1. Geological Survey of Nigeria, Bulletin No. 28, 1963
	2. Records of Geological Survey of Nigeria, 1957
ASIA	
East Asia	
Japan	1. Mining and Coal Bureau, Ministry of International Trade and Industry, Japan
Korea, Rep. of	1. Geological and Mineral Institute of Korea
	2. Commerce and Industry Statistics, Monthly Review, Dec. 1975.
Taiwan	1. Mining Research and Service Organization, Ministry of Economic Affairs, Republic of China
Middle South Asia	
Bangladesh	1. Geological Survey of Bangladesh
	2. World Energy Conference, Bangladesh National Committee
India	1. Ministry of Steel & Mines, Department of Mines, New Delhi, India
	2. Steering Group for Assessment of Natural Resources, Planning Commission, Task Force on Coal and Lignite, New Delhi, India., Report - April, 1972.
	3. Memoirs of the Geological Survey of India, Vol. 88, 1971
Pakistan	1. Master plan for the investigation and exploration of mineral resources of Pakistan, unpublished, Geological Survey of Pakistan, Quetta
Southeast Asia	
Indonesia	1. PN. Batubara (State Coal Mining Company, Ministry of Mines).
	2. Indonesian National Committee, WEC.
Philippines	1. Bureau of Mines, Department of Agriculture and Natural Resources.
Vietnam, Rep. of	1. Service de Prospection miniere
Southwest Asia	
Turkey	1. Mineral Research Board and Exploration Institute of Turkey.
	2. Ministry of Energy and National Resources, Mining Dept.
	3. Genel Enerji Raporu, June 1975, Ministry of Energy.
EUROPE	
Eastern Europe	
Germany, D.R. of	1. Ministerium fur Kohle und Energie der Deutschen Demokratischen Republik
Poland	1. Ministry of Mining and Energy, Planning Commission of the Council of Ministers, Poland.
Northern Europe	
Denmark	1. Geological Survey of Denmark
	2. The Danish Heat Society
	3. F. Thogersen. 1942. Danmarks moser. Det danske Hedeselskab.
	4. A. Kroigaard. 1943. Torvemose og torv. Hedeselskabets Tidsskrift
Finland	1. The Report of the Peat Committee 1968. B 63
	2. The State Fuel Center
Ireland	1. Statistical summary of the mineral industry, 1966-1970, I.G.S. London
Norway	1. Ministry of Industry and Handicraft, Mining Division.
Sweden	1. Hoganas AB
	2. Geological Survey of Sweden.
United Kingdom	1. Headquarters, Geological Branch of the National Coal Board.
	2. Fuel Report of the Royal Commission on Coal Supplies, 1905.
	3. National Coal Board Surveys 1952 to 1975.
Southern Europe	
Italy	1. Ministero Industria, Commercio ed Artigianato - Direzione Generale delle Miniere.
	2. Ente Nazionale per l'Energia Elettrica, (ENEL).
Portugal	1. General-Direction of Mines Archives
Spain	1. Ministerio de Industria - Direccion General de la Energia - Seccion de Carbones: "Plan Nacional de Explotacion Minera", 1970, "Estadistica de Carbones", 1971, and "Monografia de la Mineria del Carbon", 1960.
Yugoslavia	1. "Raw Material Base of Yugoslavia in Solid Fossil Fuels and Possibilities for its Further Development and Exploitation", Prof. Momcilo Simonovic, Serbian Academy of Science, Belgrade, Yugoslavia
Western Europe	
Austria	1. Federal Ministry of Trade and Industry, Mines Department
Belgium	1. Administration des Mines, Ministere des Affaires Economiques.
Netherlands	1. The Netherlands Geological Survey
	2. The Netherlands Central Bureau of Statistics
NORTH AMERICA	
Middle America	
Mexico	1. Comision de Energeticos
Northern America	
Canada	1. Energy Development Sector, Department of Energy, Mines and Resources.
United States	1. Coal Resources of the United States, U.S. Geological Survey Bulletin 1412.
	2. Demonstrated Coal reserve base of the United States on January 1, 1974, U.S. Bureau of Mines Mineral Industry Surveys.

TABLE 2D. REFERENCES ON SOLID FUELS
TABLEAU 2D. REFERENCES SUR LES COMBUSTIBLES SOLIDES

Name of Continent, Region and Country	Ref. No.
OCEANIA	
Australia & New Zealand	
Australia	1. Department of National Resources
	2. Joint Coal Board NSW
	3. Queensland Coal Board
	4. Department of Mines,Tasmania,S.Australia,W.Australia, Victoria
New Zealand	1. New Zealand Geological Survey
	2. New Zealand Mines Department Annual Reports
	3. J.O. Elphuck, "A User's Directory of New Zealand Coals," 1956, N.Z. D.S.I.R. Information Series Bulletin 10
SOUTH AMERICA	
Temperate South America	
Chile	1. Empresa Nacional del Carbon (Enacar)
Uruguay	1. Usinas y Telefonos del Estado, Division Generacion y Transmision (U.T.E.)
Tropical South America	
Brazil	1. Conselho Nacional do Petroleo
	2. Biannual Bulletin of the Brazilian National Committee of the WEC
Colombia	1. G. Poveda, Posibilidad de Desarrollo Carbonifero en Colombia, V Congreso Panamericano de Ingerieria Mecanica, Electrica y Ramas Afines (Agosto, 1973)
	2. Stella L. Hincapie y Arturo Diaz Garcia, La Industria del Carbon en Colombia, (1971)
	3. Antonio Barrera Castilla, Energia y Petroleo en Colombia, (Fundacion para la Educacion Superior y Desarrollo, Fedesarrollo, 1973)
	4. Jairo Londono A, Los Carbones de Cerrejon, (Instituto de Fomento Industrial, IFI, 1971)
	5. Instituto Nacional de Investigaciones Geologico-Mineras (Ingeominas).
Ecuador	1. Los Recursos Energeticos en la Republica Ecuador.

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TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

NAME OF CONTINENT, REGION AND COUNTRY	YEAR OF REF.	RANK OF FUEL	TOTAL AMOUNT IN PLACE (MEGA-TONNE)	KNOWN RESERVES: ECONOMICALLY RECOVERABLE RESERVES: AMOUNT (MEGA-TONNE)	KNOWN RESERVES: ECONOMICALLY RECOVERABLE RESERVES: BY SURFACE MINING (%)	KNOWN RESERVES: ECONOMICALLY RECOVERABLE RESERVES: OF COKING QUALITY (%)	KNOWN RESERVES: DEPOSITS: MAXIMUM DEPTH (M)	KNOWN RESERVES: DEPOSITS: MINIMUM SEAM THICKNESS (M)	SULPHUR CONTENT	HEAT VALUE MEAN	VALUE BASIS (AS MINED OR BURNED)	ADDITIONAL RESOURCES (MEGA-TONNE)	TOTAL RESOURCES (MEGA-TONNE)	RECENT ANNUAL PRODUCTION: YEAR	RECENT ANNUAL PRODUCTION: AMOUNT (MEGA-TONNE)	RECENT ANNUAL PRODUCTION: (GROSS OR NET)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
AFRICA																
Eastern Africa																
Ethiopia																
Entire Nation	1977	LN	-	-	-	-	-	-	-	-	-	-	-	1976	-	-
Malawi																
Entire Nation	1977	SB	14.00	10.00	-	N	150.0	-	-	-	-	-	-	1976	0	-
Mozambique																
Entire Nation	1969	BC	100.0	80.00	80.0	40.0	600.0	1.300	-	-	-	300.0	400.0	-	2.500	-
Rhodesia																
Entire Nation	1977	BT	1535	734.0	36.0	50.0	330.0	0.800	B	H	-	5820	8320	1976	3.270	-
	-	SB	965.0	-	-	-	-	-	-	-	-	-	-	1976	-	-
TOTAL ALL RANKS	-	-	2500	734.0	-	-	-	-	-	-	-	5820	8320	-	3.270	-
Rwanda																
Entire Nation	1966	P	2000	0	0	0	-	-	-	-	-	0	0	-	0	-
Zambia																
Entire Nation	1977	SB	62.00	34.00	100	0	30.00	2.000	B	M	AM	80.00	142.0	1976	0.770	-
Middle Africa																
Angola																
Entire Nation	1974	LN	U	U	U	U	U	U	-	-	-	U	U	1976	-	-
Zaire																
Entire Nation	1920	SB	-	720.0	-	-	-	2.000	B	L	-	-	-	1972	0.130	-
Southern Africa																
South Africa																
Entire Nation	1977	BT	58749	18107	45.0	2.00	500.0	0.700	A	LM	AM	33762	92511	1976	76.45	-
Western Africa																
Ghana																
Entire Nation	-		0	0	-	-	-	-	-	-	-	0	0	1976	0	-
Nigeria																
Entire Nation	1975	SB	89.00	U	U	0	305.0	1.067	A	M	AB	46.00	135.0	1975	0.272	-
ASIA																
East Asia																
Japan																
Entire Nation	1977	BT	8583	1000	U	52.0	1200	0.600	B	H	-	0	8583	1976	18.30	-
	-	LN	175.0	18.00	U	-	300.0	0.600	-	-	-	0	175.0	1976	0.100	-
TOTAL ALL RANKS	-	-	8758	1018	-	-	-	-	-	-	-	0	8758	-	18.40	-
Korea, Rep. of																
Entire Nation	1977	BT	1516	667.0	N	N	1200	0.500	A	M	AB	-	1516	1976	16.50	-
Taiwan																
Entire Nation	1977	SB	452.0	130.0	0	40.0	1000	0.300	ABC	MH	-	85.00	215.0	1976	3.240	-
Middle South Asia																
Afghanistan																
Entire Nation	1974		U	U	U	U	U	U	U	U	-	U	U	1974	0.187	-
Bangladesh																
Entire Nation	1977	SB	1054	527.0	U	U	1097	30.50	A	M	AB	U	U	1976	0	-
	-	P	133.0	U	U	U	4.000	2.000	B	U	AB	U	U	1976	0	-
TOTAL ALL RANKS	-	-	1187	527.0	-	-	-	-	-	-	-	0	0	-	0	-
India																
Entire Nation	1977	BT	20738	12448	U	38.0	600.0	1.200	A	M	AM	62935	83673	1976	100.9	-
	-	LN	1868	934.0	100	-	100.0	1.200	B	L	AM	231.0	2099	1976	3.900	-
TOTAL ALL RANKS	-	-	22606	13382	-	-	-	-	-	-	-	63166	85772	-	104.8	-
Iran																
Entire Nation	1972	HC	385.0	0	0	0	150.0	0.400	BC	M	-	0	385.0	-	1.000	-
Pakistan																
Entire Nation	1972	SB	403.1	402.4	0	0	610.0	0.305	C	L	-	U	U	-	1.117	-
	-	BC	241.1	243.1	0	0	610.0	0.305	C	L	-	U	U	-	0.091	-
TOTAL ALL RANKS	-	-	644.2	645.5	-	-	-	-	-	-	-	0	0	-	1.208	-
South East Asia																
Indonesia																
Entire Nation	1974	BT	109.0	37.00	15.0	50.0	300.0	1.500	A	L	AB	0.000	249.0	-	90.00	-
	-	SB	144.0	41.00	0	0	85.00	2.000	A	L	AB	0.000	314.0	-	100.00	-
	-	LN	1960	0	0	0	U	U	A	L	AB	-	1960	-	0	-
TOTAL ALL RANKS	-	-	2213	78.00	-	-	-	-	-	-	-	0.000	2523	-	190.0	-
Malaysia																
Entire Nation	1977		-	-	-	-	-	-	-	-	-	-	-	1976	-	-
Philippines																
Entire Nation	1973	BC	91.12	U	U	U	U	U	U	U	-	U	U	-	U	-
Thailand																
Entire Nation	1977	LN	235.0	90.00	38.0	U	120.0	100.0	B	U	-	U	235.0	1976	0.609	-
Vietnam, Rep. of																
Entire Nation	U	N	12.00	U	U	U	U	U	BC	M	-	U	U	1976	U	-
South West Asia																
Turkey																
Entire Nation	1977	BT	189.5	156.0	-	82.4	1450	0.600	A	M,H	AB	1086	1276	1976	4.632	-
	-	SB	521.2	436.1	-	-	-	0.700	C	L,M	AB	244.2	765.4	1976		-
	-	LN	2968	2575	80.0	-	350.0	0.700	B	L	AB	1875	4843	1976	1	-
TOTAL ALL RANKS	-	-	3679	3167	-	-	-	-	-	-	-	3205	6884	-	4.632	-

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

NAME OF CONTINENT, REGION AND COUNTRY (1)	YEAR OF REF. (2)	RANK OF FUEL (3)	TOTAL AMOUNT IN PLACE (MEGA-TONNE) (4)	KNOWN RESERVES: ECONOMICALLY RECOVERABLE RESERVES: AMOUNT (MEGA-TONNE) (5)	BY SURFACE MINING (%) (6)	OF COKING QUALITY (%) (7)	DEPOSITS: MAXIMUM DEPTH (M) (8)	MINIMUM SEAM THICKNESS (M) (9)	SULPHUR CONTENT (10)	HEAT VALUE MEAN (11)	HEAT VALUE BASIS (AS MINED OR BURNED) (12)	ADDITIONAL RESOURCES (MEGA-TONNE) (13)	TOTAL RESOURCES (MEGA-TONNE) (14)	RECENT ANNUAL PRODUCTION: YEAR (15)	AMOUNT (MEGA-TONNE) (16)	(GROSS OR NET) (17)
ASIA																
South West Europe																
Israel																
Entire Nation	1972		0	0	-	-	-	-	-	-	-	0	0	-	0	-
EUROPE-ASIA																
Northern																
USSR																
Entire Nation	1977	BT	276000	U	41.0	U	1800	0.300	ABC	M	-	6514000	6790000	1976	711.5	-
	-	P	46500	U	100	U	12.00	0.500	A	L	-	111500	158000	1976	33.40	-
TOTAL ALL RANKS	-	-	322500	0	-	-	-	-	-	-	-	6625500	6948000	-	744.9	-
EUROPE																
Eastern Europe																
Bulgaria																
Entire Nation	1972	BT	29.00	29.00	-	-	3.000	0.500	B	L	-	5.000	34.00	-	0.500	-
	-	BC	346.0	346.0	-	-	20.00	0.700	B	L	-	110.1	456.0	-	8.000	-
	-	LN	4010	4010	100	-	15.00	10.00	C	L	-	730.0	4740	-	20.00	-
TOTAL ALL RANKS	-	-	4385	4385	-	-	-	-	-	-	-	845.1	5230	-	28.50	-
Germany D.R.of																
Entire Nation	1977	LN	C	C	100	0	150.0	2.000	BC	L	-	0	C	1976	247.0	-
Poland																
Entire Nation	1972	HC	C	C	0	30.0	1000	1.000	B	M	-	C	C	1972	150.7	-
	-	BC	C	C	99.5	0	300.0	3.000	B	M	-	C	C	1972	38.20	-
TOTAL ALL RANKS	-	-	0	0	-	-	-	-	-	-	-	0	0	-	188.9	-
Northern Europe																
Denmark																
Entire Nation	1970	BC	0.020	0.020	100	0	10.00	2.000	BC	L	-	0	0.020	1972	0	-
	-	P	561.0	0	0	0	3.500	0.300	A	L	-	0	561.0	1972	0	-
TOTAL ALL RANKS	-	-	561.0	0.020	-	-	-	-	-	-	-	0	561.0	-	0	-
Finland																
Entire Nation	1977	P	18000	2340	100	0	5.000	1.000	A	M	AB	0	18000	1976	0.900	-
Iceland																
Entire Nation	1977		N	-	-	-	-	-	-	-	-	-	-	1976	-	-
Ireland																
Entire Nation	1977	AN	25.00	11.00	5.00	0	300.0	0.300	B-C	M	AM	20.00	0.000	1976	0.014	-
	-	SB	30.00	17.00	5.00	0	100.0	0.450	A	M	AM	20.00	0.000	1976	0.035	-
TOTAL ALL RANKS	-	-	55.00	28.00	-	-	-	-	-	-	-	40.00	0.000	-	0.049	-
Norway																
Entire Nation	1977	BT	40.00	32.00	-	32.0	700.0	0.700	B	M,H	AB	150.0	190.0	1976	0.500	-
	-		2100	U	-	-	-	0.500	-	-	AB	-	-	1976	0	-
TOTAL ALL RANKS	-	-	2140	32.00	-	-	-	-	-	-	-	150.0	190.0	-	0.500	-
Sweden																
Entire Nation	1977	SB	2.000	0	0	0	200.0	0.500	A	L	-	0	4.000	1976	0	-
	-	LN	2.000	1.000	100	0	15.00	0.600	A	L	-	0	2.000	1976	0	-
	-	P	900.0	-	100	-	8.000	1.000	-	-	-	0	900.0	1976	0	-
TOTAL ALL RANKS	-	-	904.0	1.000	-	-	-	-	-	-	-	0	906.0	-	0	-
United Kingdom																
Enitre Nation	1977	BT	u	45000	u	u	1200	0.600	B	M	AB	u	190000	1976	122.2	-
	-	SB	N	-	-	-	-	-	-	-	AB	-	N	1976	0	-
	-	P	u	-	-	-	-	-	-	-	AB	-	u	1976	N	-
TOTAL ALL RANKS	-	-	0	45000	-	-	-	-	-	-	-	0	190000	-	122.2	-
Southern Europe																
Italy																
Entire Nation	1977	LC	150.0	120.0	0	0	500.0	1.500	C	L	AM	U	U	1976	0	-
	-	LN	60.00	25.00	100	0	150.0	0.300	A	L	AM	0	60.00	1976	2.000	-
TOTAL ALL RANKS	-	-	210.0	145.0	-	-	-	-	-	-	-	0	60.00	-	2.000	-
Portugal																
Entire Nation	1977	AN	12.00	7.000	-	-	565.0	60.00	-	L	-	-	-	1976	0.200	-
	-	LN	33.00	33.00	100	-	120.0	30.00	-	L	-	-	-	1976	-	-
	-		-	-		-	-	-	-	-	-	-	-	1976	0	-
TOTAL ALL RANKS	-	-	45.00	40.00	-	-	-	-	-	-	-	0	0	-	0.200	-
Spain																
Entire Nation	1977	BT	1006	805.0	4.00	18.0	800.0	0.500	B	M-H	-	1867	2873	1976	10.50	-
	-	SB	381.0	305.0	1.00	0	800.0	0.500	C	L-M	-	740.0	1121	1976	3.000	-
	-	LN	405.0	405.0	100	0	300.0	0.500	C	L	-	-	405.0	1976	1.100	-
TOTAL ALL RANKS	-	-	1792	1515	-	-	-	-	-	-	-	2607	4399	-	14.60	-
Yugoslavia																
Entire Nation	1971	SB	82.00	70.00	-	-	500.0	0.500	C	M	-	22.00	104.0	1972	0.600	-
	-	BC	1761	1500	20.0	-	400.0	1.500	B	L	-	275.0	2034	1972	0.092	-
	-	LN	16133	15300	80.0	-	130.0	20.00	B	L	-	3480	19613	1972	21.20	-
TOTAL ALL RANKS	-	-	17976	16870	-	-	-	-	-	-	-	3777	21751	-	21.89	-
Western Europe																
Austria																
Entire Nation	1975	SB	4.000	0	0	0	1200	0.400	B	M	AB	6.000	10.00	1975	0	-
	-	BC	206.0	104.0	40.4	0	1500	1.000	A	L	AB	159.0	365.0	1975	3.400	-
	-	LN	3.000	0	0	0	20.00	0.500	B	L	AB	0	3.000	1975	0	-
TOTAL ALL RANKS	-	-	213.0	104.0	-	-	-	-	-	-	-	165.0	378.0	-	3.400	-

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

NAME OF CONTINENT, REGION AND COUNTRY	YEAR OF REF.	RANK OF FUEL	TOTAL AMOUNT IN PLACE (MEGA-TONNE)	KNOWN RESERVES: ECONOMICALLY RECOVERABLE RESERVES: AMOUNT (MEGA-TONNE)	BY SURFACE MINING (%)	OF COKING QUALITY (%)	DEPOSITS: MAXIMUM DEPTH (M)	MINIMUM SEAM THICKNESS (M)	SULPHUR CONTENT	HEAT VALUE MEAN	VALUE BASIS (AS MINED OR BURNED)	ADDITIONAL RESOURCES (MEGA-TONNE)	TOTAL RESOURCES (MEGA-TONNE)	RECENT ANNUAL PRODUCTION: YEAR	AMOUNT (MEGA-TONNE)	(GROSS OR NET)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
EUROPE																
Western Europe																
Belgium																
Entire Nation	1977	BT	1155	613.0	-	63.0	1500	0.900	A	M	-	2281	3436	1976	7.000	-
France																
Entire Nation	1977	HC	1250	432.0	3.50	60.0	1250	0.700	A	M	-	200.0	1450	1976	21.90	-
	-	SB	22.00	11.00	0	0	-	-	B	L	-	-	22.00	1976	1.500	-
TOTAL ALL RANKS	-	-	1272	443.0	-	-	-	-	-	-	-	200.0	1472	-	23.40	-
Germany F.R. of																
Entire Nation	1977	HC	44000	23919	0	59.0	1500	0.600	AB	H	AM	186300	230300	1976	89.60	-
	-	BC	55000	38890	100	-	600.0	2.000	AB	-	AM	6100	61110	1976	134.5	-
	-	P	900.0	900.0	100	1.50	12.00	2.000	A	-	AM	0	900.0	1976	0.200	-
TOTAL ALL RANKS	-	-	99900	63709	-	-	-	-	-	-	-	192400	292310	-	224.3	-
Netherlands																
Entire Nation	1977		-	-	-	-	-	-	-	-	-	-	-	1976	-	-
NORTH AMERICA																
Middle America																
Costa Rica																
Entire Nation	1977	LN	U	-	-	-	-	-	-	-	-	-	-	1976	0	-
Guatemala																
Entire Nation	U	LN	U	U	U	U	U	U	ABC	U	-	U	U	-	0	-
Mexico																
Entire Nation	1977	HC	1260	882.0	15.0	95.0	500.0	0.900	B	M	AM	400.0	1660	1976	5.650	-
	-	SB	180.0	126.0	5.00	10.0	200.0	1.000	B	M	AM	100.0	280.0	1976	0.180	-
TOTAL ALL RANKS	-	-	1440	1008	-	-	-	-	-	-	-	500.0	1940	-	5.830	-
Panama																
Entire Nation	-		0	0	-	-	-	-	-	-	-	-	-	-	0	-
Northern America																
Canada																
Entire Nation	1977	BT	U	715.0	U	U	1220	1.500	A	H	AM	U	15197	1976	14.40	-
	-	SB	U	1935	100	0	46.00	1.500	A	M	AM	U	9457	1976	6.400	-
	-	LN	U	2730	100	0	46.00	1.500	A	L	AM	U	3560	1976	4.700	-
TOTAL ALL RANKS	-	-	0	5380	-	-	-	-	-	-	-	0	28214	-	25.50	-
Greenland																
Entire Nation	1977	SB	60.00	30.00	U	U	U	1.000	AB	L	AM	25.00	85.00	1976	0	-
U.S.A.																
Entire Nation	1977	BT	214366	107183	20.0	35.0	305.0	0.710	B	H	AM	1072348	1286714	1976	586.0	-
	-	SB	152794	76397	36.0	0	305.0	1.520	A	M	AM	1365316	1518110	1976	-	-
	-	LN	30497	15249	100	0	61.00	1.520	A	L	AM	764664	795161	1976	24.00	-
TOTAL ALL RANKS	-	-	397657	198829	-	-	-	-	-	-	-	3202328	3599985	-	610.0	-
OCEANIA																
Australia & New Zealand																
Australia																
Entire Nation	1977	BT	38117	21685	20.0	64.0	600.0	1.000	A	MH	AM	185221	223338	1976	79.00	-
	-	SB	3259	1436	79.0	0	600.0	2.000	A	LM	AM	22695	25954	1976	5.000	-
	-	LN	68058	39000	100	0	470.0	15.00	A	L	AM	54628	122686	1976	31.00	-
TOTAL ALL RANKS	-	-	109434	62121	-	-	-	-	-	-	-	262544	371978	-	115.0	-
New Zealand																
Entire Nation	1977	BT	U	36.00	70.0	65.0	500.0	1.000	A	H	-	95.00	131.0	1976	0.445	-
	-	SB	U	190.0	20.0	0	600.0	1.000	A	M	-	358.0	548.0	1976	1.871	-
	-	LN	U	10.00	95.0	0	300.0	1.000	A	L	-	250.0	261.0	1976	0.170	-
TOTAL ALL RANKS	-	-	0	236.0	-	-	-	-	-	-	-	703.0	940.0	-	2.486	-
Polynesia																
Western samoa																
Entire Nation	1959	N	N	N	-	-	-	-	-	-	-	N	N	-	N	-
SOUTH AMERICA																
Temperate South America																
Argentina																
Entire Nation	1977	SB	450.0	270.0	-	-	300.0	0.700	A	M	AB	55.00	505.0	1976	0.600	-
	-	P	90.00	90.00	100	-	8.000	1.000	AB	L	AB	50.00	140.0	1976	-	-
TOTAL ALL RANKS	-	-	540.0	360.0	-	-	-	-	-	-	-	105.0	645.0	-	0.600	-
Chile																
Entire Nation	1972	BT	45.00	32.00	0	25.0	1000	0.750	BC	M	AM	245.0	290.0	1972	1.500	-
	-	SB	52.00	26.00	1.92	0	500.0	1.000	A	L	AM	3603	3655	1972	0.050	-
TOTAL ALL RANKS	-	-	97.00	58.00	-	-	-	-	-	-	-	3848	3945	-	1.550	-
Uruguay																
Entire Nation	1977	P	10.00	10.00	100	0	6.000	0.300	A	L	AB	0	0	1976	0	-
Tropical South America																
Brazil																
Entire Nation	1977	SB	1301	U	U	U	600.0	0.500	C	M	AB	10258	11559	1976	7.850	-
Colombia																
Entire Nation	1971	BT	40.00	28.00	N	U	U	0.600	A	H	AB	3220	3260	1971	3.800	-
	-	SB	110.0	81.00	U	U	U	U	AB	H	AB	730.0	840.0	1971	0	-
	-	LC	U	U	U	O	U	U	U	L	AB	1230	1230	1971	0	-
TOTAL ALL RANKS	-	-	150.0	109.0	-	-	-	-	-	-	-	5180	5330	-	3.800	-

TABLE 2. SOLID FUELS
TABLEAU 2. COMBUSTIBLES SOLIDES

NAME OF CONTINENT, REGION AND COUNTRY	YEAR OF REF.	RANK OF FUEL	TOTAL AMOUNT IN PLACE (MEGA-TONNE)	KNOWN RESERVES: ECONOMICALLY RECOVERABLE RESERVES: AMOUNT (MEGA-TONNE)	BY SUR-FACE MIN-ING (%)	OF COK-ING QUAL-ITY (%)	DEPOSITS: MAX-IMUM DEPTH (M)	MIN-IMUM SEAM THICK-NESS (M)	SUL-PHUR CON-TENT	HEAT HEAT VAL-UE MEAN	VALUE BAS-IS (AS MIN-ED OR BUR-NED)	ADDI-TIONAL RESOUR-CES (MEGA-TONNE)	TOTAL RESOUR-CES (MEGA-TONNE)	RECENT ANNUAL PRODUCTION: YEAR	AMOUNT (MEGA-TONNE)	(GROSS OR NET)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
SOUTH AMERICA																
Tropical South America																
Ecuador																
Entire Nation	1973		3.000	-	-	-	-	-	-	-	-	-	3.000	1973	0	-
Peru																
Entire Nation	1973	AN	270.0	70.00	U	-	U	1.600	A	M	-	-	281.0	-	-	-
Venezuela																
Entire Nation	1977	SB	1229	228.0	80.0	75.0	900.0	1.000	A	H	AB	2701	3930	1976	130.0	-

TABLE 2A. DEFINITIONS OF SOLID FUEL RANKINGS
TABLEAU 2A. CARACTERISTIQUES DES TYPES DE COMBUSTIBLES SOLIDES

NAME OF CONTINENT REGION AND COUNTRY	HIGHER RANKING SOLID FUELS						LOWER RANKING SOLID FUELS					
	RANK	CARBON CONTENT (%)	VOLATILE MATTER (%)	MOISTURE CONTENT (%)	ASH CONTENT (%)	OTHER	RANK	CARBON CONTENT (%)	VOLATILE MATTER (%)	MOISTURE CONTENT (%)	ASH CONTENT (%)	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
AFRICA												
Eastern Africa												
Malawi	SB	42-43	29-31	5-7	20-23	-						
Mozambique							BC	-	16-20	-	14-25	-
Rhodesia	BT	61-63	25-28	-	8-12	-						
	SB	-	-	-	-	-						
Rwanda							P	-	-	-	-	-
Zambia	SB	60-70	15-25	0-5	12-16	-						
Middle Africa												
Angola							LN	-	-	-	-	-
Zaire	SB	47-63	31-41	6-7	13-21	-						
Southern Africa												
South Africa	BT	38-81	33-8	7-1	35-5	-						
Western Africa												
Ghana	-	-	-	-	-	-	-	-	-	-	-	-
Nigeria	SB	22-51	28-46	3-17	4-43	-						
ASIA												
East Asia												
Japan	BT	23-57	19-46	0.7-15	6.5-51	-						
Korea, Rep. of	BT	38-82	3-7	1-5	12-45	-						
Taiwan	SB	30-60	24-42	2-4	10-25	-						
Middle South Asia												
Bangladesh	SB	U	U	U	U	-	P	U	U	U	U	-
India	BT	78-92	20-42	0.5-11	15-45	-	LN	-	24-33	38-54	3.0-30	-
South East Asia												
Indonesia	HC	40-50	3-45	-	0-5	-	LC	40-45	35-40	-	0-3	-
Thailand							LN	U	U	U	U	-
South West Asia												
Turkey	BT	50-60	25-39	3-8	9-11	-	LN	12-29	17-30	21-53	7-42	-
	SB	23-35	25-35	9-24	10-30	-						
EUROPE-ASIA												
Northern												
USSR	BT	64-95	5-48	3.5-30	8-60	-	P	50-60	60-70	35-55	6-18	-
EUROPE												
Eastern Europe												
Poland	HC	72-90	20-32	1-25	22-40	-	BC	66-72	52-65	53-54	8-22	-
Northern Europe												
Denmark							P	59	-	90	1-30	-
Finland							P	60	70	50	8	-
Ireland	AN	70-80	3-6	3-5	3-15	-						
	SB	25-60	10-20	1-3	10-50	-						
Norway	BT	49-53	39-42	3-4	6-8	-						
Sweden	SB	25-40	15-30	5-20	30-40	-						
United Kingdom	BT	u	u	u	1-21	-						
Southern Europe												
Italy							LC	37	17	10	36	-
							LN	15-20	16-17	44-45	14-18	-
Portugal	AN	-	-	-	-	-	LN	-	-	-	48.5	-
Spain	BT	50-80	5-40	4-16	7-40	-	LN	10-20	20-30	35-50	12-22	-
	SB	10-30	28-45	10-25	20-43	-						
Yugoslavia	SB	-	<40	<10	-	-	BC	-	-	10-30	-	-
							LN	-	-	>30	-	-
Western Europe												
Austria							BC	41	25-34	8-10	15-35	-
							LN	33-37	30-33	34-37	7-20	-
Belgium	BT	53-66	24-33	5-7	5-7	-						
France	HC	-	4-40	2-3	5-35	-						
	SB	-	36-42	10-12	9-30	-						
Germany F.R. of	HC	31-89	0.5-10	0.5-10	3-14	-	BC	15-22	45-60	45-60	0-8	-
							P	-	30-40	30-40	3-10	-
NORTH AMERICA												
Middle America												
Mexico	HC	40-54	18-20	1-5	25-44	-						
	SB	20-43	27-40	1-5	18-49	-						
Northern America												
Canada	BT	45-73	18-34	2-8	4-22	-	LN	24-29	18-25	23-27	19-34	-
	SB	U	U	U	U	-						
Greenland	SB	-	46-55	10-30	5-18	-						
U.S.A.	BT	69-86	31-14	U	U	-	LN	U	U	U	U	-
	SB	U	U	U	U	-						
OCEANIA												
Australia & New Zealand												
Australia	BT	80-90	20-50	1-5	4-30	-	LN	62-70	45-52	40-70	0-6	-
	SB	70-77	35-42	8-19	2-25	-						
New Zealand	BT	58-48	41-33	13-3	9-2	-	LN	37-26	36-29	36-23	14-3	-
	SB	47-32	40-28	24-11	28-2	-						
SOUTH AMERICA												
Temperate South America												
Argentina	SB	32-37	30-35	10-15	20-25	-	P	20	50	15	-	-
Chile	BT	45-55	40-45	2-3	5-10	-						
	SB	35-40	30-35	15-25	10-15	-						
SOUTH AMERICA												
Tropical South America												
Brazil	SB	35-50	20-40	5-10	15-50	-						
Colombia	BT	-	14-33	-	-	-	LN	<69	>33	-	-	-
	SB	<69	>33	-	-	-						

TABLE 2A. DEFINITIONS OF SOLID FUEL RANKINGS
TABLEAU 2A. CARACTERISTIQUES DES TYPES DE COMBUSTIBLES SOLIDES

NAME OF CONTINENT REGION AND COUNTRY	HIGHER RANKING SOLID FUELS						LOWER RANKING SOLID FUELS					
	RANK	CARBON CONTENT (%)	VOLATILE MATTER (%)	MOISTURE CONTENT (%)	ASH	OTHER	RANK	CARBON CONTENT (%)	VOLATILE MATTER (%)	MOISTURE CONTENT (%)	ASH CONTENT (%)	OTHER
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
AFRICA												
Eastern Africa												
Malawi	SB	42.6	29.6	6.15	21.6	-						
Rhodesia	BT	61.8	26.8	1.3	10.5	-						
	SB	-	-	-	-	-						
Zambia	SB	63	21	1	15.5	-						
Southern Africa												
South Africa	BT	54	27	3	27.5	-						
ASIA												
East Asia												
Japan	BT	43.4	37.7	2.2	16.9	-						
Korea. Ref. of	BT	65	4.7	4.3	29	-						
Taiwan	SB	40	35	3	15	-						
Middle South Asia												
Bangladesh	SB	U	35	3	25	-	P	33.3	U	U	46.6	-
India	BT	82	37	5	-	-	LN	68	30	-	-	-
Southeast Asia												
Thailand							LN	66.3	39.3	29.7	14.4	-
Southwest Asia												
Turkey	BT	56	29	5	10	-	LN	22	24	37	19	-
	SB	27	29	17	20	-						
EUROPE-ASIA												
Northern												
USSR	BT	85	25	15.0	20.2	-	P	55	65	50	12	-
EUROPE												
Northern Europe												
Finland							P	55	65	45	5	-
Ireland	AN	76	4.5	3.8	7	-						
	SB	45	15	1.5	25	-						
Norway	BT	52	40	3.5	7.5	-						
Sweden	SB	30	20	16	34	-						
United Kingdom	BT	u	u	u	6-7	-						
Southern Africa												
Spain	BT	55	15	10	20	-	LN	14	24	45	17	-
	SB	17	34	17	32	-						
Southern Europe												
Portugal	AN	-	-	-	40	-	LN	-	-	-	23.3	-
Western Europe												
Belgium	BT	59	28	6.5	6.5	-						
Germany F.R.of	HC	-	-	-	-	-	BC	-	-	-	-	-
							P	40	-	-	-	-
NORTH AMERICA												
Middle America												
Mexico	HC	47	19	3	35	-						
	SB	36	34	3	27	-						
Northern America												
Greenland	SB	-	50	20	11	-						
U.S.A.	BT	U	U	U	U	-	LN	U	U	U	U	-
	SB	U	U	U	U	-						
Northern Amrica												
Canada	BT	56	27	4	14	-	LN	27	22	25	26	-
	SB	42.0	30.0	21.0	7.5	-						
OCEANIA												
Australia & New Zealand												
Australia	BT	83	38	3.0	17	-	LN	66	49	64	2	-
	SB	76	39	18	10	-						
New Zealand	BT	52	36	6	5	-	LN	31	32	26	5	-
	SB	41	36	20	4	-						
SOUTH AMERICA												
Temperate South America												
Argentina	SB	35	32	12	21	-	P	-	-	-	15	-
Uruguay							P	26.44	65.08	13.00	7.55	-
Tropical South America												
Brazil	SB	44	26	6	30	-						

TABLE 2B. NOTES ON SOLID FUELS
TABLEAU 2B. NOTES SUR LES COMBUSTIBLES SOLIDES

NAME OF CONTINENT REGION AND COUNTRY	NOTE NO.
AFRICA	
Eastern Africa	
Ethiopia	(a) Although lignite occurences have been noted in the country since a long time no systematic exploration work has yet been undertaken in the country. Therefore no assessment is possible of the quality and quantity of deposits. Lignite deposits are noted in many localities of the Ethiopian Plateau and they are fairly widespread in occurences. The beds are mostly thin and the quality ranges in character from almost peat to sub-bituminous coal. No record of commercial exploitation of solid fuels are available as at present. Occurences of lignite are known to exist in the provinces of Gondar (Chelga), Wollo (Wuchale and East of Dessie), Shoa (D. Berhan, D. Libanos and Mugher Valley), Kaffa (Giren), Wolega (west of Nejo-Arjo) and Ilubabour near Urrumu. From random samples the calorilfic values range from (1910-6400 K-Cal/Kg).
Mozambique	(a) Economically recoverable reserves are determined by the general geology and experience in existing mines in the Moatize Area of Tete District.
Rhodesia	(a) Low ash coal of which Wankie has 750 Million tons and Wankie Option Area 225 million tons is included in bituminous known resources
	(b) In sub-bituminous reserve, which was not necessarily low ash, Wankie has 150 million tons of this amount and Wankie Option Area has 100 million tons
	(c) Sulphur content 1.6% in Wankie Coal. Average heat value code H.
Rwanda	(a) The bed at Akanyaru is 200 Km2, that at Kebira 2 Km2, Rugezi is a peat Swamp in course of formation, Cyabaralika is a bed of 2.2 Km2, Kiguhu is a bed of 5 Km2.
	(b) Maximum depths for Akanyaru in a range 0 to 40m, at Cyabaralika 200 to 400m and at Kiguhu 2 to 5 m.
	(c) Production capacity of 3 cu Km is estimated for 1980.
Zambia	(a) The International Classification of hard coals code number for Zambian coal is 400 - 411.
Middle Africa	
Angola	(a) Surveys in 1926 and 1965 indicated resources in lignite and peat. Quantitatives data is not available.
Zaire	(a) Coal occurs in the Kuga and Luana Basins of Southeastern Zaire. Production is from the Luana Basin deposits.
	(b9 The heating value of as-mined coal is 4500-5000 Kcal/Kg. After treatment, dried coal containing 15% ash has a heating value of 5800-6100 Kcal/Kg.
	(c) Several industrial petrochemical plants have been established.
Southern Africa	
South Africa	(a) Amount of 58,759 consits of proven and indicated reserves as given in the report of the Commission of Inquiry into the Coal Resources of South Africa.
	(b) Quantity recoverable is based on a ratio calculated on basis of figures supplied by the abovementioned Commission.
	(c) Specifications for mineable coal in situ: Depth: 300 metres for steam coal and 500 metres for metallurgical coal and anthracitic coal, workable thickness 1,2 metres for steam coal and 0,7 metres for metallurgical coal and anthracital coal.
	(d) Information regarding the questions on coal characteristics is based on average value of coal mined obtained from the Annual Report of the Fuel Research Institute.
Western Africa	
Nigeria	(a) Data refer only to the Mines at Enugu (Anambra State) and Okaba (Benue State).
ASIA	
East Asia	
Japan	(a) The annual production statistics for the fiscal year 1976 ended March 31, 1977.
	(b) The coal characteristics refer to the conditions in the fiscal year 1976. Average heat value code M.
	(c) The reserves and production of lignite are not converted into the coal equivalent.
Taiwan	(a) Average heat value code M.
Middle South Asia	
Bangladesh	(a) Average heat value Code M for subbituminous and Code L for Peat.
India	(a) Carbon content and Volatile matter noted as on unit coal, Moisture and Ash on 60% RH and 40 Deg. C.
Pakistan	(a) Economically recoverable reserves were determined by detailed geological mapping and drilling.
	(b) Opportunities existing for increasing the use of local coal in power generation.
	(c) Total reserves in place of solid fuel are greater than recoverable reserves, but actual quantities of the former are unknown. Additional resources in Punjab, Sind and Baluchistan are extensive, but have not yet been estimated.
Southeast Asia	
Indonesia	(a) All bituminous deposits contain some sub- bituminous coal. South Sumatran brown coal deposits also contain some sub-bituminous coal.
	(b) Economically recoverable reserves are given as minable resources, and not as saleable reserves and are determined according to the mining method applicable.
Southwest Asia	
Turkey	(a) Figures given for sub-bituminous and lignite are based on the recent geological surveys undertaken through 1976. The figures for sub-bituminous refer to high ranking Lignite having the specified characteristics and other figures refer to lignite only. Exploration for peat resources will start in 1978.
	(b) Recoverable reserves are estimated as 90% of Proved reserves (surface mining) and as 75% Proved reserves (underground mining).
	(c) Production of lignite includes sub-bituminous lignites.
	(d) Average heat values Code M for bituminous, L for lignites.
EUROPE-ASIA	
Northern	
USSR	(a) The range of heat values is reported as 6200- 8100 K cal/Kg for bituminous coals and as 2500-2650 K cal/Kg for other solid fuel.
EUROPE	
Eastern Europe	
Poland	(a) Economically recoverable reserves of hard coal have a minimum seam thickness of 0.4 - 1.0 m

TABLE 2B - NOTES ON SOLID FUELS

NAME OF CONTINENT REGION AND COUNTRY	NOTE NO.
EUROPE	
Eastern Europe	
Poland	depending on ash content (20 - 40%), a limiting seam dip of approximately 35 degrees, heat value of more than 12.6 MJ/Kg (3000 Kcal/Kg, and depths up to 1000m. Brown coals have a minimun seam thickness of 3m, a linear ratio of cover to coal of 8.8:1, heat value more than 6.6 MJ/Kg (1600 Kcal/Kg), and depths up to 300m.
	(b) Production quantities are as mined.
Northern Europe	
Denmark	(a) Peat cannot compete with foriegn solid fuels at present. The case of energency peat could be used as fuel. A small amount is used in horticulture.
	(b) Carbon content is on a dried basis while moisture content is on in-place basis.
Finland	(a) The peat has been treated into the form in which it will be delivered to the customer on the basis of heat value. The average heat value is Code M as burned.
Iceland	(a) Some minor resources of Lignite and some resources of Peat which are no longer exploited.
Ireland	(a) Data is based on Reports prepared by the Irish Department of Industry and Commerce 1964. Owing to the very different character of Irish coals, information is furnished under the headings of Anthracite and semi-bituminous coals. The average heat value of each is Code M.
Norway	(a) The deposits of peat for possible fuel utilization are estimated to be around 2000 M tonnes. The total resources of sphagnum moss for use as moss litter or growth media and soil improvment are estimated to be about 100 M tonnes. Production of peat for agricultural purposes amounts to approx. 35000 tonnes (air dried, 40 - 45 per cent moisture). Production of peat fuel has been reduced to zero but the total energy equivalent of all reserves is approx. 17.6 exajoules.
Sweden	(a) The total peat supply of Sweden is estimated to approx. 9000 M. tonnes. The size of the part wich is economically suitable for energy production depends on the prices of alternative fuels and exploitation technique. A common assumption is that at most 10 per cent of the total supply is available for energy production on an industrial scale. With regard to nature conservancy aspects it therefore seems probable that "the deposit which are economically suitable for and likely to be used for fuel" contain less than 900 M. tonnes of peat. Today there is no peat production for energy purpose in Sweden. The annual production for gardening etc. is about 0.3 M. Tonnes. The peat will probably be used as milled peat with a moisture content of c. 50%. The average heat value for this kind of peat is 8-9 Mj/Kg.
United Kingdom	(a) 45,000m. tonnes was proportion of the coal in place which could be recovered using established technology. The proportion of recoverable reserves fully proved in respect of thickness, quality and mining conditions, and accessible at existing mines, as at April 1975, amounted to 3,887m. tonnes (method of assessment set out in NEB \Procedure for the Assessment of Reserves', ref PI/1972/4).
	(b) An extensive exploration programme is in progress, to estimate amounts in place and additional resources, data still incomplete or not yet fully assessed.
	(c) Estimate of ash are based on deep-mine data for the operating reserves of 3,887m. tonnes at April, 1975, at existing collieries
	refers to probable mined section (not the seam) and excludes dirt bands.
Southern Africa	
Spain	(a) The statistics agree with the quoted reference. Quantities recoverable are the reserves probable and most probable. Tonnage in place is derived from reserves by by dividing by 0.8. Additional reserves are the quantities possible and infered again divided by 0.8.
Southern Europe	
Italy	(a) Sardinia: "Sulcis" - type coal (piceous lignite) is classified as LC.
Portugal	Anthracite of low calorific value - 16907Kj/Kg and lignite of 5901 Kj/Kg.
Western Europe	
Austria	(a) Economically recoverable reserves are based on persent economic and technological conditions.
France	(a) The quantitiy recoverable is equivalent to the classification used in France "tonnage planifiable".
	(b) The percentage shown for coking quantity includes quantities in mixtures.
Germany F.R.of	(a) Reserves and resources are estimated on the basis of most recent survey in 1977. Recoverable reserves are actually recoverable under the technical and economical conditions prevailing today. It is assumed that the maximum depth for HC 2000 metres and for BC 1500 metres.
	(b) The sulphur content of the HC coal is A for 60% and B for 40% of production.
Netherlands	(a) No resources from a technical mining point of view.
NOBTH AMERICA	
Middle America	
Costa Rica	(a) Some lignite deposit are being investigated in Costa Rica.
Mexico	(a) Average heat value 27209 Kj/Kg for HC coal and 23023 Kj/Kg for SB coal.
Northern America	
Greenland	(a) Additional quantitiy of resources quoted as a range 20 to 30 M. tonnes.
U.S.A.	(a) Recoverable reserves calculated at recovery rates of 50 percent of amount in place.
	(b) Total "indentified and hypotehetical" resources estimated to be in-place, at depths up to 1,830 metres, including the estimated unrecoverable portions of known reserves is the basis for "total resources".
	(c) Sub-bituminous production is included with bituminous coal.
	(d) Peat resources of the U.S.A. are not well defined, but may be on the order of 23 billion tonnes. In 1974, peat production was approximately 642 thousand tonnes. Peat is no longer in use as a fuel. A survey of peat resources and an investigation of the potential use of peat for the production of fuel gas were underway in 1977.
Northern Amrica	
Canada	(a) Known reserves in Canada are reported as "recoverable reserves" which are defined as that portion of coal resources that has been reasonably well delineated and can be produced with current technology and delivered at competitive market prices. Maximum depth of deposits is 305m in West Canada, 1220 in East Canada.
	(b) Total Resources - In Canada we prefer not to add together the quantities - measured indicated and inferred. So only the quantity of "measured resources" are reported.
	(c) Coal characteristics are for raw coal at mine mouth.
OCEANIA	
Australia & New Zealand	
Australia	(a) Dates of reserves and resources assessment range from 1972-77.

TABLE 2B. NOTES ON SOLID FUELS
TABLEAU 2B. NOTES SUR LES COMBUSTIBLES SOLIDES

NAME OF CONTINENT REGION AND COUNTRY	NOTE NO.
OCEANIA	
Australia & New Zealand	
Australia	(b) Known reserves of anthracite, bituminous and sub-bituminous coal quoted in the table, with minor exception, occur at depths not exceeding 600 metres. Minimum seam thickness is 1.5 metres (in special circumstances 1 metre) and maximum ash content is 30% (dry basis). Known reserve of lignitic coals all occur at depths less than 470 metres with the majority at less than 300 metres: all seams exceed 3 metres in thickness. (c) Economically recoverable reserves represent the amount of coal that can be physically mined from a reserve at an acceptable cost and afe obtained by applying a mining recovery factor to the known reserves. In the case of anthracite, bituminous and sub-bituminous coal which could be won by surface mining the recovery factor used varied from 90-95%, the depth limit ranged from 45 to 60 metres and the ratio of thickness of overburden to thickness of coal ranged up to 10:1 but mostly did not exceed 7:1. For underground mining of the same rank coal recovery factors ranged up to 70% but were mostly around 50%. In the case of lignitic coal only coal which could be won by surface mining was considered economically recoverable. The criteria used to define economically recoverable reserves, with minor exception, were a minimum seam thickness of 15 metres: maximum overburden of 90 metres above the uppermost coal seam: an overburden-to-coal ratio not greater than 2:1, a maximum open-pit depth of 200 metres and a recovery factor of 95%.
	(d) Coal characteristics for heat value are gross specific energy (or higher heating value) and as mined are code M for average BT and SB coals and code L for LN. Carbon and volatile percentages are d.a.f, moisture content a.d. and ash as mined.
New Zealand	(a) Quantity recoverable only includes measured reserves.
	(b) Maximum depth of deposits is for all categories of reserves. Depth of drilling is usually dependent on overburden ratios being less than 20 to 1.
	(c) Additional resources is all indicated and inferred reserves as at 1/1/76.
	(d) % By surface mining refers only to measured reserves.
SOUTH AMERICA	
Temperate South America	
Argentina	(a) The bulk of Argentina's coal is in the Rio Turbio mine.
	(b) Estimates for peat are based on peat dried in air at 200 Kg/m3 in Tierra del Fuego.
Chile	(a) Economically recoverable reserves are based on use of current mining technology in the Central zone for seam thickness of 75cm or more. In the Southern zone only opencast or surface methods are used where seam thickness of between 2m and 14m are exploited. Production in the Southern Zone is expected to be 5 million tonnes per year.
Uruguay	(a) Peat occurs in an area 40 Km2. Its utilisation is not economic at present but it is possible that in future a power station of 40MW could beinstalled.
Tropical South America	
Brazil	(a) All data are gross.
Colombia	(a) Several non-related methods were used in determing economically recoverable resources. Resources have been estimated in a conservative way. Data on the number of known deposits is scanty and most of Colombia has not been properly explored. A general trend towards increasing the exploitation of Solid fuels over use of crude oil and natural gas is in progress.
Ecuador	(a) Coal production is uneconomic. Potential wood productionn is 4.5 millio tonnes per annum.
Venezuela	(a) The quantity recoverable exlcudes that which might be recovered by underground mining in el Zulia.
Tropical South Amrica	
Peru	(a) Production is in the region of La Libertad (Alto Chicana).

TABLE 2C. RFFERENCES ON SOLID FUELS
TABLEAU 2C. REFERENCES SUR LES COMBUSTIBLES SOLIDES

NAME OF CONTINENT REGION AND COUNTRY	REF. NO.
AFRICA	
Eastern Africa	
Ethiopia	1. Lignite deposits in Ethiopia - by Murdock T.G.1944 2. Jelenec A. Danilo "Mineral Occurences of Ethiopia". Ministry of Mines - Addis Ababa - 1966.
Malawi	1. Blomfield, K (1958). Geology of the Nkana Coalfield Bulletin, Geological Survey. Malawi, 8.
Mozambique	1. Mines and geology department of Mozambique.
Rhodesia	1. The Geology and Coal Resources of the Country Around Wankie Southern Rhodesia Geological Survey Bulletin No. 48 R.L.A> Watson. 2. Coal Resources of Rhodesia Report No. C57 Institute of Mining Research, University of Rhodesia W.A. Hodgson.
Zambia	1. Previous information supplied to WEC March 1976. 2. Zambia Mining Yearbook 1976.
Middle Africa	
Zaire	1. A> Jamote, 1951, Le Gisements Charbonniers du Katanga.
Southern Africa	
South Africa	1. Report of the Commission of Inquiry into the Coal Resources of South Afrifca, 1975. 2. Fuel Research Institute of South Africa, Forty-Sixth Annual Report, December 1976. 3. Department of Mines, Mining Statistics, 1976.
Western Africa	
Nigeria	1. Geological Survey of Nigeria, Bulletin No 28,1963. 2. Records of Geological Survey of Nigeria, 1957.
ASIA	
East Asia	
Japan	1. Japan Coal Association.
Korea. Ref. of	1. Korea Research Institute of Geo Science and Mineral Resources.
Taiwan	1. Coal Resources of Taiwan MRSC Report - 70 December, 1965. 2. Mineral Resources Development in Taiwan R.O.C. MRSO Report : 165 July, 1977.
Middle South Asia	
Bangladesh	1. Final Reoprt to the Asian Development Bank and the Government of the People's Republic of Bangladesh, April 1976. 2. Final Report by the Committee for Utilisation of Indigenous Natural Resources of Bangladesh, August, 1977.
Pakistan	1. Geological Survey of Pakistan (unpublished).
Southeast Asia	
Indonesia	1. P.N. Batubara (State Coal Mining Company, Ministry of Mines. 2. Indonesia National Committee, WEC.
Philippines	1. Bureau of Mines, Department of Agriculture and Natural Resources.
Thailand	1. National Energy Administration 2. Electricity Generating Authority of Thailand.
Vietnam, Rep. of	1. Service de Prospection miniere.
Southwest Asia	
Turkey	1. "Energy Resources Long-Term Project Programmes", the Ministry of Energy and Natural Resources, 1977.
EUROPE-ASIA	
Northern	
USSR	. Coals of the USSR. Handbook, Moscow, "Nedra". 1975. 2. Prospecting for and conservation of mineral resources. Moscow, 1977, No.11, pp.34-41. 3. Central Statistical Office of the USSR. The Soviet Economy in 60 years. "Statistika", 1977. 4. Peat in the economy. "Nedra", Moscow, 1968, pp.77-79. 5. Mikhailov N.M.,Sharkov A.T. "Physical properties of fuel and prevention of fuel-handling problems at power stations". "Energiya", Moscow, 1972, p 147.
EUROPE	
Eastern Europe	
Poland	1. Ministry of Mining and Energy, Planning Commission of the Council of Ministers.
Northern Europe	
Denmark	1. Geologifcal Survey of Denmark 2. The Danish Heat Society 3. E. Thorogersen, 1942, Denmarks moser. Det Danske Hedeselskab. 4. A. Kroigaand, 1943, Torvemose og torv. Hedeslskabets Tidsskrift
Finland	1. State Fuel Centre
Ireland	1. Statistical Bulletin - Dublin. 2. Memoirs of Geological Survey of Ireland.
Norway	1. Mining Division, Norwegian Ministry of Industry and Handicraft. 2. Norwegian Land and Peat Socidety.
Sweden	1. Torvproduktionens framtid. Statens Bransle- kommission. Stockholm 1952. 2. Trov i sverige. Planeringsrapport. Namnden for Energiproduktionsforskning. Stockholm 1977. 3. Hoganas AB, Hoganas 4. Sveriges Geologiska Undersokning, Stockholm.
United Kingdom	1. National Coal Board Surveys 1976 and 1975. 2. The Royal Commission on Coal Supplies in 1905 and revised in 1973.
Southern Africa	
Spain	1. Inventario de Recursons Nacionales de Carbon - ENADIMSA 1977.
Southern Europe	
Italy	1. Ministero Industria, Commercio e Artigianato - Diezione Generale delle Miniere. 2. ENEL - Ente Nazionale per l'Energia Elettrica.
Yugoslavia	1. Raw material base of Yugoslavia in solid fossil fuels and possibilities for its fufther development and expansion. Prof. Momcilo Simonovic, Serbian Academy of Science.
Western Europe	
Austria	1. Federal Ministry of Trade and Industry, Mines Department.
Belgium	1. Ministere des Affaires Economiques (Administration des Mines)
Germany F.R.of	1. Statistik der Kohlenwirtschaft e.V.

TABLE 2C. REFERENCES ON SOLID FUELS
TABLEAU 2C. REFERENCES SUR LES COMBUSTIBLES SOLIDES

NAME OF CONTINENT REGION AND COUNTRY	REF. NO.
NORTH AMERICA	
Middle America	
Mexico	1. Comision de Energeticos.
Northern America	
Greenland	1. Geol. Surv. Greenland Rep. No. 77, (1976)
U.S.A.	1. Bureau of Mines, U.S. Department of the Interior, Demonstrated Coal Reserve Base of the United States on Jauary 1, 1976, August, 1977.
	2. Averitt, Paul, U.S. Geological Survey Bulletin 1412, "Coal Resources of the United States, January 1, 1974,".
	3. Cornelia C. Cameron, "Peat," pp 503-513 in Donald A Brobst and Walden P. Pratt, Editors, United States Mineral Resources, Geological Survey Professional Paper 820, U.S. Government Printing Office, Washington: 1973.
Northern Amrica	
Canada	1. Department of Energy Mines & Resources (Dec. 1977). "1976 Assessment of Canada's Coal Resources and Reserves" Report EP 77-5.
OCEANIA	
Australia & New Zealand	
Australia	1. Department of National Resources.
New Zealand	1. Mines statement for year ending 31 Dec. 76 Mines Dept.
	2. Analysis of Industrial Coals 1967-1970 NZCRA (Coal Research Assn)
	3. New Zealand Official Yearbook 1976 Dept of Statistics.
SOUTH AMERICA	
Temperate South America	
Argentina	1. National Coal Fields.
Chile	1. Empresa Nacional del Carbon (ENACAR)
Uruguay	1. Informacion procedente de UTE (Administracion Nacional de Usinas y Trasmisiones Electricas), Division Generacion y Trasmision - ano 1973.
Tropical South America	
Brazil	1. Conselho Nacional do Petroleo, Ministerio das Minas e Energia.
Colombia	1. G. Poveda, Posibilidad de Desarrollo Carbonifero en Colombia, 1973.
	2. Stella L. Hincapie y Anturo Diaz Garcia, la Industria del carbon en Colombia, 1971.
	3. A.B. Castilla, Energia y Petroleoen Colombia, 1973.
	4. Jairo Londo A, Los Carbones de Cerrefon, 1971.
Ecuador	1. Los Recursos Energeticos en la Republica Ecuador.

TABLE 3. CRUDE OIL AND NATURAL GAS LIQUIDS
TABLEAU 3. PETROLE BRUT ET GAZ NATURELS LIQUIDES

NAME OF CONTINENT, REGION AND COUNTRY	YEAR OF REF.	KNOWN OIL REMAINING IN-PLACE (MEGATONNE)	RESERVES PROVED RECOVERABLE (MEGATONNE)	ADDITIONAL RESOURCES (MEGATONNE)	ADDITIONAL RESOURCES RECOVERABLE (MEGATONNE)	RECENT ANNUAL PRODUCTION YEAR	RECENT ANNUAL PRODUCTION AMOUNT (MEGATONNE)	AVERAGE API GRAVITY RANGE	AVERAGE API GRAVITY AVERAGE VALUE		<1% SULFUR (% OF TOTAL PRODUCTION)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		(11)
AFRICA											
Eastern Africa											
Ethiopia											
Entire Nation	1977	-	-	-	-	1976	-	-	-	-	-
Malawi											
Entire Nation	1977	0	0	0	0	1976	0	-	-	-	-
Mozambique											
Entire Nation	1973	-	-	-	-	1972	-	-	-	-	-
Middle Africa											
Angola											
Entire Nation	1972	345.7	49.41	0	0	1972	609.1	-	32.00	-	100.0
Zaire											
Entire Nation	1973	U	U	U	U	U	U	-	-	-	-
Northern Africa											
Moroco											
Entire Nation	1973	U	U	U	U	1973	0.423	U	U	-	U
Sudan											
Entire Nation	1977	-	-	-	-	1976	-	-	-	-	-
Tunisia											
Entire Nation	1977	317.5	83.56	U	U	1976	3.705	X	-	-	-
U.A.R.Egypt											
Entire Nation	1975	1325	455.8	223.8	U	1975	11.19	U	U	-	-
Southern Africa											
South Africa											
Entire Nation	1977	0	0	0	0	1976	0	-	-	-	-
Western Africa											
Ghana											
Entire Nation	1970	U	U	U	U	1970	0	-	40.00	-	-
Nigeria											
Entire Nation	1975	4213	1330	265.0	U	1975	84.50	-	37.00	-	100.0
ASIA											
East Asia											
Japan											
Entire Nation	1977	7.100	1.800	U	U	1976	0.300	X	40.00	-	100.0
Korea (Re p.of)											
Entire Nation	1977	0	0	0	0	1976	0	-	-	-	-
Taiwan											
Entire Nation	1977	C	C	C	C	1976	C	-	-	-	-
Middle South Asia											
Bangladesh											
Entire Nation	1977	0	0	0	0	1976	0	-	-	-	-
India											
Entire Nation	1977	1618	286.0	6312	1516	-	8.690	X	32.00	-	100.0
Iran											
Entire Nation	1972	U	U	U	U	1972	254.5	X	U	-	U
Pakistan											
Entire Nation	1972	U	U	U	U	1972	0.550	X	U	-	U
Southeast Asia											
Bahrain											
Entire Nation	1977	42000	U	U	U	1976	2.880	U	31.70	-	-
Indonesia											
Entire Nation	1974	U	C	0	0	1974	68.41	X	U	-	0.200
Malaysia											
Entire Nation	1977	C	C	C	C	1976	8.100	X	37.00	-	100.0
Philippines											
Entire Nation	1973	U	U	U	U	1973	U	U	U	-	U
Thailand											
Entire Nation	1977	0.040	0.180	U	0.180	1976	0.015	X	30.00	-	0.180
Vietnam (Rep.of)											
Entire Nation	1973	U	U	U	U	1973	0	-	-	-	-
Southwest Asia											
Israel											
Entire Nation	1972	2.463	1.970	U	U	1972	0.422	-	28.00	-	100.0
Kuwait											
Entire Nation	1977	C	C	C	C	1976	96.50	X	32.00	-	0
Qatar											
Entire Nation	1977	577.0	195.0	U	U	1976	23.60	-	36.00	-	U
Saudi Arabia											
Entire Nation	1977	20000	U	U	U	1975	350.0	X	U	-	U
Syria											
Entire Nation	1977	U	U	U	U	1976	10.04	U	U	-	U
Turkey											
Entire Nation	1977	241.3	28.60	U	U	1976	2595	X	25.60	-	-
EUROPE-ASIA											
Northern											
USSR											
Entire Nation	1977	U	U	U	U	-	519.7	X	32.20	-	10.80

TABLE 4. OIL SHALE AND BITUMINOUS SANDS
TABLEAU 4. SCHISTES ET SABLES BITUMINEUX

NAME OF CONTINENT REGION AND COUNTRY	YEAR OF REF.	TYPE OF RESOURCE	AREA (SQ KM)	KNOWN RESOURCES: DEPOSIT AVERAGE THICKNESS (M)	KNOWN RESOURCES: YIELD OR OIL CONTENT (G OIL/KG SHALE)	POTENTIAL TOTAL RECOVERABLE OIL (MEGATONNE)	RECENT ANNUAL PRODUCTION: YEAR	RECENT ANNUAL PRODUCTION: AMOUNT (MEGATONNE)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
AFRICA								
Eastern Africa								
Angola (a,b,c,d)								
Entire Nation	1972	Sand	U	U	U	U	1972	0
	-	Other	U	200.0	140.0	200.0	1972	N
Ethiopia (a)								
Entire Nation	1977	Shale	-	-	-	-	1976	-
Malawi								
Entire Nation	1977	Shale	0	0	0	0	1976	0
Mozambique (a,b)								
Entire Nation	1972	U	-	-	-	-	-	-
Zaire (a,b,c,d,e								
Entire Nation	1950	Sand	0	13.50	155.0	U	1950	0.020
	-	Other	20000	10.00	60.00	U	1950	0
Southern Africa								
South Africa								
Entire Nation	1977	Shale	0	0	0	0	1976	0
	-	Sand	0	0	0	0	1976	0
Western Africa								
Ghana (a)								
Entire Nation	1973	Shale	U	U	U	U	1973	0
	-	Sand	U	U	U	U	1973	0
Nigeria								
Entire Nation	1975	Shale	0	0	0	0	1975	0
	-	Sand	0	0	0	0	1975	0
ASIA								
East Asia								
Japan								
Entire Nation	1977	Shale	U	U	U	U	1976	U
	-	Sand	U	U	U	U	1976	U
Korea (Rep.of)								
Entire Nation	1977	Shale	0	0	0	0	1973	0
	-	Sand	0	0	0	0	1973	0
Middle South Asia								
Bangledesh								
Entire Nation	1977	Shale	0	0	0	0	1976	0
	-	Sand	0	0	0	0	1976	0
Pakistan (a)								
Entire Nation	1973	Shale	U	U	U	U	1974	0
	-	Sand	U	U	U	U	1974	0
Southeast Asia								
Indonesia								
Entire Nation	1973	Shale	U	U	U	U	1973	U
	-	Sand	U	U	U	U	1973	U
Malaysia								
Entire Nation	1977	Shale	U	U	U	U	1976	U
	-	Sand	U	U	U	U	1976	U
	-	Other	U	U	U	U	1976	U
Philippines								
Entire Nation	1973	Shale	U	U	U	U	1973	U
	-	Sand	U	U	U	U	1973	U
Thailand (a)								
Entire Nation	1977	Shale	451.2	500.0	14.20	U	1976	0
	-	Sand	U	U	U	U	1976	U
	-	Other	U	U	U	U	1976	U
Vietnam (Rep of.)								
Entire Nation	1973	Shale	U	U	U	U	1973	0
Southwest Asia								
Israel (a,b,c)								
Entire Nation	1973	Shale	6.300	30.00	54.00	20.10	1973	0
Turkey (a,b,c)								
Entire Nation	1977	Shale	223.0	7.000	50.00	U	1976	0
	-	Other	U	U	U	U	1976	0
EUROPE-ASIA								
Northern								
USSR								
Entire Nation	1977	Shale	410000	1.500	U	U	1976	U
	-	Sand	30000	20.00	U	U	1976	U
EUROPE								
Eastern Europe								
Bulgaria								
Entire Nation	1973	Shale	U	-	-	U	1973	0
German D.R.								
Entire Nation	1977	Shale	N	N	N	N	1976	N
	-	Sand	N	N	N	N	1976	N
Poland								
Entire Nation	1973	Shale	0	-	-	0	1973	0

TABLE 4. OIL SHALE AND BITUMINOUS SANDS
TABLEAU 4. SCHISTES ET SABLES BITUMINEUX

NAME OF CONTINENT REGION AND COUNTRY	YEAR OF REF.	TYPE OF RESOURCE	KNOWN RESOURCES AREA (SQ KM)	DEPOSIT AVERAGE THICKNESS (M)	YIELD OR OIL CONTENT (G OIL/KG SHALE)	POTENTIAL TOTAL RECOVERABLE OIL (MEGATONNE)	RECENT ANNUAL PRODUCTION YEAR	AMOUNT (MEGATONNE)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EUROPE								
Northern Europe								
Denmark								
Entire Nation	1977	Shale	-	-	-	-	1976	0
Finland								
Entire Nation	1977	Shale	0	0	0	0	1976	0
Iceland								
Entire Nation	1977	Shale	0	0	0	0	1976	0
Ireland								
Entire Nation	1977	Shale	0	0	0	0	1976	0
Norway								
Entire Nation	1977	Shale	0	0	0	0	1976	0
Sweden (a,b)								
Entire Nation	1977	Shale	-	12.50	5.500	880.0	1976	0
United Kingdom								
Entire Nation	1977	Shale	u	u	u	u	1976	0
	-	Sand	N	N	N	N	1976	0
Southern Europe								
Spain								
Entire Nation	1977	Shale	23.00	4.000	70.00	12.00	1976	0
Yugoslavia								
Entire Nation	1971	Shale	U	20.00	100.0	128.0	1971	0
Western Europe								
Austria (a)								
Entire Nation	1974	Shale	N	10.00	50.00	N	1974	0.001
Belgium								
Entire Nation	1977	Shale	0	0	0	0	1976	0
	-	Sand	0	0	0	0	1976	0
France								
Entire Nation	1977	Shale	U	3.000	60.00	U	1976	0
Germany F.R.of (a)								
Entire Nation	1977	Shale	27.00	35.00	50.00	100.0	1976	0
Netherlands								
Entire Nation	1977	Shale	0	0	0	0	1976	0
NORTH AMERICA								
Caribbean								
Trinidad and Tobago (a)								
Entire Nation	1975	Sand	0.080	183.0	400.0	U	1975	U
	-	Other	0.600	61.00	300.0	U	1975	0.081
Middle America								
Guatemala								
Entire Nation	1972	Shale	-	-	-	-	1972	0
	-	Sand	-	-	-	-	1972	0
Panama								
Entire Nation	1973	Shale	0	-	0	0	1973	0
Northern America								
Canada (a,b,c)								
Entire Nation	1977	Shale	U	U	U	U	1976	U
	-	Sand	49214	914.0	100.0	27400	1976	2.500
Greenland (a)								
Entire Nation	1977	Shale	0	0	0	0	1976	0
U.S.A. (a,b,c,d,e								
Entire Nation	1977	Shale	7382	35.00	255.0	28000	1976	0
	-	Sand	U	U	U	2000	1976	0
OCEANIA								
Australia & New Zealand								
Australia (a,b)								
Entire Nation	1977	Shale	2000	10.00	92.00	247.0	1976	0
New Zealand (a,b)								
Entire Nation	1977	Shale	3.270	14.00	95.00	1.300	1976	0
Melanesia								
New Guinea (a)								
Entire Nation	1972	Shale	-	-	-	-	1972	-
Papua (a)								
Entire Nation	1972	Shale	-	-	-	-	1972	-
Polynesia								
Western Samoia								
Entire Nation	1959	Shale	U	-	-	-	-	0
	-	Sand	U	-	-	-	-	0
SOUTH AMERICA								
Temperate South America								
Argentina (a,b)								
Entire Nation	1977	Shale	1.000	150.0	60.00	45.00	1976	0
	-	Other	U	0.500	-	-	1976	N
Chile (a)								
Entire Nation	1936	Shale	100.1	4.500	U	U	1936	0
	-	Other	U	0	0	0	1936	0

TABLE 4. OIL SHALE AND BITUMINOUS SANDS
TABLEAU 4. SCHISTES ET SABLES BITUMINEUX

NAME OF CONTINENT REGION AND COUNTRY	YEAR OF REF.	TYPE OF RESOURCE	AREA (SQ KM)	KNOWN RESOURCES: DEPOSIT AVERAGE THICKNESS (M)	KNOWN RESOURCES: YIELD OR OIL CONTENT (G OIL/KG SHALE)	POTENTIAL TOTAL RECOVERABLE OIL (MEGATONNE)	RECENT ANNUAL PRODUCTION: YEAR	RECENT ANNUAL PRODUCTION: AMOUNT (MEGATONNE)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SOUTH AMERICA								
Temperate South America								
Uruguay (a,b								
Entire Nation	1977	Shale	U	-	50.00	50.00	1976	U
Tropical South America								
Brazil								
Entire Nation	1977	Shalc	459.5	5.000	72.00	314.0	1976	0.011
	-	Sand	U	U	U	U	1976	0
Colombia (a)								
Entire Nation	1972	Sand	U	U	U	U	1972	U
Venezuela								
Entire Nation	1977	Sand	30.00	51.00	65.40	47.54	1976	-

TABLE 4A. NOTES ON OIL SHALE AND BITUMINOUS SANDS
TABLEAU 4A. NOTES SUR LES SCHISTES ET SABLES BITUMINEUX

NAME OF CONTINENT REGION AND COUNTRY	NOTE NO.
AFRICA	
Eastern Africa	
Angola	(a) The value of yield per tonne is the average of a reported range 80 to 200
	(b) Current production is used for tarring roads
	(c) Angola data reported by Portugal.
	(d) Type of other resource is a chalky asphalt.
Ethiopia	(a) The search for Oil Shale and Bituminous sands is at the exploration stage. An oil shale layer of 100 m length and 15 m width has been located in Wollo province. In the region of the Rift Valley Lakes a layer of soft volcanic sandstone with Bitumen cut out by the torrent Buldul, which connects Lake Zwai with Lake Abiata has been observed. No exploration work has been undertaken up to now therefore it is not possible to give any indication of the extent and quality of deposits.
Mozambique	(a) Mozambique data reported by Portugal
	(b) The type of resource was not specified.
Zaire	(a) Type of other resource is a chalky asphalt
	(b) Production (20000 tonnes) is reported as bitumen
	(c) Average thickness of bituminous sand deposit was reported as 12 to 15 metres and average oil content as 11 to 20 percent
	(d) Other resources include the Mavuma basin estmiated to contain reserves of several megatonnes of asphatic minerals, average thickness 20 to 30 metres and average oil content 12 to 18 percent.
	(e) The Ubundu Basin has never been explored, mean results of analyses are density (1.82), oil content (152L/tonne) ammonium sulphate (8.73 Kg/tonne) mineral residue (64.8%).
Western Africa	
Ghana	(a) Both oil shale and bituminous sand deposits are of a noncommercial nature.
ASIA	
Middle South Asia	
Pakistan	(a) No significant quantities of oil shale or bituminous sands have been found. Explorations are being conducted.
Southeast Asia	
Thailand	(a) Yield from oil shale reported as 2.4 to 26.1.
Southwest Asia	
Israel	(a) Shale thickness varies in the three fields Ein Bokek, Ef's and Nebi Musa 50, 45 & 20 m. respectively
	(b) Oil yield also varies Ein Bokek and Ef's have been core sampled giving yhields of 85.0 Kg/tonne and 60 Kg/tonne. Nebi Musa was surface sampled giving yield of 45.0 Kg/tonne possibly infulenced by surface oxidation.
	(c) Asphalt occurs in the southern part of the Dead sea but has not been evaluated
Turkey	(a) The shale figures are calculated from geological surveys completed in the six existing fields (Ankara, Nigde, Izmit, Kutahya, Bilecik, Bolu). More reliable data referring to estimated yield could only be given upon completion of further surveys. There is now no bituminous shale production in Turkey. The main lines of the current R+D programme are directed towards their use as fuel in thermal power plants for electricity generation or the production of synthetic oil pyrolysis techniques.
	(b) Average thickness of Shale deposits reported in the range 1 to 13 m.
	(c) Exploration, and technical assessment of the asphaltite deposits found in Southeastern Turkey are being carried. 52 million tonnes of total exploitable reserves (proved + probable + possible) have been determined. In the Sirnak field, total proved reserves of 17.5 million tonnes are estimated. These estimations are subject to revision. As a result of research it has been concluded that there are various utilisation possibilities of the asphaltic reserves namely, electricity generation, synthetic fuel (crude oil and gas) production, producing ammonia and hydrogen sulphide as by- products and recovery of valuable metals (such as nickel, cobalt, vanadium, molybdenium) and radioactive minerals (U3 O8 , ThO2) from asphaltite ashes were proved to be economically viable at laboratory-scale. The yields of the raw products obtained from the pyrolysis process of Avgamasya asphaltites for, and also the important characteristics of the concerned asphaltites deposits have been determined. A pilot plant is now planned and the project is planned to be completed by 1980.
EUROPE	
Northern Europe	
Sweden	(a) Thickness reported in the range 10-15 m
	(b) Yield reported in the range 5-6 KG/tonne.
Western Europe	
Austria	(a) Shale oil used solely for pharmaceutical products. Not at present considered as potential fuel source.
Germany F.R.of	(a) Data refer to "Schandelah", the biggest deposit and only one which is currently explored. In addiition there are minable resources in northern Germany 1 - 1.5 x 10 9 t in southern Germany 0.3 x 10 9 t taking into account a 5% recovery from the Shale this means 65 -90 x megatonnes potential recoverable oil.
NORTH AMERICA	
Caribbean	
Trinidad and Tobago	(a) Deposits are a pitch lake and oilsand quarries the production from the latter was recorded as 33,354 cubic metres.
Northern America	
Canada	(a) The only major operation presently taking place is at Fort McMurray by Great Canadian Oil Sands. There is a pilot project in Cold Lake, Alberta producing between 5,000 - 10,000 barrels per day. Syncrude will be in operation in 1978.
	(b) The bitumen contained in the sands goes from 10% to 15% by weight
	(c) The average thickness was reported as a range 0 -914 and the total potential oil as a range 10960 - 27400.
Greenland	(a) Data for Greenland was reported by Denmark.
U.S.A.	(a) Identified shale oil resources in high-grade deposits of the Green River Formation (Colorado, Utah and Wyoming). Resources in lower grade deposits in that region and deposits in other areas are estimated to be serveral times as large.
	(b) Deposits of sand are located in various regions predominately in Utah, and data do not permit consolidated reporting of resource characteristics.

TABLE 4A. NOTES ON OIL SHALE AND BITUMINOUS SANDS
TABLEAU 4A. NOTES SUR LES SCHISTES ET SABLES BITUMINEUX

NAME OF CONTINENT REGION AND COUNTRY	NOTE NO.
NORTH AMERICA	
Northern America	
U.S.A.	(c) In a large portion of the deposits there are sequences of rich oil shale that are much thicker than 35 meters. The very thickest deposits are near the centre of the Colorado oil shale area, where moderately rich sequences are 610 meters thick.
	(d) Potential oil recovery assuming a recovery factor of 50 percent of the estimated in place oil resources.
	(e) Yield reported as a range 90 to 360 Kg/tonne
OCEANIA	
Australia & New Zealand	
Australia	(a) Figures given are for Demonstrated Resources. Very large additional resources of oil shale are inferred covering an area of 700,000 sq. km. All reserves and resources are currently subeconomic.
	(b) Yield recorded as a range 80 to 104 Kg/tonne.
New Zealand	(a) Deposit area is that of Orepuki deposits in Southland, and in Lower Nevis Valley, Central Otago.
	(b) Average thickness reported as a range 1.4 to 26 m and Yield as a range 31 to 160 Kg/Tonne.
Melanesia	
New Guinea	(a) Data was reported by Australia. No known resources are indicated.
Papua	(a) Data were reported by Australia. No known resources are indicated.
SOUTH AMERICA	
Temperate South America	
Argentina	(a) Shale is located in RINCON BLANCO, SAN JUAN Province.-
	(b) Other deposits are Pirobituminous Asphalt located in MENDOZA, Province and NEUQUEN Province.
Chile	(a) There are no recent data available for Chile.
Uruguay	(a) ANCAP has in hand a definitive study of bituminous resources. Result are not yet available.
	(b) Yield of oil reported as a range 47 to 54 Kg/tonne.
Tropical South America	
Colombia	(a) Bituminous sand have been reported for the Upper Madgalena subregion but not evaluated.

TABLE 4B. REFERENCES ON OIL SHALE AND BITUMINOUS SANDS
TABLEAU 4B. REFERENCES SUR LES SCHISTES ET SABLES BITUMINEUX

NAME OF CONTINENT REGION AND COUNTRY	REF. NO.
AFRICA	
Eastern Africa	
Angola	1. Service De Geologia & Mines de Angola
Ethiopia	1. Danilo J.A. Mineral Occurances of Ethiopia, Ministry of Mines, 1966.
Malawi	Geological Survey Department of Malawi
Zaire	1. R. Brosius, Sur les Gisements Bitumineux du MAYUABI, Bull, Inst. Royal College Belge, 1973 2. G. Passu, Les Schistes Bitumineux de Congo Belge, Congress International VII Paris 1935. 3. A.Clerfayt, Le Developement Energetique du Congo Belge, A.R.S.O.M., XII 2, Bruxelles
Western Africa	
Nigeria	1. Gulf Oil Company (Nigeria) Limited
ASIA	
Middle South Asia	
Bangledesh	1. Bangledesh Mineral, Oil and Gas Corporation.
Southeast Asia	
Indonesia	1. Indonesia National Committe, WEC.
Philippines	1. Buseau of Mines, Department of Agriculture and National Resources.
Thailand	1. Department of Mines
Vietnam (Rep of.)	1. Service de Prospecti Miniere
Southwest Asia	
Israel	1. Ministry of Development, Geological Survey of Israel, Israel Mining Industries (Various Reports).
Turkey	1. Reports of the Bituminous Shale Unit of The Petroleum and Geothermal Energy Department of MTA (the Mineral Exploration and Research Institute of Turkey) -Unpublished.
EUROPE-ASIA	
Northern	
USSR	1. Kler V.R., Nenakhova V.F. Geological deposits of fuel shales in the Soviet Union. "Sovetskaya Geologiya", 1977, No.3. 2. The Perm' bitumens of Tatariya. Kazan', 1976, Kazan' University Publishing House.
EUROPE	
Northern Europe	
Ireland	1. Geological Survey of Ireland
Sweden	1. Sveriges Geologiska Undersokning, Stockholm
United Kingdom	1. Department of Energy Paper No.1 "U.K. Oil Shales: Past and possible future exploitation" 1975.
Western Europe	
Austria	1. Oesterreichisches Monathandbuch, 1975
Germany F.R.of	1. Federal Institute for Geosciences and Natural Resources.
Netherlands	1. Central Bureau of Statistics
NORTH AMERICA	
Northern America	
Canada	1. Oil Sands and Heavy Oils: The Prospects -E.M.R.
U.S.A.	1. U.S. Geological Survey, Department of the Interior, Geological Survey Professional Paper 820, "United States Mineral Resources", 1973.
OCEANIA	
Australia & New Zealand	
Australia	1. National Energy Advisory Committee. Draft paper: "An Assessment of Australia's Energy Resources" - Petroleum estimates prepared by BMR, 1977.
New Zealand	1. Williams GJ, 1974 Cenozoic Geology of the Lower Nevis Basin with special reference to oil shale deposits". DSIR Bulletin 212. 2. Robinson W E, Dinneen GU 1967 "Constitutional Aspects of Oil-Shale Kerogen". World Petroleum Congress 7 (Mexico) 3. Willett R W, "The Oil-Shale Deposit of Orepuki, Southland". NZ Journal of Sciences and Technology
Melanesia	
New Guinea	1. Department of Minerals and ENERGY (Bureau of Mineral Resoursces), Australia
Papua	1. Department of Minerals and Energy (Bureau of Mineral Resources). Australia
Polynesia	
Western Samoia	1. Department of Minerals and Energy (Bureau of Mineral Resources), Australia
SOUTH AMERICA	
Temperate South America	
Chile	1. Corporacion de Fomento de la Production (CORFO).
Uruguay	1. Boletin No.22 del Instituto Geologico del Uruguay.
Tropical South America	
Brazil	1. PETROBRAS - Petroleo Brasileiro S.A. Servico de Planejamento
Colombia	1. Empressa Colombiana de Petroleos (ECOPETROL)

WORLD ENERGY CONFERENCE

SURVEY OF ENERGY RESOURCES 1980

~~pre~~pared by

BGR

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CONTENTS

Part A

Text

Foreword

During the last few years a great number of studies dealing with the global resource situation of energy raw materials have been compiled. These studies have demonstrated very clearly that a comprehensive and universally acceptable inventory and analysis is not as yet possible. The reasons for this situation are geological. To this day, the geological knowledge of our planet is not as yet comprehensive enough to enable the geological analyst to accurately and completely quantify the resources on conventional energy raw materials. This applies even more so to renewable energy resources, the technology of which is largely still in the development stage.

This study is therefore just a further step towards the quantitative assessment of the energy raw materials situation. It gives a comprehensive picture of today's knowledge based on many newly acquired data. It does not however claim provide the final answer in quantitative terms.

Following an already established tradition of publishing energy studies, the World Energy Conference asked the Federal Institute for Geosciences and Natural Resources of the Federal Republic of Germany to compile the survey for 1980, for the occasion of the 11th World Energy Conference as a contribution to the world-wide energy discussion.

The report is based largely on new data which were collected through a world-wide questionnaire. Critical evaluation and interpretation of these data led to the conclusions at which the study finally arrived. Our thanks are due to all those who assisted with the questionnaire and thereby contributed to the compilation of this study.

For the benefit of the economists and politicians reading this report, it should be made clear that there is a large difference between the data of conventional and of renewable energy resources. Although the comprehensive quantitative inventory and assessment of conventional energy raw material does not as yet exist, several generations of scientists have collected a wealth of information already, which allows the expert to arrive at relatively precise estimates. In contrast, the research into renewable energy resources is still relatively recent and technological difficulties still have to be overcome. The economic feasibility of renewable energy resources is in most cases still unsolved. All these factors contribute to a certain vagueness as far as quantitative evaluations are concerned. It is quite clear that conventional energy resources are finite and that the conservation and introduction of renewable energy resources are therefore imperative. This statement however, is of a qualitative nature, and it is still an almost impossible task to give quantitative recommendations as to when and to what degree the transition from conventional to renewable energy should take place.

This study has been compiled by several authors and with the help of many individuals. Our special thanks are due to all National Committees of the member countries of the World Energy Conference and to the non-member countries for their valuable contributions. The General Secretary of the World Energy Conference, E. RUTTLEY, London, and the members of the Conservation Commission, took an active interest in the compilation of the study. We thank them for many stimulating and valuable suggestions. We also wish to thank Prof. L. BAUER, Vienna, chairman of the Consultative Panel of the World Energy Conference, which was primarily responsible for the Survey 1980. Under the careful guidance of the chairman, close cooperation and coordination developed between the executive organs of the World Energy Conference and the Federal Institute for Geosciences and Natural Resources. We thank the advisors who made many valuable and critical suggestions and all those without whose help this study could not have been presented.

Prof. Dr. F. BENDER
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A1

SOLID FOSSIL FUELS

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1. SOLID FOSSIL FUELS

1.1. INTRODUCTION

The term Solid Fossil Fuels encompasses both coal (anthracite, bituminous coal, sub-bituminous coal, brown coal) and also peat. However, the asphaltic pyrobitumina (which often occur in veins) and the oil shales are not included.

Following the energy crisis in 1973 and especially because of the increase in the price of oil since the beginning of 1979, and also due to the problems encountered in using atomic energy, coal and even peat has once again come into world-wide consideration as a source of both primary energy and chemical raw materials.

Numerous countries have already begun to re-evaluate their coal resources, and to start both prospecting and exploration campaigns in areas around known coal occurrences and also in prospective areas. At the same time, there has been and there will continue to be increased efforts to find more rational, environmentally less harmful ways to use coal, and also to develop a modern form of coal conversion, particularly in the areas of gasification and liquification. These efforts have been extensively backed financially within the energy research programs of the larger coal-producing countries. For some of the countries this research could even lead to the introduction of peat gasification.

Regretfully, up till now it has not been possible to agree upon and introduce an all-encompassing international classification system for solid fossil fuels. The coal statistics of many countries distinguishes solely between bituminous coal and brown coal.

The system used in the questionnaire, where coal is subdivided into four types -- anthracite, bituminous coal, sub-bituminous coal and lignite -- and where peat is kept as a separate fifth class, is presently the most extensive system of classification available, even when the divisions between the groups are not internationally standardized and therefore could lead to a degree of inaccuracy when calculating quantities.

The tabular summary on the next page shows the approximate boundary values that are most commonly used for the classification parameters (table 1.1).

TABLE 1.1 : Boundary values of the most important parameters when classifying coal according to rank.

	Natural water content %	Heat of combustion af, moist, KJ/kg and Kcal/kg (brackets)	Volatile matter (daf) %	Total carbon (daf) %
Peat				
———	70 - 75	ca. 6700 (1600)	60 - 62	60 - 64
Soft brown coal, lignite				
———	35 - 40	18 850 - 19 250 (4 500 - 4 600)	ca. 53	ca. 67
Sub-bituminous coal				
———	ca. 10	23 900 - 26 800 (5 700 - 6 400)	45 - 50	ca. 77
Bituminous coal				
———	ca. 3	ca. 35 400* (8 450*)	10 - 14	91 - 92
Anthracite				

* in anthracite stage this value is lower

1.2. ORIGIN AND PROPERTIES

In numerous sediment basins of the earth, coal is present as organic sedimentary rock in the form of seams, i.e. in layers. The coaly substance is derived primarily from plant material deposited in bogs of earlier geological eras. The coal deposits that are economically viable were formed from land plants that grew after 350 million years ago since the beginning of the Carboniferous, a time when the earth's vegetation increased markedly. Combustible organic rock originating before this period is of an oil-shale nature and is derived from algae.

1.2.1. Formation of Peat

In the formation of peat it is important that the complete decomposition of the dead plants to carbon dioxide and water is prevented. This leads to a relatively large accumulation of plant material, because reducing environment is created in the bogs due to the exclusion of air which largely stops the normal microbial decomposition processes. After this process is finished, one finds plant material which has become altered in composition and has a greater or lesser enrichment in the amount of carbon present (biochemical coalification), and also humic substances which are formed as an intermediate product during this "peatification". During peatification, 50 - ca. 90 % of the primary plant material decomposes.

Development of relatively large amounts of peat takes place within the humid belts (tropical humid, subtropical humid and temperate).

Broadly speaking one distinguishes between nutrient-rich low bogs formed in areas of groundwater, lakes and trickling water, and raised bogs with a limited nutrient supply and fed only by rain water.

Larger low bog areas are caused when valley floors, hollows, basins and flat coastal plains turn into sump areas, and also from silting up of stagnant waters (lakes, dead arms of rivers, cut-off sea bays). The formation of sumps in coastal plains and in flat subsidence basins in an earlier geological era have probably a very important role in the formation of coal.

The formation of raised bogs is mainly found in the cool to temperate humid areas, where the decaying processes are somewhat slowed down (Fig. 1.1).

Low bog peats usually reach a thickness of a few meters, but in individual cases deposits tens of meters thick can be found. It is likely that the thickest deposit, with a thickness of over 200 m, is that at Philippi in Greece. In contrast, due to the different conditions of growth, the thickness of raised bog peats rarely exceeds 5-8 m. Around a thousand years are needed for the formation of one meter peat, however in very favorable conditions only 500-300 years are necessary.

Thickness of coal seams varies from a few centimeters to a around 200 m (Fushun in NE China) in the case of bituminous coal -- but on average less than 3 m -- and over 200 m in the case of Tertiary soft brown coal. The formation time of 1 m brown coal (which is much more compacted than peat) is around 1000-3000 years and for 1 m bituminous coal 6000-9000 years. The horizontal extent of the seams is from a few square meters to several thousand square kilometers. In some of the coal basins only a single seam has developed, whereas in others there are a number of seams, e.g. in the Donez area where there are 200.

1.2.2. Coalification

When the peat becomes covered with mineral sediments and forced to sink down to increasingly warm zones of the earth's crust, first of all it undergoes a transformation to soft brown coal and lignite by a process of loosing water (physical, mainly mechanical phase). Following this, according to the intensity of the so-called geochemical coalification process (enrichment in the amount of carbon present) which is above all temperature dependent, sub-bituminous coal, various bituminous coals or anthracite can be formed. The temperatures necessary for the geochemical coalification are approximately 50-300 deg. C (maximum 350 deg. C), which is surprisingly low. The formation of graphite can take place in connection with metamorphosis, i.e. the formation of crystalline shists.

The degree of carbon enrichment is from about 52-62 % in the case of peat to 90-96.5 % in the case of anthracite, and theoretically 100 % with graphite. At the same time, the amount of volatile matter present drops from 65-70+ % to less than 10%, or with graphite to zero. The percentage of oxygen drops

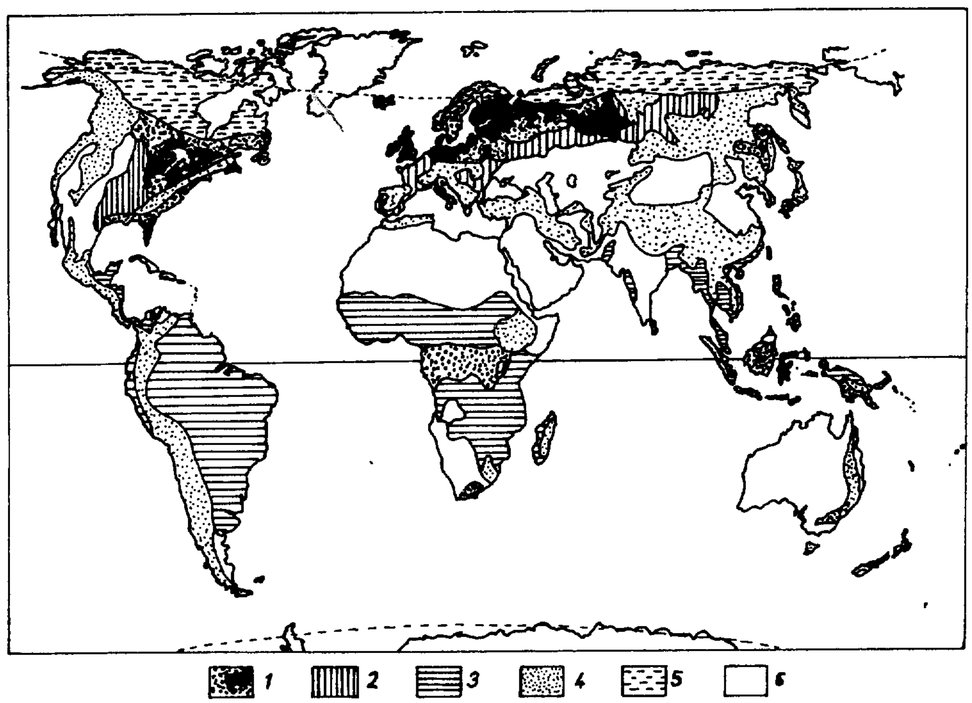

Fig. 1.1 The belts of peat around the world

Les ceintures de tourbières dans le monde

Die Torfgürtel der Erde

from 30-35 % in peat to 2 % and less in anthracite. The percentage of nitrogen drops only slightly from around 2-3 % for water- and ash-free peat to around 1 % for coal.

The energy content of the solid humic fuels is increased by the coalification process from about 8 MJ/kg to about 36 MJ/kg (ash-free, natural moisture). The highest energy content occurs with coal containing 15-20 % volatile matter (low-volatile bituminous coal); with increasing coalification up to anthracite the heating value of drops off again slightly.

1.2.3. Quality of the Raw Material

The quality of a solid fossil fuel is determined by the properties of its organic constituents and also by the amount and type of mineral impurities.

1.2.3.1. Properties of the Organic Material

The most important characteristics are

-- degree of coalification, also called rank (determined by chemical tests or vitrinite reflectance);

-- moisture content, content of volatile matter or fixed carbon, percentage of total carbon, hydrogen, oxygen, and nitrogen;

-- calorific properties (calorific value/heating value);

-- behaviour during extraction and low temperature carbonization;

-- caking and coking capacity;

-- coal petrographic characteristics (lithotypes, microlithotypes, maceral groups).

In addition to the factors classically used to assess quality, the last-mentioned properties are becoming more and more important. This is because, apart from the degree of coalification and the presence of mineral substances, the make-up of micro components in the coal has a great influence on coal conversion processes (coking, low temperature carbonization, extraction, gasification, liquefaction).

The geological age, i.e. the degree of development of the plants, must also be taken into consideration. This is because with coals with the same degree of coalifiaction and the same make-up of maceral groups, one can still find noticeable differences in technological behaviour for example in the case of Carboniferous as against Upper Cretaceous coals.

Peat used as a source of energy or for coking, etc. should have a high degree of decomposition and contain only small amounts of ash and sulfur. This is the reason that only raised bog peats are used. They also have the advantage that they can be more easily drained. The question of how much of the thick and large, mostly high-ash low bog peats could even be considered in the future as a source of energy (e.g. the deposits at Philippi, Greece, and Padul, Spain, and the regularly flooded tropical coastal bogs) is very uncertain.

1.2.3.2. Mineral Impurities

During the use or conversion of coal or peat, the mineral constituents that are always present to a greater or lesser extent constitute in some cases solely neutral ballast material, but in other cases lead to the presence of impurities in the product or can be set free as environmentally damaging emissions.

The presence of mineral substances in solid fossil fuels arises in various ways:

-- from mineral materials either chemically bonded or present as crystals within the plants (plant ash),

-- substances washed or blown into the peat,

-- minerals that are formed during the peatification and geochemical coalification stages.

The following are the most important factors when considering the mineral constituents:

-- the overall proportion (content of mineral matter, ash content),

-- the composition of the mineral constituents,

-- the distribution of the minerals (which affects the washability),

-- the composition of the ash, ash melting characteristics,

-- the content of sulfur, chlorine and phosphorus and the trace elements, and various compounds containing these elements.

Raised bog peats contain very little mineral material (1-3 % ash related to dry weight), arising partly from air-borne dust particles. In the case of low bog peat, running water or flooding brings in a greater or lesser proportion of mineral components, so that the ash content is mostly 5-15 % and more. The pyrite, which is the main source of sulfur in coals, is mostly formed during the peatification stage.

In nearly all bituminous and brown coal seams, one finds to a greater or lesser extent inclusions of clay, sand or marl and even pure carbonate impurities (dirt bed) and also pyrite and marcasite, present in layer, lenticular or nodular form, as well as in joints.

Apart from these more coarse dirt beds, mineral inclusions are also found in a more finely divided, intergrown form which can only be partially separated by the washing process. 60-80 % of the fine impurities is clay followed by carbonate impurities with 5-30 % and iron sulfide, especially pyrite, and also quartz. Last of all, mineral elements can also be present that are directly bound chemically to the organic material.

The proportion of inorganic main, subsidiary, and trace elements found in the individual coal deposits is dependent on the paleogeographic situation of the coal basins together with their subsequent geological history, and can vary considerably.

The sulfur content, which is a particulary disturbing factor in the utilization of coal, can reach over 10 % by weight in individual deposits, but is usually under 2 %. Forty to eighty percent of the sulfur is present as pyrite or marcasite, and the rest as sulfate compounds or as organic sulfur chemically bound within the coal.

Chlorine is present in nearly all coals to a level of 0.05-1.0 %. The maximum phosphorus content of coal is around 0.08 %.

According to RUCH et al. (1974), only three trace elements in coal reach concentrations more than a factor of ten higher than the average concentration found in the earth's crust: cadmium, boron and selenium. The proportions of chlorine, manganese, and phosphorus are at least ten times less than that in the earth's crust. However, it should be noted that regional variations are considerable. In certain localized areas, particular elements such as uranium, germanium, arsenic, boron and beryllium, occur in substantial concentrations and could possibly attain economic importance in the future as by-products of coal conversion.

1.3. COAL AND PEAT DEPOSITS, AND PROSPECTIVE AREAS

A requirement for the formation of both larger and smaller coal basins is an area of subsidence of the earth's crust, i.e. tectonic downward movements which occurred over geological history since the Devonian/Carboniferous eras.

Sunken areas of this type are found in connection with two different types of large scale geotectonic units within the earth's crust: relatively stiff platforms and folded regions (orogenes).

The orogenes which become consolidated by mountain formation processes, are then flattened out to platforms or tables, and over the following geological history, some areas become covered once more by younger sedimentary deposits. This can lead to the formation of coal-bearing layers in the following situations:

a) In epirogenic depressions of the platform, i.e. where larger regions of the platform have sunk slowly over a period of time, or at the edges of the corresponding anticlines.

There is some variation in the coal content between the different basins. The thickness of the coal-bearing formations and the number of seams (1-20), is low in most cases. Despite this, quite large amounts of coal can be present in the flat and practically undisturbed coal-bearing layers which can cover considerable areas. The regional coalification is low (e.g. the lower Carboniferous coals of the Moskow basin).

b) In depressions at the edge of platforms (i.e. in the transition areas bordering marine basins).

   The largest proportion of coal is found in the coastal regions (e.g. the Mid-continent Basin in the USA).

c) In regions of salt tectonic, where various types of depressions can occur, for example:

   -- Around individual rising salt domes or in areas between several salt domes where depressions have been caused by underground salt migration.

   -- Over salt domes where subrosion has caused funnel-shaped depressions or collapsed regions.

d) In depressions in the Karst. This type of depression plays an important role in the brown coal deposits in Yugoslavia.

The coal deposits which are economically most important are those connected with the formation of folded mountains:

a) The most important regions for the sedimentation of coal-bearing layers are the fore-deeps of the folded zones. Coal-bearing layers found in these regions extend over a large area and thickness (5-10 km), and contain considerable amounts of coal. The seams also cover a large area and sometimes have a substantial thickness. Additionally a depth-dependent broad range of rank is recognizable. However, such basins show complex tectonic behaviour close to zones of folding, and a simpler structure in regions close to the platforms (e.g. Central European coal belt, and the Appalachian Basin).

b) The postorogenic deposits of coal-bearing layers in older depressions or collapsed basins situated in folded mountain regions (intramontan basins) also have considerable economic importance (e.g. Saar-Lothring coal basin, Karaganda Basin, the intramontan brown coal basins in Southern Europe).

The most important geological periods of coal formation were the Upper Carboniferous and Lower Permian, Jurassic (especially in Central and East Asia), Cretacious and Tertiary (Fig. 1.2).

The regions of the earth where coal can be found are largely known, or at least these prospective areas can be marked out relatively accurately. Coal deposits are found on all continents, though the largest deposits are concentrated in the northern hemisphere (Encl. 1.1). The following regions contain larger coal-bearing areas:

North America : Appalachian, Mid-continent and Western province. The latter contains mainly Cretacious and Tertiary coal and extends practically from Coahuila in Northern Mexico right up to Alaska. These are the same type as the most important deposits in South America.

South America : In the foreland of the Colombian and Venezuelan Andes ranges, and also the Cretacious coals found in Peru. In addition there are large deposits of brown coal in the extreme South of Chile.

Europe : A belt of paralic Carboniferous bituminous coal extends from England through Northern France, Belgium, Holland, West Germany and Poland right up to the Donez region in the USSR. In addition to this there are areas of Tertiary brown coal in the Rheinland, Central and Eastern Germany, Poland, Czechoslovakia and Yugoslavia.

Additionally, there is a deposit of Lower Carboniferous brown coal in the Moskow Basin and a whole row of various types of coal deposit along the Ural, together with the important Petschora Basin in the North.

Central Russia and Eastern Asia :

Here there are numerous coal basins of vari-

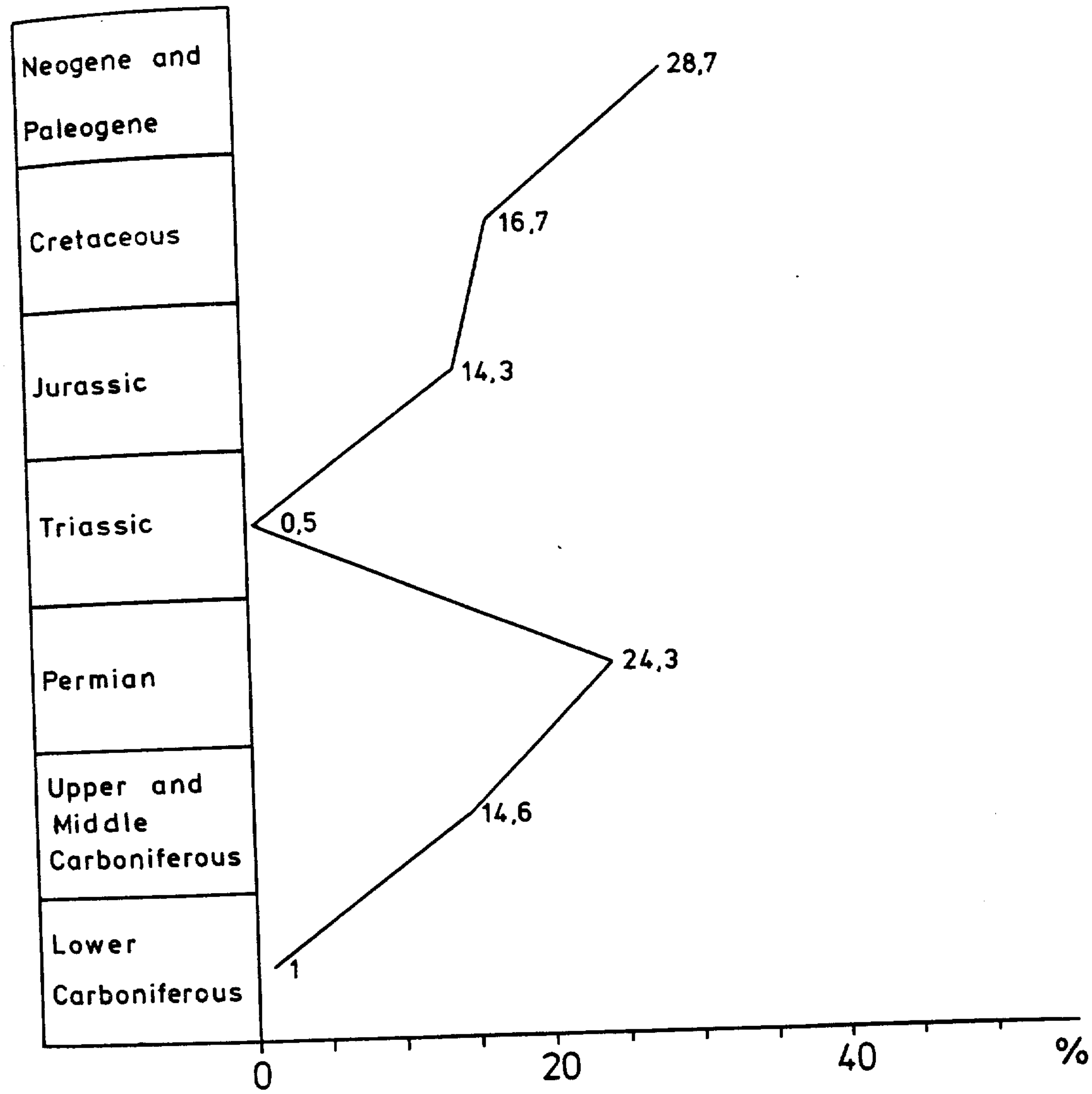

Fig. 1.2 Percentage of the total coal found within each of the geological formations following the Carboniferous

Pourcentage des réserves de charbon à l'intérieur des différents étages géologiques à partir du Carbonifère

Anteil der Kohlenreserven innerhalb der geologischen Formationen vom Karbon ab ous ages, for example the basins at Karaganda, Kusnezk, Kansk-Achinsk and also the hardly prospected but enormous prospective areas East of the River Jenissei and on the River Lena.

China : The mainly Carboniferous, Permian and Jurassic coal deposits found in China lie mostly in the North and Northwest, in the provinces of Hopei, Shansi, Shensi, Ningsia and Singkiang.

Australia : The bituminous coal deposits in New South Wales (Sydney Basin) and Queensland (Bowen, Clarence, Moreton and Galilee Basins) are mainly Permian (Gondwana formation). Tertiary soft brown coal deposits are found in Victoria (particulary in the Latrobe Valley Basin). Additionally, investigations are currently being carried out on extensive Jurassic coal deposits, most of which are of sub-bituminous rank.

India : Deposits of Gondwana coal, especially in the provinces of Bihar, Orissa and Madhya Pradesh.

Southern and Southeast Africa :

Coal-bearing layers of the Karroo formation (= Gondwana formation) extend from near Durban right through the South African provinces of Natal and Transvaal towards the North, further than the Zambesi River.

It is very unlikely that new, currently unknown coal deposits will be found with the same scale and size as those in the Ruhr area in Germany, or the Appalachian Basin. There is however quite a good chance that numerous small deposits possessing several hundred or thousand million tons of coal will be found, particulary in the case of brown coal. This has been demonstrated by the discovery of the Elbistan brown coal field in Turkey.

Among the various areas where it is hoped to find coal are: Western Canada North of the 60th latitude and the Arctic islands; a few regions of South America, for example Colombia, Venezuela and Southern Brazil, and possibly even the Amazon area; islands in Indonesia; extensions of the Karroo formation in Southern Africa (particulary in Botswana and Namibia).

There are also numerous signs of coal deposits in the Antarctic, which formerly constituted part of the Gondwana continent. Following up on the success of prospecting in Southern Europe, it seems logical to prospect for brown coal in other intramontan basins of the alpidic orogen, and also in Karst regions.

Figure 1.1 shows regions where peat is found. The main areas are the regions around the Great Lakes in the United States and Canada, the Northeastern United States and Eastern Canada, and also Alaska, the Central European lowlands from Holland through to the Ural, Western Sibiria, (which has approximately 786,000 km^2 of bog areas and also the largest single bog in the world which is 53,000 km^2 in size - the great Vasyugansk Bog), Great Britain, Ireland and Scandinavia (particulary Finland and Sweden).

In addition there are large bogs in the Mediterranean area (Padul, Spain, and Philippi, Greece), in Southeastern and Southern USA (Georgia, Florida, Mississippi Delta region), in Bangladesh and Assam, in Sumatra, Borneo and also in Newzealand.

Additionally, there are hopes of finding new deposits in tropical and subtropical regions.

Particulary in Europe, large areas of bogland have been cultivated and are being actively farmed. Raised bog peat which is only partly decomposed -- the so-called white peat -- is often excavated for use in farms and gardens. Such bogs, and also the areas that are flooded for months on end (coastal bogs and bog areas in valley floors, which are difficult to drain), cannot be used as a source of peat fuel. Bogs containing only small amounts of peat, or where the peat contains a high proportion of minerals, or bogs situated in undeveloped areas are also unusable.

1.4. MINING, USE AND CONVERSION

1.4.1. Coal Mining

Table 1.2 summarizes the various highly developed methods used to mine coal. In the industrialized countries, both extraction of the coal and roof support in underground mining is highly mechanized.

TABLE 1.2 : The technology of coal mining

Opening-up	Access	Mining method	Recovery method	Transport	Recovery of overburden or surrounding rock	Transport of overburden or surrounding rock
Open cast	Contour mining Open pits Strip mining	Slicing Benching	Bucket ladder excavator Shovel excavator Bucket wheel excavator Scrapers and front-end loaders	Track haulage Conveyor belt Shuttle cars (LHD technique*)	Bucket ladder excavator Shovel excavator Drag line excavator Bucket wheel excavator Front loader Dozers and scrapers Drilling and blasting	Direct removal with excavator Conveyor bridge Railway truck Conveyor belt
Underground	Adit Inclined drift Vertical shaft	Long wall mining Short wall mining Room and pillar mining without pillar extraction Room and pillar mining with pillar extraction Sublevel caving Combined methods	By hand with pneumatic picks Drilling a. blasting Drum shearer Coal plough Continuous miner Hydromechanical methods	Chain scraper Scraper Conveyor belt Railway trains Lorries (LHD technique) In the case of shafts, with a cage or skips Pneumatic and hydraulic methods	Drilling and blasting combined with various loading equipment By hand Various loading equipment Tunnelling machine Vertical shaft raisers	Track haulage Conveyor belt LHD technique In the case of shafts, with a cage or skips bulk haulage front-end loaders and shuttle cars
Auger mining	From high well of open cast mining when overburden coal ratio becomes unfavourable	---	Spiral-auger	Lorries	---	---
In situ mining by drilling	Drilling	Gasification Gas recovery	Drilling, ignition pumping-off	Pipelines	---	---

* LHD technique = Load, Haul, Dump

It is hoped to obtain a further improvement of the extraction technology by using hydromechanical mining. Additionally, there is an intensive effort being made to extend the usability of mechanized mining techniques to include very thick or thin seams, and also seams that are dipping appreciably or indeed steeply. This adaption is absolutely necessary to substantially reduce the percentage of coal that cannot be reached by the present machines.

Mechanization of coal recovery, which concentrates on fewer operating positions, did not only lead to rationalization of the extraction together with considerable increase in the coal output per shift, for each operating position and each mine, it also brought with it negative effects such as:

-- An increase in the amount of rock in the raw coal which increases demands on the washing equipment.

-- An increase in the amount of coal.

-- A large increase in the amount of coal wasted because only the most suitable and tectonically undisturbed areas in the deposit are mined.

There are losses of coal with all types of mining due to the necessity of safety pillars to protect both underground and above ground installations, together with additional recovery and preparation losses. Estimates show that throughout the world the losses for both underground and open cast mining are on average 50 %. In underground mining, the losses can increase up to 80 % in the case of very thick seams (FETTWEIS 1976).

With the increase in depth, working against the increased pressure of the overlying rock, increasing problems of removing water and the increasing temperatures etc. lead to progressively increasing costs. For this reason, the absolute limit for underground coal mining is currently around 1500-1600 m, where local conditions can allow slightly deeper or demand considerably shallower workings (FETTWEIS 1976). The Ruhr area in Germany has the greatest average depth of all coal mines throughout the world, with an average depth of 850 m, the deepest floor being currently 1280 m. One of the deepest shafts of all with a depth of 1420 m is in the Ibbenbueren area. The levels reach down to 1450 m.

The limiting depth for open cast mining is determined by the costs of removing the overburden, problems of water and also the stability of the slopes. The limit is reached with a ratio of overburden : coal of 10 : 1 to over 30 : 1. In the forseeable future, the absolute limit of depth for open cast mining of coal appears to be 600 m.

1.4.2. Use and Conversion of Coal

Figure 1.3 gives an idea of the current and future possibilities for the use (for heating) and conversion (electricity generation, coking, gasification and liquefaction) of coal. It has been taken from the book "Rohstoff Kohle" (Raw material coal), which was written by a team of authors and published in 1978 (BENTHAUS et al.).

Coal is an energy raw material with a non-homogeneous composition and is chemically rather inert. At the present time, it is used mainly to generate electricity and as a source of heat. Only some of the coal is converted to other products, the conversion of bituminous coal into coke being the most common.

In the Federal Republic of Germany, the proportion of coal used for making coke is comparatively high. In 1978 it was about 39 % of the total output. In Great Britain and Poland it was only about 13 %, in the USSR 19.5 % and in the USA about 10 %.

Coking is the thermal decomposition of coal in the absence of oxygen and at temperatures of 900 deg. C and more. This leads to the production of various types of coke, e.g. blast furnace and foundry coke, electrometallurgical coke. The valuable by-products that arise (e.g. benzol and tar) have suffered a considerable loss of importance due to the rapid rise in petrochemicals which has lead to this seriously reduced profits from the coal based products. However, the energy crisis of 1973 has lead to a considerable upgrading of the value of the hydrocarbons obtained from coal.

In the German Democratic Republic, high temperature coke produced from brown coal was initially used as a substitute for blast furnace coke, but it is now used in various countries in a range of processes, e.g. electrometallurgy (copper and lead production), electrochemical processes (carbide and phosphorus production), and for the production of industrial minerals (dolomite firing in kilns).

The manufacture of formed coke is still in the development

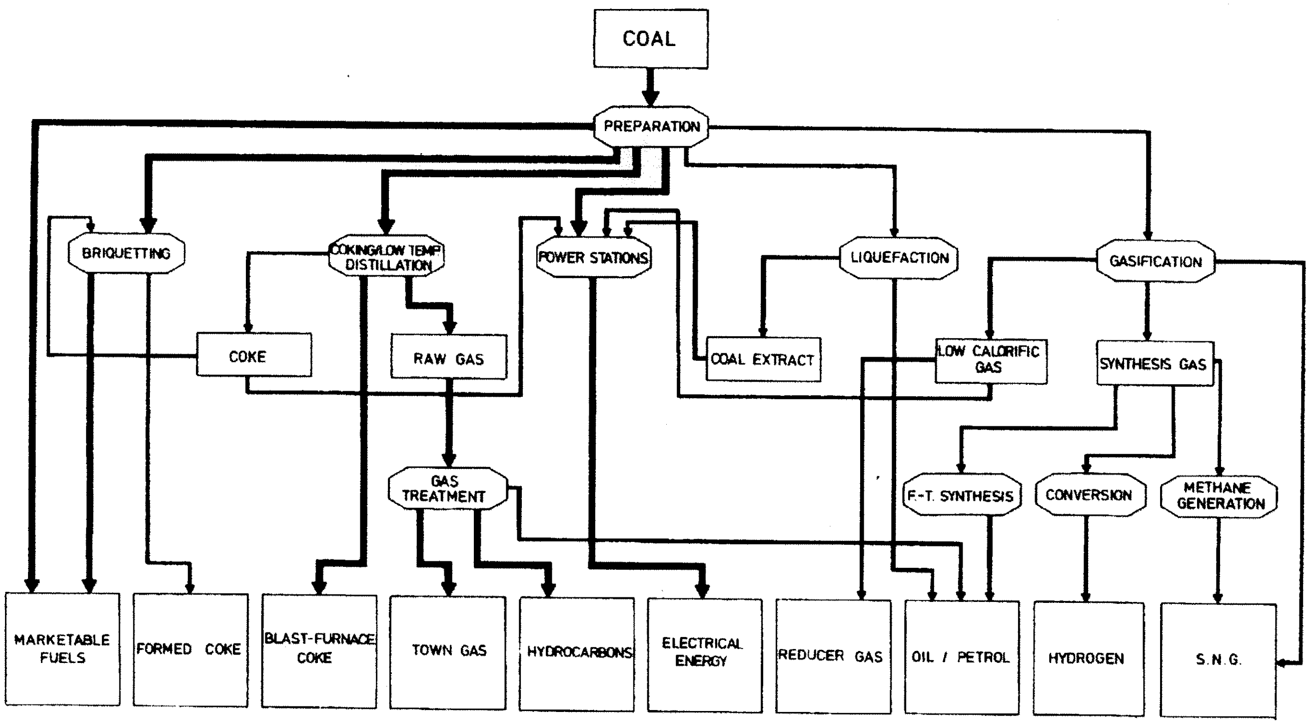

Fig. 1.3 The most important coal conversion methods and coal products

Méthodes de conversion les plus utilisées pour le charbon et leurs produits

Die wichtigsten Kohlenumwandlungsverfahren und ihre Endprodukte stage. First of all briquetts or pellets are formed which are then sent through a coking process.

This technique is especially interesting for two reasons:

-- coal types not normally suitable for producing coke (anthracite, semi-anthracite/low volatility bituminous coal, high volatile bituminous coal) can be used to manufacture formed coke. This is particulary interesting due to the world-wide shortage of classical coking coals.

-- The thermal treatment reduces the volatile constituents, and therefore formed coke is a smoke-poor environmentally harmless fuel. This is in addition to its usefulness in metallurgy and other technical processes.

Low temperature carbonization -- that is thermal treatment at 500-600 deg. C in the absence of oxygen -- is used to produce tar, which is a chemical raw material. At the same time gaseous hydrocarbons are produced. Brown coal, subbituminous coal and the high volatile bituminous coals are particulary suitable for this process. However the process has lost considerable importance due to the ready availability of crude oil. It has recently been discussed whether it is advantageous to send the bituminous coal through a low temperature carbonization process before combustion in power plants in order to allow extraction of the valuable gaseous and liquid constitutents. However, such a method would only be economical with cheap coals.

Formerly, the generation of town gas from coal was a very widely practised process, but it has now become more or less nonexistent in Western Europe. But in some countries of Eastern Europe, e.g. in Yugoslavia, it is of growing importance. In the future, the gasification of coal to generate synthesis gas ($CO + H_2$) and Substitute Natural Gas (SNG) with methane as a main constituent will become increasingly important.

The combined process to gasify the coal to synthesis gas and then to produce hydrocarbons by the Fischer-Tropsch synthesis is being carried out on a very large scale in South Africa.

Lignites, subbituminous coals, high volatile bituminous coals and especially coals rich in minerals or sulfur, which are hardly usable in any other form, should be gasified. Even the gasification of peat has come once more into consideration.

A considerable advance would be the introduction of the in situ gasification of coal. Regretfully, the economical introduction of this process is far from realization -- despite substantial development effort in the USSR, Czechoslovakia and also in the USA -- due to considerable technical and geological problems (permeability of the rock, joints etc.). In future the in situ technology could enable the utilization of coal seams that cannot currently be mined due to their extreme depth or seams that are unusable due to a too high ash content.

Before and during the Second World War, large-scale installations for coal liquefaction, i.e. the manufacture of liquid hydrocarbons from coal by hydrogenation, were being operated in Germany. Towards the end of the war, there were twelve installations in operating having a total output of 4 Mt liquid fuels. Coal liquification became quickly uneconomical after the war due to the ready availability of oil.

Another type of liquefaction process with more chance to become economical is the slight hydrogenation of coal with hydrogen donating solvents. This process is called coal extraction and yields an extract which is practically ash and sulfur free and which becomes liquid only above 180 deg. C. It could be used as a substitute for heavy heating oil in power stations and furnaces as well as a chemical raw material.

The coals most suitable for hydrogenation are the brown coals, particulary when they have a high bitumen content, and also the high volatile bituminous coals (ideally possessing over 35 % volatile matter) and having a maximum of 84 % total carbon.

A new way of burning coal is the technique of fluidized bed combustion. It takes place with considerably reduced emissions and enables the utilization of other types of coal containing much mineral impurity or sulfur.

The large-scale introduction of this and the other new coal technologies will involve long lead-times. The viewpoint of the experts is that the economical large-scale introduction of the manufacture of formed coke cannot take place before 1988-1990. Coal liquefaction will not be introduced before 1990, and the large-scale gasification or liquefaction of coal using the process heat from high temperature nuclear reactors will not take place before 1995-2000.

1.4.3. Technology of Fuel Peat

Since peat is used, before it is cut a proportion of the water is removed by excavating a system of ditches. This reduces the amount of water in the peat under the most favourable circumstances to 87 %, although even 90 % water is satisfactory for carrying out the cutting. Similarly practised over hundreds of years is a process of kneading to compact the peat, because otherwise it would not possess enough density for optimum combustion. This process is now carried out by machinery simultaneously with the cutting. Following this, the peat sods are air-dried to a water content of about 30 %.

A higher degree of compression is obtained in briquets. Briquetts are still used for domestic heating in Ireland, Finland and the USSR. In part briquets are also used for the manufacture of coke. But regularly sod peat is taken for coke-making.

Production of coke from peat has been carried out in kilns since the 17th century. Coke and activated carbon manufactured from raised bog peat are highly valued for use in special metallurgical and cleaning processes due to the high reactivity and the extremely low ash and sulfur content.

1.4.4. Environmental Influence arising from Mining, Use and Conversion

The world-wide increase in coal production, particulary in open cast mines, and an increase in the production of peat has brought with it a whole row of influences and demands on the environment. The following effects should receive particular notice:

-- Alteration to landscapes and biotopes due to the removal of hills and woods, presence of waste tips, insufficient recultivation, the diversion of waterways and remains of unfilled open cast mining sites in flat areas,

-- temporary influence to the water household due to sinking of the ground water table over large areas, interruption of the flow of ground water, sealing up of springs and the diversion and canalization of waterways,

-- Loss of farming and forestry land areas over long periods of time above all due to very deep and therefore very extensive open cast mines.

The technological utilization of solid fuels brings with it a release of a large number of different products that could lead to a greater or less influence, or even damage to the environment if they are allowed to escape. These products can arise in various types of technological process in the form of dusts, exhaust gases and waste liquids.

Dust is set free particulary in the case of combustion and the manufacture of coke. Thanks to the continuous improvement of filter installations in power stations (but less due to changes in the domestic use of solid fuels), the emission of dust into the air has been reduced by 98 % over the last 25 years. Even the cokeworks have had very substantial success in fighting the problem of dust.

Similarly, the proportion of dangerous trace elements such as lead, zinc, fluorine, arsenic and mercury etc. contained in the so-called "purified gas dusts" (dusts remaining in exhaust gas released to the air) have also been considerably reduced. However, the data available on both trace elements and their compounds and the emissions of radioactive elements (uranium, potassium etc.) is rather incomplete.

Apart from carbon dioxide (of which the increasing concentration in the atmosphere and the problems resulting from this do not lie within the scope of this paper), exhaust gases from combustion and conversion processes contain above all sulfur dioxide, nitrogen oxides, hydrocarbons, carbon monoxide, and in smaller amounts the more volatile elements such as iodine and mercury. Whereas removal of sulfur from stack gases is practised throughout the world, no one has been successful in removing the nitrogen oxides. However, using the technique of fluidized bed combustion, the combustion temperature can be lowered enough to substantially reduce the formation of the nitrogen oxides (SCHILLING 1979).

The problem of disturbance to the groundwater household by open cast mining has already been mentioned. An additional demand placed on rivers and sometimes also the groundwater is the release of waste water from underground operations containing salts or acids, the waste water from coal washing plants, acidic water resulting from the decomposition of pyrite trickling out of waste tips and also solube pollutants coming from ash tips. Waste water from technological processes which contains a high proportion of organic compounds, especially phenols, can represent a particular problem.

1.5. RESOURCES

1.5.1. Classification of Resources

The method of resource classification practised in the Survey of Energy Resources of the World Energy Conference has become virtually traditional. It lists resources into the two categories of "known reserves" and "additional resources", where in the case of known reserves it is differentiated between reserves in place and the amount that could be recovered. The wording of the definitions used for the categories in the two surveys of 1974 and 1978 is virtually identical. Based on the definitions used for the hydrocarbons, the following criteria were chosen to prepare the compilation submitted here:

"Proved Reserves" represent the fraction of total resources that has not only been carefully measured but has also been assessed as being exploitable in a particular nation or region under present and expected local economic conditions (or at specified costs) with existing available technology.

"Proved recoverable reserves" are the fraction of proved reserves in place that can be recovered (extracted from the earth in raw form) under the above economic and technological limits.

An additional subdivision of the proved recoverable reserves which has recently been introduced is the question of the overall production costs of the saleable coal f.o.b. mine. In order to obtain some indication of the costs, the coal is classified within the following rather broad groupings:

$$< 15,\ 15 - 30,\ 30 - 60,\ > 60 \text{ US \$/ton.}$$

"Additional Resources" embrace all resources, in addition to proved reserves, that are of at least foreseeable economic interest. The estimates provided for additional resources reflect, if not certainty about the existence of the entire quantities reported, at least a reasonable level of confidence. Resources whose existence is entirely speculative are not included.

"Additional resources in proven coal or peat provinces" include resources additional to those known deposits reported under proved reserves, but which could exist in unexplored extensions of known deposits or in undiscovered deposits in proven coal areas.

"Additional resources in other areas" include resources inferred through knowledge of geological conditions favourable for the occurrence of coal. The estimates should be based on the results of geological and exploratory information or on evidence of duplication of parallelism of geological conditions that occur in proven coal provinces.

Computer tables 1.1 - 1.3 do not include the "additional resources in other areas". The figures can be calculated from the difference between the total "additional resources" and the amounts estimated for known provinces.

Even though the structural characteristics of coal deposits are relatively well understood, there are still problems in preparing statistics for the resources. One source of uncertainty and differences between statistics prepared by different sources is the fact that the subdivision of coal according to rank is not internationally unified. A more serious problem is the lack of unification in the subdivisions and nomenclature of resource categories drawn up in relation to confidence level of geological predictions, thickness and depth of seams, and technical and economic recoverability; yet another problem is the legal limitation on mining in particular areas. The above considerations totally ignore the fact that some countries purposefully withhold information about their energy sources.

Peat deposits are much simpler to classify than those of coal. Due to the simplicity of make-up of peat deposits subdivision of resources according to geological certainty and economic factors is not half as complex as in the case of coal. The deposits are mostly late and post glacial and lie directly on the earth's surface in bog areas, and therefore it is usually simple to estimate extent and thickness and therefore the volume of raw material present.

In the case of a deposit used for fuel, the following criteria is used: Due to the high water content and the low heating value, it is not viable to transport the peat over extended distances, and in fact a power station or cokeworks must lie in the direct neighbourhood of the workings. Therefore the deposit must be sufficiently large to supply the power station throughout its viable working life.

For some of the countries quoted in the computer tables 1.1 - 1.3, figures for the in-situ reserves also include amounts that are not exploitable. The figures for additional resources also include largely speculative quantities together with figures for the so-called "occurrences" (FETTWEIS 1979; International resource classification of the U.N. 1979), which are economically uninteresting for the foreseeable future.

1.5.2. Background to the Results

Only 42 of the countries possessing coal or peat deposits returned the questionnaires. This is about a half of the countries currently mining or who have previously mined these fuels. Some of the questionnaires were incompletely answered. Throughout the world there are over a hundred countries with coal or peat deposits, or at least indications of the presence of such deposits.

One of the tasks of this Survey of Energy Resources is the representation of the fuel statistics in a form that is easily understood, and to this end computer tables 1.1 - 1.5 list the reserves and resources separated according to the type of coal or peat. Note that in computer tables 1.1 - 1.3 quantities are represented in metric tonnes, in 1.4 in Megatonnes of coal equivalent and in 1.5 in Petajoule. Computer table 1.6 lists the criteria used in assessing the reserves (minimal seam thickness, maximum depth, recovery factor etc.).

The resources tables show the total production for 1978 and also the amount produced by open cast mining, and in the case of "bituminous coal and anthracite" the percentage of coking coal and anthracite present. Some countries have included the production figures for sub-bituminous coal together with those for bituminous coal, and in some places this had lead to small contradictions in the figures.

Very few countries replied with information on their cumulative production, and this rarely included the complete time span that was requested (e.g. Federal Republic of Germany only forwarded figures for the period after 1900), and thus it was impossible to calculate a usable value for the world cumulative production up to the present day.

The break-down of the resource statistics into regions was only carried out by a few countries, and therefore regional differences have only been treated in the text and not shown in the tables.

As far as possible the same conversion factors were used for converting the figures for recoverable coal reserves and additional coal resources into coal equivalent (ce) as were used by the United Nations in their energy statistics (see computer table 1.4). A factor of 0.78 was assumed throughout for the sub-bituminous coal, this being the average value (= 23 MJ/kg) calculated for the sub-bituminous coals of the US coal classification system.

In the case of peat, apart from a few exceptions the quantities were converted to coal equivalents in just the same way as in the international statistics by assuming a heating value of 12,560 KJ/kg (3000 Kcal/kg) which is the value for air dried peat containing around 30 % water per weight. This corresponds to a conversion factor of 0.43.

1.5.3. The Resource Situation for each Type of Solid Fossil Fuels

Computer tables 1. 1 - 1.5 show the geological resources and the economically recoverable reserves of coal and peat for each continent and country.

According to the current state of knowledge, there are 13,476 (rounded to 13,500) Gt of coal resources in the broadest sense, (Table 1.3) contained in the coal occurrences, and this fuel could produce a total heat quantity of 11,062 (rounded to 11,100) Gt ce (Table 1.4; 11,184 - 122 = 11,062 Gt ce).

These figures are nearly 940 Gt ce (9.3 %) higher than in the WEC study of 1978 (PETERS & SCHILLING) (see Table 1.5), the difference being mainly due to new exploration work that has taken place in Australia and Canada. At the same time the recoverable reserves rose by about 50 Gt ce (8 %).

Of this quantity, 1320 Gt (9.8 %) is proved (if one includes a reasonably reliable figure for the proved reserves in China of about 200 Gt the new figure is 10.5 % - see section 1.5.4.3.) The remaining 90.2 % almost certainly consists mainly of inferred, hypothetical and speculative quantities possessing confidence levels of less than 50 % and sometimes considerably less than this. For a few of the countries it is likely that figures from so-called occurrences (in the sense of FETTWEIS 1979) have become included in the statistics, i.e. quantities that are certain to be economically uninteresting for the foreseeable future. Only a very small proportion of the additional resources are proved, and they are placed in this category solely because they are sub-economic. For this reason around 12,160 Gt of the total amount can only be considered with extreme caution from the point of view of possible future raw material supplies. Once again due to the uncertainty in the figures, adding up the quantities of reserves in situ and the additional resources to obtain the overall geological resources in situ was not carried out in computer tables 1.1 - 1.5.

TABLE 1.3 : Total resources of solid fossil fuels in situ, and recoverable reserves (in Gt and %), and the calculated lifetime of these reserves based on the production level in 1978.

	COAL				PEAT
	Bituminous coal & anthracite Gt (%)	Sub-bituminous coal Gt (%)	Lignite Gt (%)	Total Gt (%)	Gt (%)
Proved reserves	774,6 (58,7)	221,6 (16,8)	323,5 (24,5)	1 319,7 (100,0)	56,7
Additional resources	6 161,4 (50,7)	3 835,2 (31,5)	2 159,6 (17,8)	12 156,2 (100,0)	261,6
Total	6 936,0 (51,5)	4 056,8 (30,1)	2 483,1 (18,4)	13 475,9 (100,0)	318,3
Proved recoverable reserves	487,7 (55,3)	143,0 (16,2)	251,1 (28,5)	881,8 (100,0)	15,8 16
Calculated static lifetime, years	198	780	281	---	326

TABLE 1.4 : Total resources of solid fossil fuels and recoverable reserves in Gt ce and %.

	COAL			PEAT	Total
	Bituminous coal & anthracite Gt ce (%)	Sub-bituminous coal Gt ce (%)	Lignite Gt ce (%)	Gt ce (%)	Gt ce (%)
1 Proved reserves in situ	774,6 (71,6)	172,8 (16,0)	113,2 (10,5)	20,7 (1,9)	1 081,3 (100,0)
2 Recoverable reserves	487,7 (70,4)	111,6 (16,1)	88,1 (12,7)	5,8 (0,8)	693,2 (100,0)
3 Additional resources in situ	6 161,4 (61,0)	2 991,4 (29,6)	848,3 (8,4)	101,3 (1,0)	10 102,4 (100,0)
Total of 1 & 3	6 936,0 (62,0)	3 164,2 (28,3)	961,5 (8,6)	122,0 (1,1)	11 183,7 (100,0)

TABLE 1.5 : Development of the estimates for geological resources and recoverable reserves of coal since 1974

Year	Geological Resources in situ		Technically & economically recoverable reserves		recoverable reserves in % of the geological resources
	Gt	Gt ce	Gt	Gt ce	
WEC 1974	10 754	8 603	591	473	5,5
WEC 1976	11 505	9 045	713	560	6,2
WEC * 1978	---	10 125	---	636	6,3
This report 1980	13 476	11 062	882	687	6,2**

* PETERS & SCHILLING (1978)
** for resources and reserves in ce

Among the proved reserves in situ (1320 Gt), 775 Gt (58.7 %) is bituminous coal, 222 Gt (16.8 %) is sub-bituminous coal and 323 Gt (24.5 %) is lignite. The additional resources are 12,156 Gt, which is made up of 6161 Gt (50.7 %) bituminous coal, 3835 Gt (31.5 %) sub-bituminous coal, and 2160 Gt (17.8 %) lignite. The total resources of 13,476 Gt in situ consist of 6936 Gt (51.5 %) bituminous coal, 4057 Gt (30.1 %) sub-bituminous coal and 2843 Gt (18.4 %) lignite.

Only 882 Gt (6.5 %) of the total resources and 66.8 % of the proved reserves are currently economically recoverable. This high value of 66.8 % arises because the figures for the proved reserves of China and for some other countries with unknown in situ reserves (Great Britain, Zaire etc.) should really have been set higher, and because the recovery factor for the sub-bituminous coal and lignites is currently substantially above the average value for "coal" in general (which is 50 %). (See section 1.5.3.2. and 1.5.3.3.). This is probably because many of the countries state quantities for reserves in situ after most of the various losses have been subtracted (losses due to safety pillars, slopes etc.).

The recoverable reserves are made up of 488 Gt (55.3 %) bituminous coal, 143 Gt (16.2 %) sub-bituminous coal and 251 Gt (28.5 %) lignite. For a few of the countries, e.g. Mongolia, Madagascar etc., figures for the recoverable amount are not available. The total of all recoverable reserves is probably around 890 Gt.

With this total, the 1978 production level of bituminous coal could be maintained for 198 years, the production level of sub-bituminous coal for 780 years, and the production level of lignite for 281 years. Thus it can be seen that doubling the present production levels is certainly possible from the point of view of proved reserves.

The total resources of peat are around 318 Gt (122 Gt ce), and of this, 57 Gt (17.9 %) are proved reserves and 262 Gt additional resources. Nearly 16 Gt (5.0 %) are considered as economically be maintained for 326 years.

1.5.3.1. Bituminous Coal and Anthracite

The proved reserves of bituminous coal and anthracite are 775 Gt (computer table 1.1; table 1.3). Of this quantity, 488 Gt

(63 %, or when a doubling of the figures for the in situ proportion is assumed for China and Great Britain, then about 53 %) is economically recoverable. Of this amount, 96 % is concentrated in only nine countries: the USA 107 Gt (21.9 %), the USSR 104 Gt (21.3 %), China 99 Gt (20.3 %), Great Britain 45 Gt (9.2 %), Poland 27 Gt (5.5 %), South Africa and Australia both with 25 Gt (5.1 %), Federal Republic of Germany 24 Gt (4.9 %), and India 13 Gt (2.7 %). The remaining 4 % is divided between 40 further countries.

The proportion of the reserves recoverable by open cast mining varies considerably from country to country (computer table 1.1). In the most important countries it lies between 0 % (Federal Republic of Germany) and 42 % (India). In the USA it is 22 %, in Australia 30 %, in the USSR 14 %, and for China it is estimated to be around 10 %. In Canada, Venezuela, Mozambique and a few other countries it is 80 %. In these latter countries there is a strong tendency to consider only those deposits of bituminous coal that can be mined open cast as being economically recoverable.

Out of the most important countries, the following have a high percentage of coking coal: Australia (74 %), Federal Republic of Germany (60 %), the USSR (50 %), China (37 %), the USA (35 %), India (31 %) and Poland (20 %).

Larger reserves of anthracite are found in the USSR (18 % of the recoverable reserves of the country), in China (10 %) and in the USA (3 %).

The quantity of additional resources of anthracite and bituminous coal is 6161 Gt, and thus the overall total resources of these fuels is 6936 Gt. When higher in situ reserves are assumed for China and Great Britain, then the figure for additional resources must be correspondingly reduced (to about 6015 Gt).

Only 44.5 % of the additional resources lie in known areas (computer table 1.1), though China is not included in this calculation due to a lack of sufficient information. The most important countries are the USSR, China, the USA, Australia, Federal Republic of Germany, Great Britain, Botswana, Canada and India.

The world-wide production in 1978 was 2487 Mt. Of this, 462 Mt (18.6 %) was produced in open cast mining. The percentage that was coking coal was 17.6 % (438 Mt), and 6.5 % was anthracite (162 Mt).

The most important producing countries are: China with 618 Mt

(441 Mt ce), the USSR with 507 Mt (456 Mt ce), the USA (492 Mt), Poland (192.6 Mt), Great Britain (122 Mt), India with 101 Mt (79 Mt ce), South Africa with 90.4 Mt (85 Mt ce), Federal Republic of Germany (90.1 Mt), Australia (66.1 Mt) and North Korea (45 Mt).

The USA produce the greatest quantity of open cast coal (268 Mt or 54.4 % of the production), but Canada produces the highest percentage (74 %). The percentage mined open cast is also quite high in Australia (46.3 %) and in India (25 %). In the USSR it is only 18.5 % and in South Africa 13.8 %. Within Europe, solely Great Britain produces bituminous coal in any quantity from open cast mines (11.4 %).

The most important producers of coking coal (without taking account of China and Poland) were the USSR, the USA, Federal Republic of Germany and Australia. The most important anthracite producers were the USSR, North Korea, South Korea, Federal Republic of Germany and the USA.

Computer table 1.6 summarizes the various mining parameters used to assess reserves and resources (depth, seam thickness and recovery factor). These parameters vary considerably from country to country.

South Korea quotes figures for recoverable reserves at a greater depth than any other country (1700 m), followed by Federal Republic of Germany and the USSR with 1500 m, 1000 m for Australia and Poland, only 305 m in the USA and 300-500 m for South Africa. There are no figures available for China.

For the most important countries, the minimum seam thickness that is considered acceptable for mining is between 0.5 and 0.71 m, however according to quality and recoverability, this can sometimes be as little as 0.3 m or as large as 1.2-1.5 m.

The recovery factor in South Africa is only 40 %, in the USA 50 % and in Australia and India 56 %. The USSR states its recovery factor as being 80 %. There are no figures available for the other countries with large bituminous coal reserves.

For the additional resources, the greatest depth and smallest seam thickness that is taken into consideration is in Federal Republic of Germany (2000 m and 0.3 m). The same depth is chosen by Poland, followed by the USA with 1829 m, the USSR with 1800 m and Australia with 1500 m. In South Africa the resource seams lie at a maximum depth of only 400-500 m. The minimum seam thickness considered in the USA is 0.36 m. In the other countries the minimum is usually set between 0.5 and 0.8 m, but can in some cases be as high as 1.5 m, e.g. in

Australia.

A recovery factor for the additional resources is very rarely given. For the most important countries the available estimates lie between 40 and 50 %. These estimates can be considered as relatively optimistic.

1.5.3.2. Sub-bituminous Coal

The total proved reserves of sub-bituminous coal are 222 Gt (see computer table 1.2 and table 1.3). Of this amount, 143 Gt (64.4 %) is considered as recoverable. Of the 143 Gt, 64.1 % (92 Gt) lies in the USA and 29.4 % (42 Gt) in the USSR, the remaining 6.6 % being spread widely. Of the other countries, solely Canada (1.5 %), Australia and Yugoslavia (each 1 %) and Chile (0.8 %) possess appreciable quantities. However there are no figures available for China.

The quantity of sub-bituminous coal recoverable by open cast mining varies considerably from area to area. In Canada and Australia practically only the open cast sub-bituminous coal is considered as economically recoverable (the proportion being 100 and 95 % of the total amount respectively). In the USA the proportion mined open cast is 40 % and in the USSR only 17 %.

The additional resources are 3835 Gt, although only 1255 Gt lie in known coal areas. The largest quantities are quoted by the USSR (2014 Gt or 52.5 %), only 514 Gt of this being in known coal areas. The USA has 1365 Gt (35.6 %) additional resources, only 287 Gt lying in known coal areas. Thus it can be seen that by far the largest proportion of these resources are more or less hypothetical or speculative. Quite large amounts are also found in Canada (323 Gt) and Australia (105 Gt).

In 1978 the most important producing countries were the USA with 80 Mt, the USSR with 65 Mt, North Korea with 11 Mt and Australia with 5.7 Mt. A total of 183.4 Mt was produced, 135 Mt of this (73.6 %) being in open cast mines.

Just as with bituminous coal, the mining parameters chosen for the assessment vary considerably from country to country. The smallest maximum depth is set by Canada (230 m), followed by the USA (305 m), Australia (400 m) and the USSR (600 m). The greatest depth set is in Taiwan, where the thinnest seams are also considered (1000 m and 0.3 m). The corresponding figure for thickness in Canada, the USA and Australia is 1.5 m, and for the USSR 0.7 m.

According to whether open cast or underground mining is used the recovery factor varies between 90 and 40 %.

For the additional resources the maximum depth considered in the most important countries varies considerably; in the USA and in the USSR it is around 1800 m, in Canada around 450 m and in Australia it is 600 m. The minimum seam thicknesses considered were generally around 0.7-1.0 m, but Australia chose 1.5 m. Figures were rarely given for the recovery factor within this category.

1.5.3.3. Lignite

The proved reserves of soft and brown coal and lignite are 323 Gt (computer table 1.2, table 1.3). Of this amount, 251 Gt (77.7 %) are economically recoverable. Around 92 % of this quantity is concentrated in only seven countries: the USSR (34.7 %), the Federal Republic of Germany (14 %), Australia (12.9 %), GDR (10 %), the USA (9.7 %), Yugoslavia (6 %) and Poland (4.8 %).

Apart from in Austria, Bulgaria, Yugoslavia and Thailand, this type of coal is more or less exclusively produced from open cast mines.

Of the additional resources of 2160 Gt, 93 % are found in the three countries USSR (53.5 %), the USA (35.4 %) and Australia (4.1 %). After this comes China with 1.9 % and Poland with 1.1 %. A rather larger percentage of the additional resources (52.5 %) are expected in known coal areas than in the case of bituminous coal and sub-bituminous coal.

In 1978 world production of brown coal was 895 Mt (without China), and of this 73.8 % (660.6 Mt) was produced in open cast mining (although this does not include the open cast production for Czechoslovakia, Hungary and Yugoslavia because the figures were not available). The highest production was in the German Democratic Republic with 253.3 Mt (28.3 %), Federal Republic of Germany with 123.6 Mt (13.8 %), Czechoslovakia (10.6 %), Poland (4.6 %), Yugoslavia (4.4 %), Australia (3.7 %), and the USA and Bulgaria both with 3 %. Further important producing countries are Greece, Hungary, Romania and Turkey.

Mining parameters for depth and seam thickness used to assess the reserves vary considerably from country to country (computer table 1.6). The greatest depth considered was for open cast mining in the Federal Republic of Germany (600 m), the USA lying at the other extreme with 37 m. However, where the lignite is mined underground assessment of the reserves is sometimes made as deep as 800 m. Seams thicker than 1.5-3.0 m are generally considered to be worthy of recovery, although for Australia (which possesses considerable bituminous coal) the lower limit is 15 m. Because brown coal is mainly mined open cast, the recovery factor is high - 80 % (e.g. in the USA) to 95 % (e.g. Federal Republic of Germany).

When each individual country assesses its additional brown coal resources, the lower limits for depth and thickness are extended in comparison to the respective limits quoted above for the proved reserves. The maximum depth chosen in the USA is extremely high (1829 m), that in the USSR corresponds to what is technically possible (600 m in comparison to 300 m for reserves), and Australia has chosen 500 m (in comparison to 200 m for its reserves). At the same time Australia has chosen a minimum seam thickness of 3 m, the USSR 2 m, and the USA only 0.76 m. In this supply category the recovery factor was estimated to be 30-55 %.

1.5.3.4. Peat

The questionnaire only yielded very sparse information on the supplies of peat, so that figures given here have had to rely largely on other sources, the main one being an estimate from the BGR in 1976, the results of which are just as valid today as they were then. This estimate is based on the following assumptions for the average deposit thickness:

-- 1.8 m for Western Europe, European USSR, North America and the Falkland Islands

-- 4.8 m for Indonesia

-- 0.5 m for the peat deposits in all the other countries.

One factor often not taken account of in our quantity estimates or in the information that we received back from the questionnaire is the usability of peat deposits as a source of fuel. In most countries other opposing interests such as farming and forestry in peat areas, and impairment to the water household and the environment assume more importance than the peat, so that deposits rarely come to be used as a source of fuel.

The total peat reserves are 56.7 Gt (20.7 Gt ce); from this currently only 15.8 Gt (5.8 Gt ce) is considered as economically recoverable (computer table 1.3; table 1.3 and 1.4). The additional resources are about 262 Gt (101 Gt ce). Peat only represents an insignificant percentage of the total recoverable reserves and additional resources of solid fossil fuels (0.8 % and 1.0 % after conversion to coal equivalent).

The country with the most peat is the USSR, followed by Canada and the USA, although it should be noted that both of these latter countries have much coal, and for this reason for the foreseeable future the peat (raised bog peat) is best for specialized technical applications. In order of recoverable reserves, the USSR comes first with 10.9 Gt (68.8 %), followed by Finland with 2.3 Gt (14.8 %), Sweden and the Federal Republic of Germany both with 0.9 Gt. However, other sources state that the recoverable reserves in the Federal Republic of Germany are at the highest 0.3 Gt.

Apart from the countries already mentioned, large amounts of peat are present in Great Britain, Poland, Norway, and Indonesia, and in the African countries of Ruanda and Burundi, although in the three last named countries the deposits are mainly of low bog peat which contains much ash and has less value than raised bog peat as a fuel.

The production of peat, which takes place exclusively open cast, was 48.4 Mt in 1978. By a noticeable margin, the most important country was the USSR with 41.2 Mt (85.1 %), followed by Ireland with 4.3 Mt (8.9 %), and Finland with 1.9 Mt (3.9 %). The remaining 2.1 % was produced by Canada, the Federal Republic of Germany and Norway.

1.5.4. An Analysis According to Continent and Economic-Political Groups

The tables 1.6 and 1.7 summarize the reserves and resources of

TABLE 1.6 : Recoverable reserves and additional resources of coal and peat (in Gt) according to continents and economic-political groups.

Proved recoverable reserves								Additional resources in situ							
Bituminous coal & Anthracite		Sub-bituminous coal		Lignite		Peat		Bituminous coal & Anthracite		Sub-bituminous coal		Lignite		Peat	
Gt	%	Gt	%	Gt	%	Gt	%	Gt	%	Gt	%	Gt	%	Gt	%
32,5	6,7	0,2	0,1	0,0	-,-	-,-	-,-	144,4	2,3	1,0	0,0	0,0	-,-	2,5	1,0
111,4	22,8	96,5	67,5	26,5	10,6	0,6	3,8	1181,2	19,2	1710,4	44,6	816,9	37,8	111,3	42,5
113,9	23,4	1,0	0,7	4,1	1,6	-,-	-,-	1423,2	23,1	2,8	0,1	59,0	2,7	21,5	8,2
104,0	21,3	42,0	29,4	87,0	34,6	10,9	69,0	2480,0	40,2	2014,0	52,5	1156,0	53,6	113,5	43,4
100,5	20,6	1,7	1,2	101,0	40,3	4,3	27,2	429,5	7,0	1,5	0,0	35,3	1,6	12,8	4,9
25,4	5,2	1,6	1,1	32,5	12,9	-,-	-,-	503,1	8,2	105,5	2,8	92,4	4,3	0,0	-,-
487,7	100,0	143,0	100,0	251,1	100,0	15,8	100,0	6161,4	100,0	3835,2	100,0	2159,6	100,0	261,6	100,0
70,0	14,4	0,0	-,-	35,2	14,0	1,1	7,0	335,4	5,4	0,0	-,-	0,0	-,-	5,8	2,2
205,9	42,2	95,6	66,9	98,0	39,0	4,8	30,4	2007,3	32,6	1794,3	46,8	901,1	41,7	119,5	45,7
134,2	27,5	42,0	29,4	135,7	54,0	10,9	69,0	2572,3	41,7	2014,0	52,5	1186,5	54,9	118,3	45,2
22,5	4,6	3,5	2,4	4,1	1,6	0,0	-,-	214,4	3,5	24,4	0,6	28,2	1,3	22,7	8,7
0,4	0,1	0,3	0,2	0,4	0,2	-,-	-,-	4,7	0,1	6,0	0,2	17,6	0,8	19,3	7,4

TABLE 1.7 : Recoverable reserves and additional resources of coal and peat (in Gt ce) according to continents and economic-political groups.

Continent or economic-political groups	Proved recoverable reserves									
	Bituminous coal & Anthracite		Sub-bituminous coal		Lignite		Peat		Total	
	Gt ce	%	Gt ce	%	Gt ce	%	Gt ce	%	Gt ce	%
Africa	32,5	6,7	0,1	0,1	0,0	-,-	-,-	-,-	32,6	4,7
America	111,4	22,8	75,3	67,4	13,2	15,0	0,3	5,2	200,2	28,9
Asia	113,9	23,4	0,8	0,7	1,4	1,6	-,-	-,-	116,1	16,7
USSR	104,0	21,3	32,8	29,4	28,7	32,6	3,6	62,0	169,1	24,4
Europe	100,5	20,6	1,3	1,2	35,1	39,8	1,9	32,8	138,8	20,0
Oceania/ Australia	25,4	5,2	1,3	1,2	9,7	11,0	-,-	-,-	36,4	5,3
Total	487,7	100,0	111,6	100,0	88,1	100,0	5,8	100,0	693,2	100,0
Common Market	70,0	14,4	0,0	-,-	10,6	12,0	0,5	8,6	81,1	11,7
OECD	205,9	42,2	74,6	66,8	34,9	39,6	2,1	36,2	317,5	45,8
COMECON	134,2	27,5	32,7	29,3	45,1	51,1	3,6	62,1	215,6	31,1
Developing countries	22,5	4,6	2,8	2,5	1,3	1,5	0,0	-,-	26,6	3,8
OPEC	0,4	0,1	0,2	0,2	0,2	0,2	-,-	-,-	0,8	0,1

Additional resources in situ									
Bituminous coal & Anthracite		Sub-bituminous coal		Lignite		Peat		Total	
Gt ce	%	Gt ce	%	Gt ce	%	Gt ce	%	Gt ce	%
144,4	2,3	0,8	0,0	0,0	-,-	1,3	1,3	146,5	1,5
1181,2	19,2	1334,1	44,5	406,8	48,0	47,9	47,3	2970,0	29,4
1423,2	23,1	2,2	0,1	19,5	2,3	9,2	9,0	1454,1	14,4
2480,0	40,2	1570,9	52,5	381,5	45,0	37,4	37,0	4469,8	44,2
429,5	7,0	1,1	0,0	12,1	1,4	5,5	5,4	448,2	4,4
503,1	8,2	82,3	2,8	28,4	3,3	0,0	-,-	613,8	6,1
6161,4	100,0	2991,4	100,0	848,3	100,0	101,3	100,0	10102,4	100,0
335,4	5,4	0,0	-,-	0,0	-,-	2,5	2,5	337,9	3,3
2007,3	32,6	1399,6	46,8	432,5	51,0	51,4	50,8	3890,8	38,5
2572,3	41,7	1570,9	52,5	391,4	46,1	39,5	39,0	4574,1	45,3

solid fossil fuels grouped according to continent and economic-political interests.

There is a clear concentration of coal and peat deposits in the northern hemisphere (computer tables 1.1-1.3, enclosure 1.2). Speaking from the point of view of economic-political groups, the most important deposits are situated in the industrial countries and in China.

1.5.4.1. Africa

Apart from South America, Africa is the continent possessing the least coal reserves. The deposits - practically all bituminous coal with a total of 216 Gt - are concentrated mainly in the south of the continent (encl. 1.1, computer table 1.1). The certain recoverable reserves (32.5 Gt bituminous coal) are mainly situated in South Africa, but the potential resources are mainly expected in Botswana (100 Gt). Other relatively important coal countries are Zimbabwe/Rhodesia, Swaziland and Mozambique. It is rather difficult to prepare figures for the reserves in Madagascar, Tanzania and Zaire.

There has been practically no alterations to the figures since the inquiry of PETERS & SCHILLING and the Survey of Energy Resources (both published in 1978); the only exception is South Africa which has increased its figure for recoverable reserves from 18.1 Gt in 1978 to a current figure of 25.3 Gt, an increase of 7 Gt.

The sub-bituminous coal is concentrated in Nigeria. According to the present state of knowledge, Africa's lignite resources are insignificant. More important are the peat deposits (low bog peat), which are found in Ruanda and Burundi.

In addition to the computer tables 1.1-1.3, the following African countries have signs of coal deposits:

Bituminous coal	in Kenya, Lesotho, Namibia and Uganda,
Brown coal	in Tunisia, Algeria, Angola, Sierra Leone, Benin, Cameroon, Upper Volta, Sudan, Somalia, Dschibuti and Uganda.
Peat	in Ruanda, Burundi, Sudan, Madagascar, and maybe in Nigeria and Zaire.

1.5.4.2. America

Since the earlier report there have only been significant changes in the case of Canada and Argentina. None of the other countries have reported any important changes in the figures, and there have been no changes found in the literature on the subject. In the USA the values for 1974 are still valid.

According to the latest calculations, Canada now has 330 Gt sub-bituminous coal, situated exclusively in the province of Alberta, although only 2.2 Gt is currently economically recoverable. Canada also has 45.4 Gt lignite, 2.1 Gt of this being recoverable. The lignite is situated mainly in the provinces of Saskatchewan (33.5 Gt) and British Colombia (8.5 Gt), the rest being in Ontario (0.2 Gt). The figures for the bituminous coal resources in Canada are practically unchanged at 99 Gt.

There has been a new find of 9.4 Gt lignite in Argentina (Austral basin). Despite this, and despite increases in the estimates for Brazil, Chile and Colombia (the increases being relatively small), Latin America is a region with relatively little coal (encl. 1.2).

Apart from the countries listed in the computer tables 1.1 - 1.3, there are signs of bituminous coal in Uruguay and Bolivia, brown coal in Brazil, Guayana, Panama, El Salvador, Guatemala and Mexico, and peat in Guayana, Brazil and Colombia.

1.5.4.3. Asia

China is the country possessing the largest coal resources in Asia (excluding the USSR). However figures available from various sources for total quantities and the sub-division according to category of resource and type of coal differ considerably. We have used the conservative estimates of PETERS & SCHILLING (1978): 99 Gt recoverable reserves of bituminous coal, in situ reserves maybe 200 Gt, a total of 1425 Gt geological resources of bituminous coal and 40.5 Gt geological resources of brown coal.

IKONNIKOV (1975) quotes a middle estimate of 1991 Gt for the in situ coal reserves in China, made up of 1881 Gt (94.5 %) bituminous coal and anthracite and 110 Gt (5.5 %) lignite.

This estimate lies between the older conservative values and the particulary high figures quoted in the period of the "Big Leap". The figure of 9000-10,000 Gt for the total geological in situ coal resources also originated during this period. The latest estimates for China based on geological reports are approximately 600 Gt total reserves (which includes the proved and probable reserves).

In the case of India, which is the second most important coal country in Asia (excluding USSR), a marked increase of the additional bituminous coal resources is apparent, although the reserve quantities have remained the same. The current geological bituminous coal resources are around 112 Gt in comparison to 84 Gt previously. In the remaining countries, the estimates are practically unchanged.

Signs of coal deposits in Asia that have not yet been categorized are present in Lebanon, Yemen, Nepal, Bhutan and Laos.

It is possible that peat will be found in India, Thailand, Vietnam and Malaysia.

1.5.4.4. The Soviet Union

The USSR is the country with the most coal of all. The figures quoted for the total coal resources have remained relatively constant since 1960 at 5500 to nearly 6000 Gt (Table 1.8). The only source of information which differs substantially from this figure is the appendix to the 1978 Survey of Energy Resources which quotes the bituminous coal resources alone as being 6790 Gt. Between 1962 and 1974/76 the proportion of bituminous coal decreased from 4630 Gt to approx. 3990 Gt and the proportion of lignite increased from 1350 Gt to approx. 1720 Gt. During this period the in situ reserves of bituminous coal increased by around 25 Gt, and the lignite reserves by around 50 Gt.

The reason that the figures in this report appear to show considerably more brown coal than before is that the sub-bituminous coal was probably previously grouped together with bituminous coals, whereas we have grouped it together with the brown coals. Figures for the total in situ reserves have not changed since 1974/76. The additional resources have increased by around 216 Gt. Unfortunately, information on the regional distribution of the coal in the USSR was not made available.

TABLE 1.8 : The coal resources of the USSR since 1962 according to the Surveys of Energy Resources

-vey ergy sources :	BITUMINOUS COAL (Gt)				LIGNITE (Gt)				COAL (Gt)
	Reserves		Additional Resources	Total	Reserves		Additional Resources	Total	Total
	in situ 1	recoverable 2	3	1 + 3	in situ 1	recoverable 2	3	1 + 3	
62*	144	115	4486	4630	57	45	1293	1350	5980
68*	145	u	3976	4121	104	u	1303	1407	5528
74	166	83	3827	3993	107	54	1613	1720	5713
76	169	u	3825	3994	108	u	1609	1717	5711
78	276	u	6514	6790	-,-	-,-	-,-	-,-	6790
80	130	104	2480	2610	146	129	3170	3316	5926

= to a depth of 1200 m; then unlimited

= unknown

1.5.4.5. Europe

The coal supplies in the European countries have been accurately known for quite some time, so that few alterations appear in the new figures. In this paper, the sole noticeable changes are that Poland has increased its figures for bituminous coal and brown coal to 144 and 40 Gt respectively. The respective figures for the recoverable reserves have also been increased, to 27 Gt and 12 Gt respectively. From the 45 Gt of reserves in Great Britain, 4.49 Gt are classified as proved and 40.51 Gt as probably recoverable. The National Committee of the Federal Republic of Germany gives slightly different figures for the reserves of the individual bituminous coal basins than those from PETERS & SCHILLING (1978). This has a small effect on the figure for total reserves (23,991 Mt instead of 23,919 Mt).

Uneconomical small deposits are found in Switzerland (both bituminous and brown coal), in Great Britain (sub-bituminous coal), in Poland and in the Federal Republic of Germany. Lastly, brown coal deposits are found in Cyprus.

1.5.4.6. Oceania and Australia

In Australia and New Zealand, intensive prospecting and re-evaluation programs have lead to a considerable increase of the estimates for coal resources. With total coal resources of 784 Gt, this area now takes fourth place among the great world coal areas, behind the USSR, USA and Canada and Asia, and lies before Europe, which has 767 Gt.

Increases are particularly marked in Australia which has doubled its figures for bituminous coal resources from 223 Gt in 1978 to 549 Gt. The figures for sub-bituminous coal resources have increased from 26 Gt to 107 Gt, although in comparison the figures for the recoverable reserves have only increased slightly, for bituminous coal from 21.7 Gt (1978) to 25.4 Gt, and for sub-bituminous coal from 1.4 Gt to 1.5 Gt.

Figures for soft brown coal deposits are unchanged. Table 1.9 shows the distribution throughout the various states, subdivided into recoverable reserves and additional resources. Bituminous coal deposits are found mainly in New South Wales and Queensland, sub-bituminous deposits mainly in Queensland and brown coal in Victoria..

TABLE 1.9 : The regional distribution of the recoverable reserves and additional resources of the coal in Australia

	Proved recoverable reserves (Mt)			Additional resources (Mt)		
	Bituminous coal	Sub-bitumi-nous coal	Brown coal	Bituminous coal	Sub-bitumi-nous coal	Brown coal
w uth Wales	11 700	450	---	480 000	10 000	---
eensland	13 700	175	---	22 640	90 260	---
ctoria	---	---	32 000	---	---	87 350
st Australia	---	161	---	---	2 087	---
uth istralia	---	720	440	---	2 300	1 680
ismania	25			N.A.	---	---
tal	25 425	1 506 (1 500)	32 440	502 640 (503 000)	104 647 (105 000)	89 030 (89 000)

New Zealand quotes an increase in the figures for additional resources of lignite to 3.4 Gt, 3.2 Gt of this being situated in the South Island.

In Oceania there are signs of coal deposits in Papua New Guinea, and peat deposits on West Samoa.

There are numerous outcrops of bituminous coal in the Antarctic. Small scale mining is sometimes carried out to supply fuel to the research stations.

1.5.4.7. Economic-political Groups

OECD and COMECON countries possess the largest coal resources (Tables 1.6 and 1.7), whereas the developing countries possess very little. Only 4.1 % of the recoverable reserves of bituminous coal, 2.4 % of the sub-bituminous reserves and 1.4 % of the lignite reserves are found in the developing countries. The situation for additional resources is similarly unfavourable.

The OPEC countries (computer tables 1.1 and 1.2) only have small percentage of the world coal resources (5.4 Gt bituminous coal and 24.6 Gt brown coal), and this is concentrated mainly in Venezuela and Indonesia.

1.5.5. Production Costs of the Recoverable Reserves

Unfortunately, the figures received back from the questionnaire under the section for production costs for the recoverable reserves of solid fossil fuels were very sparse (table 1.10), but in spite of this certain conclusions can still be drawn for the cost of mining the coal in the individual regions (except for countries with centrally planned economies). The results are in good agreement with corresponding estimates from the World Bank (1979).

In North America, South Africa, India and Australia, production costs for bituminous coal and anthracite were nearly always under 30 $/t. Solely in the USA and Canada are there considerable quantities of recoverable reserves with production costs lying above this, between 30 and 60 $/t. In contrast, in Europe the production costs are always more than 30 $/t, and in fact the costs are mostly more than 60 $/t. The costs in Japan and South Korea are similarly high. However one can still find minimal production costs in Zimbabwe/Rhodesia, Swaziland, Botswana, and in some regions of Colombia.

Mining of sub-bituminous coal nearly always costs less than 30 $/t, and in Canada and the USA it is cheaper than 15 $/t.

In the most important countries, the mining costs for soft brown coal and lignite, both of which are mined more or less exclusively open cast, do not exceed 15 $/t, and in fact in some situations the costs can be considerably less than this. However, in the Federal Republic of Germany only 10 Gt of the soft brown coal can be mined for this price.

Peat has a very low calorific value, and can only be recovered economically by open cast mining.

Solely Finland and Ireland returned estimates of the mining costs for their recoverable reserves (Table 1.10). For the former they were smaller than 15 $/t, but from the 188 Mt recoverable reserves in Ireland surprisingly only 99 Mt are estimated to be recoverable for less than 15 $/t, a further 12 Mt for a cost between 15 and 30 $/t, the remaining 77 Mt costing as much as 30-60 $/t. Apart from the exception of Ireland one can assume that the production costs for peat are generally smaller than 15 $/t, despite the effort necessary for air drying.

TABLE 1.10 : Recoverable reserves according to production costs.

	Country	< 15	15 - 30	30 - 60	> 60
		US $ / t			
		BITUMINOUS COAL & ANTHRACITE			
Africa	South Africa	22 090,0	3 200,0		
	Zambia		11,7	3,6	
America	Canada			1 607,0	
	USA	15 627,0	57 614,0	33 942,0	
	Brasilia	123,0	66,0		
	Mexico		1 200,0		
	Venezuela		134,0		
Asia	India	12 610,0			
	Indonesia			10,9	
Europe	Belgium	31,0	62,0	62,0	174,0
	France*			550,0	
	Federal Republic of Germany			23 991,0	
	Great Britain*			45 000,0	
	Netherlands				130,0
	Norway				18,0
	Spain			247,0	151,0
Oceania/ Austr.	Australia *	25 400,0			
		SUB-BITUMINOUS COAL			
America	Canada	2 182,0	neg.		
	USA	91 676,0			
	Argentina			100,0	
	Brasilia	600,0	324,0		
	Mexico		384,0		
	Venezuela		2,5	3,8	
Asia	Indonesia		108,4		
	Taiwan			140,0	
Europe	France*			10,0	
	Spain		123,0		
Oceania/ Austr.	Australia *	1 500,0			
		LIGNITE			
America	Canada	2 117,0			
	USA	24 400,0			
Asia	Indonesia		420,0		
	Thailand	103,0			
Europe	Federal Republic of Germany	10 000,0			
	Italy	6,0	15,0		
	Spain	430,0			
Oceania/ Austr.	Australia*	32 440,0			
		PEAT			
Europe	Finland	2 340,0			
	Federal Republic of Germany*	900,0			
	Ireland	99,0	12,0	77,0	

* other sources

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Coal

Conversion factors for coal equivalents

1. Bituminous coal/Antracite	= 1	
2. Subbituminous coal	= 0,78 (ref. text)	
3. Lignite	= 0,3	Turkey Fed. Rep. of Germany German Dem. Rep. Poland, Australia
	= 0,33	all African countries all Latinamerican countries all Asiatic countries exept Turkey. USSR, France, Greece, Hungary, Italy, Romania Spain
	= 0,5	Canada, USA, Albania, Austria, Bulgaria, Portugal, New Zealand, Yugoslavia
	= 0,6	Czechoslowakia
4. Peat	= 0,43	all countries except Fed. Rep. of Germany = 0,49 Ireland, Ruanda/Burundi = 0,50 USSR = 0,33

10^6 t ce = 29,3 × 10^{15}J

10^{15}J = 1 Peta Joule (PJ)

Source of Estimates on Solid Fossil Fuels

BGR =	Data collected by the Federal Institute for Geosciences and Natural Resources (Bundesanstalt für Geowissenschaften und Rohstoffe) from various sources (notes in periodicals, newspapers, internal reports and others)
WEC 74 =	WEC Survey of Energy Resources 1974 (1976, 1978)
P & S =	Peters, W. & Schilling, H.-D. (1978): An appraisal of world coal resources and their future availability

AFRICA	
Botswana	P & S, BGR
Burundi	BGR
Central African Republic	BGR
Egypt	WEC 74, BGR
Malawi	BGR
Mali	BGR
Morocco	BGR (lignite)
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Ruanda	BGR
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Colombia	Villegas, A. (Edit. 1979): Zonas carboniferas de Colombia. - Publicaciones geologicas especiales del INGEOMINAS No. 3, 29 p
Cuba	BGR
Falkland Islands	BGR
Haiti	BGR
Honduras	BGR
Mexico	Comisión de Energéticos
Peru	BGR
Uruguay	BGR (peat)

ASIEN

Afghanistan	BGR
Burma	BGR
China, P.R.	P & S, BGR
Indonesia	BGR (peat)
Iran	WEC 74
Japan	BGR (peat)
Korea, D.P.R.	P & S Petroconsultants Ltd. (1978): Coal world-wide (non-exclusive report)
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Yemen, A.R.	BGR

EUROPE

Albania	BGR
Austria	BGR (peat)
Bulgaria	BGR
Czechoslovakia	WEC 74, BGR
France	BGR
German Dem.Rep.	BGR (reserves and resources)

Greece	BGR
Hungary	WEC 74, BGR
Iceland	BGR
Italy	BGR (peat)
Netherlands	BGR (peat)
Poland	BGR
Romania	WEC 74, P & S, BGR
Spain	BGR (peat)
Switzerland	BGR (peat)
Yugoslavia	WEC 78 (data rounded)
New Caledonia	BGR

TABLE 1.1 BITUMINOUS COAL / ANTHRACITE

NAME OF CONTINENT REGION OR COUNTRY	YEAR OF REF.	PROVEN RESERVES: IN PLACE 10^6 T	PROVEN RESERVES: RECOVERABLE 10^6 T	PROVEN RESERVES: BY SURFACE MINING %	PROVEN RESERVES: OF COKING QUALITY %	PROVEN RESERVES: OF ANTHRACITE %	ADDITIONAL RESOURCES: TOTAL 10^6 T	ADDITIONAL RESOURCES: IN PROVEN COAL PROVINCES 10^6 T	PRODUCTION 1978: TOTAL 10^6 T	PRODUCTION 1978: BY SURFACE MINING 10^6 T	PRODUCTION 1978: OF COKING QUALITY 10^6 T	PRODUCTION 1978: OF ANTHRACITE 10^6 T
AFRICA												
ALGERIA *	1979	66.4	42.9	0	0	N.A.	N.A.		0.			
BOTSWANA	1977	7000.0	3500.0				100000.	N.A.	0.31			
EGYPT *	1965	25.0	13.0				N.A.		0.00			
MADAGASCAR	1977	1000.0	N.A.				N.A.		N.A.			
MALAWI	1977	25.0	12.0	0	0	0	N.A.		0.00			
MOROCCO *	1979	100.0	50.0			100			0.72	N.A.	N.A.	0.72
MOSAMBIQUE	1976	240.0	240.0	83	40		155.		0.38			
NIGER	1979	4.5	N.A.				N.A.		N.A.			
NIGERIA *	1979	N.A.	N.A.				21.	21.	0.00			
SOUTH AFRICA *	1975	58749.0	25290.0	5-1	3	2	33762.	33767.	90.40	12.50	3.50	2.20
SWAZILAND	1961	2020.0	1820.0	N.A.	0	N.A.	3000.	3060.	0.15			
TANZANIA *	1979	304.0	200.0				1500.	N.A.	0.00			
ZAIRE	1978	600.0	600.0				N.A.		0.08			
ZAMBIA *	1979	32.4	24.0	58	0	0	98.	98.	0.78	0.78	N.A.	N.A.
ZIMBABWE-RHODESIA	1977	1535.0	734.0	36	50	N.A.	5820.	5820.	3.65			
AMERICA												
CANADA *	1978	5556.0	1607.0	80	79	N.A.	93413.	93413.	17.10	12.70	13.80	0.
USA *	1974	214366.0	107183.0	22	35	3	1072000.	481000.	492.00	268.00	65.00	6.00
BRAZIL *	1978	270.0	189.0	33	22	N.A.	1447.	1447.	2.65	0.	1.13	N.A.
CHILE *	1979	231.3	26.5	0	N.A.	0	291.	291.	1.12	0.	0.22	0.
COLOMBIA *	1979	2025.0	1010.6	N.A.	20	NEG.	7200.	7200.	3.34			
MEXICO *	1979	1500.0	1200.0	14	96	4	1300.	1300.	6.61	1.90	6.61	0.00
PERU *	1979	125.0	N.A.	N.A.	14	86	835.		0.00			
VENEZUELA *	1979	161.0	134.0	96	N.A.	N.A.	4700.	4700.				
ASIA												
AFGHANISTAN	1965	112.0	64.0				600.	N.A.	0.18			
BANGLADESH *	1978	1053.0	242.0	0	N.A.	0	N.A.		0.00			
BURMA	1975	4.5	2.3				120.		0.01			
CHINA,P.R.OF	N.A.	99000.0	99000.0	10	37	10	1326000.	N.A.	618.00			
INDIA *	1978	20738.0	12610.0	42	31	1	91139.	90329.	101.25	25.46	23.83	0.
INDONESIA *	1979	13.6	10.9	100	N.A.	70	4.	0.	0.05	0.05	0.	0.05
IRAN *	1972	385.0	193.0				N.A.		1.00			
JAPAN *	1979	8532.0	1050.0	N.A.	52	1	NEG.		19.00	1.00	9.10	NEG.
KOREA,D.P.R.OF	1978	2000.0	300.0			100	2700.	2700.	45.00			45.00
KOREA,REP.OF *	1978	182.0	116.3	0	0	100	1049.	1049.	18.00	0.	0.	18.00
MALAYSIA *	1978	0.0	0.0				177.	57.	0.			
MONGOLIA	N.A.	12000.0	N.A.		15		N.A.		0.30			
TURKEY *	1978	285.2	186.2		87		924.	924.	4.29			
VIETNAM *	1965	300.0	150.0	N.A.	N.A.		700.	700.	4.10			
USSR												
USSR *	1979	130000.0	104000.0	14	50	18	2480000.	1080000.	507.00	94.00	189.00	75.00
EUROPE												
AUSTRIA *	1978	0.0					4.	0.				
BELGIUM *	1978	670.0	440.0	0	60	0	2617.	2617.	6.59	0.	3.80	
BULGARIA *	1979	36.0	30.0	N.A.	65	35	1200.	N.A.	0.30	N.A.	0.40	0.10
CZECHOSLOVAKIA *	N.A.	5750.0	2700.0				5500.	5500.	28.76			
FRANCE *	1977	1400.0	550.0				200.	0.	19.69			
GERMAN DEM.REPUBLIC *	1978	N.A.	N.A.						0.11			
GERMANY,FED.REP.OF *	1979	44000.0	23991.0	0	40	5	186300.	186300.	90.10	0.	63.00	9.00
GREAT BRITAIN *	1977	45000.0	45000.0	N.A.	37	2	145000.	145000.	122.00	14.00	14.00	2.00
HUNGARY *	1966	450.0	225.0				350.	350.	2.95			
IRELAND *	1979	55.0	55.0	5	0	45	40.	N.A.	0.03	0.	0.	0.01
NETHERLANDS *	1978	240.0		0	N.A.	N.A.	1194.	1194.	0.		N.A.	N.A.
NORWAY *	1978	20.0	18.0	0	90	0	150.	100.	0.46	0.00	N.A.	0.00
POLAND *	1978	60000.0	27000.0	0	20		84000.	84000.	192.60	0.00		
PORTUGAL *	1978	7.1	5.3	0	0	70	5.	5.	0.18	0.	0.	0.18
ROMANIA *	1978	70.0	50.0				520.	520.	7.30			
SPAIN *	1979	498.0	398.0	7	18	25	2375.	2375.	11.70	1.20	2.20	3.80
YUGOSLAVIA *	1971	80.0	70.0	0	0		22.	22.	0.47			
AUSTRALIA AND OCEANIA												
AUSTRALIA *	1979	45800.0	25400.0	30	43-7	0	503000.	503000.	66.10	30.60	41.90	N.A.
NEW CALEDONIA	N.A.	4.0	2.0				8.	8.				
NEW ZEALAND *	1979	35.0	35.0	95	39	0	125.	125.	0.30	NEG.	0.30	N.A.
TOTAL AFRICA		71701.3 12753.5	32525.9 7119.0				144356. 110496.	42701. 8841.	96.47 4.57	13.28	3.50	2.92
TOTAL AMERICA		224234.3 2150.0	111349.5 1010.0				1181186. 101448.	589351. 7200.	522.82 3.34	282.60	86.76	6.00 0.
TOTAL ASIA		144605.3 113801.5	113926.7 99711.3				1423213. 1329920.	95755. 3400.	811.18 668.59	26.51	32.95	63.05 45.
TOTAL AUSTRAL.-OCEA.		45839.0 4.0	25437.0 2.0				503133. 8.	503133. 8.	66.40	30.60	42.20	
TOTAL EUROPE EX.USSR		138276.1 67750.0	100532.3 30195.0				429477. 90742.	427983. 90392.	482.94 251.84	15.21 0.	83.40 0.40	15.10 0.10
EC		91565.0 1400.0	70036.0 550.0				333551. 200.	333111. 0.	238.41 19.69	14.01	80.80	11.01
OECD		384464.3 1400.0	205918.5 550.0				2007347. 93763.	1416053. 0.	849.54 20.15	327.51 0.	213.10	21.00 0.
OPEC		628.0 395.0	380.8 193.0				4725. 21.	4721. 21.	1.05 1.	0.05	0.	0.05
COMECON		208600.0 78570.0	134135.0 30125.0				2577270. 91070.	1171070. 91070.	743.12 235.67	94.00 0.	189.60 0.40	75.10 0.10
DEV.COUNTRIES		38506.9 13874.0	22490.1 7658.3				214368. 113239.	110424. 10229.	140.92 5.45	28.19	31.81	18.77 0.
TOTAL WORLD		774656.0 196459.0	482771.4 138437.3				6161365. 1637614.	2738927. 109841.	2486.81 928.34	462.20 0.	437.81 0.40	162.07 45.10

TABLE 1.2 SUBBITUMINOUS COAL AND LIGNITE

NAME OF CONTINENT REGION OR COUNTRY	YEAR OF REF.	RANK OF FUEL	PROVED RESERVES: IN PLACE (10^6 T)	PROVED RESERVES: RECOVERABLE (10^6 T)	PROVED RESERVES: BY SURFACE-MINING (%)	ADDITIONAL RESOURCES: TOTAL (10^6 T)	ADDITIONAL RESOURCES: IN PROVEN COAL PROVINCES (10^6 T)	PRODUCTION 1979: TOTAL (10^6 T)	PRODUCTION 1979: BY SURFACE MINING (%)
AFRICA									
CENTRAL AFRICAN REP.	1979	LN	4.0	4.0	100	N.A.			
ETHIOPIA *	1980	LN	0.0			1.		0.00	
MADAGASCAR	1977	LN	75.0	N.A.		N.A.			
MALI	1979	LN	0.0			3.			
MOROCCO *	1979	LN	0.0	N.A.		40.	40.		
NIGERIA *	1979	SB	338.0	169.0	24	1000.	N.A.	0.24	N.A.
ZIMBABWE-RHODESIA	1977	SB	965.0	0.0		N.A.			
AMERICA									
CANADA *	1978	SB	7328.0	2182.0	100	327672.	322672.	8.30	8.30
		LN	3207.0	2117.0	100	42236.	42236.	5.10	5.10
		TOTAL	10535.0	4299.0		364908.	364908.	13.40	13.40
USA *	1976	SB	152794.0	91676.0	40	1365000.	287000.	80.00	80.00
		LN	30497.0	24400.0	100	765000.	403000.	27.00	27.00
		TOTAL	183291.0	116076.0		2130000.	690000.	107.00	107.00
ARGENTINA *	1978	SB	150.0	150.0	0	400.	400.	0.50	0.00
		LN	0.0	0.0		9350.	9350.	0.00	
		TOTAL	150.0 0.0	150.0 0.0		9750.	9750.	0.50 0.	0. 0.
BRAZIL *	1978	SB	1320.0	924.0		12770.	12770.	1.85	1.85
CHILE *	1979	SB	1150.0	1150.0	N.A.	4135.	4135.	0.83	0.
COLOMBIA *	1979	SB	47.0	24.0		590.	590.	N.A.	
		LN	1.0	1.0		200.			
		TOTAL	48.0 48.0	25.0 25.0		790. 790.	590. 590.		
ECUADOR *	1979	SB	0.0			36.	36.		
HAITI	1979	LN	13.0	N.A.		27.			
HONDURAS	1979	SB	21.0	N.A.		N.A.			
MEXICO *	1979	SB	480.0	384.0	3	500.	500.	0.	
		LN	N.A.	N.A.		N.A.			
		TOTAL	480.0	384.0		500.	500.	0.	
PERU *	1979	LN	N.A.			100.		0.00	
VENEZUELA *	1979	SB	17.0	6.3	2	4300.	3300.	0.06	0.06
ASIA									
BANGLADESH *	1979	LN	0.0	0.0		3.	3.	0.00	
BURMA	1975	LN	N.A.	N.A.		80.			
CHINA, P.R. OF	N.A.	LN	N.A.	N.A.	N.A.	40500.	N.A.	N.A.	N.A.
CHINA, REP. OF *	1978	SB	210.0	140.0				2.66	
INDIA *	1978	LN	1869.0	1588.0	100	281.	281.	3.40	3.40
INDONESIA *	1979	SB	135.5	108.4	80	627.		0.12	0.05
		LN	525.0	470.0	100	17587.	17565.	0.13	0.13
		TOTAL	660.5	578.4		18209.	17565.	0.25	0.18
JAPAN *	1979	LN	175.0	18.0	N.A.	NEG.		NEG.	
KOREA, D.P.R. OF	N.A.	SB	300.0	300.0		2200.	2200.	11.00	
MALAYSIA *	1978	LN	0.0			250.	0.	0.	
MONGOLIA	N.A.	LN	12000.0	N.A.		N.A.		3.08	
PAKISTAN *	1972	SB	403.0	402.0		N.A.		1.33	
		LN	243.0	243.0		N.A.		N.A.	
		TOTAL	646.0 646.0	645.0 645.0				1.33 1.33	
PHILIPPINES *	1979	SB	170.0	82.0		N.A.		0.28	
		LN	N.A.	N.A.		N.A.		N.A.	
		TOTAL	170.0 170.0	82.0 82.0				0.28 0.28	
THAILAND *	1978	LN	246.0	103.0	42	N.A.		0.65	0.65
TURKEY *	1978	LN	3923.5	1728.1		280.		14.76	
VIETNAM *	1965	LN	12.0	N.A.		N.A.			
YEMEN, PEOP. REP.	N.A.	SB	0.5	0.0		N.A.			

TABLE 1.2 SUBBITUMINOUS COAL AND LIGNITE

OR COUNTRY	REF.	FUEL	10^6 T	10^6 T	FACE-MINING %	10^6 T	COAL PROVINCES 10^6 T	10^6 T	MINING %
USSR									
USSR *	1979	SB	52000.0	42000.0	17	2014000.	514000.	65.00	38.00
		LN	94000.0	87000.0	90	1156000.	546000.	152.00	122.00
		TOTAL	146000.0	129000.0		3170000.	1060000.	217.00	160.00
EUROPE									
ALBANIA	N.A.	LN	15.0	N.A.	N.A.	N.A.		1.00	
AUSTRIA *	1978	LN	132.5	65.4	50	63.	2.	3.10	0.50
BULGARIA *	1979	LN	4418.0	3700.0	45	700.	100.	26.50	20.50
CZECHOSLOVAKIA *	N.A.	LN	7220.0	2860.0	N.A.	1620.	1620.	95.29	N.A.
DENMARK/GREENLAND *	1979	SB				21.	21.		
FRANCE *	1977	SB	23.0	10.0		35.	35.	1.50	
		LN	50.0	50.0	100			1.20	1.20
		TOTAL	73.0 73.0	60.0 60.0		35. 35.	35. 35.	2.70 2.70	1.20 1.20
GERMAN DEM. REPUBLIC *	1978	LN	30000.0	25000.0	100	0.		253.30	253.30
GERMANY, FED. REP. OF *	1979	LN	55000.0	35150.0	100			123.60	123.20
GREECE *	1976	LN	3600.0	1550.0	N.A.	1150.	1150.	22.37	22.37
HUNGARY *	1966	LN	4400.0	4000.0	N.A.	4200.		22.72	N.A.
ITALY *	1979	SB	10.0	10.0		N.A.			
		LN	23.0	21.0	100	22.	22.	1.90	1.90
		TOTAL	33.0 10.0	31.0		22.	22.	1.90	1.90
POLAND *	1978	LN	16000.0	12000.0	100	24000.		41.00	41.00
PORTUGAL *	1978	LN	35.5	33.0	100	N.A.	N.A.	0.	
ROMANIA *	1976	LN	3900.0	1100.0		N.A.		19.42	
SPAIN *	1979	SB	154.0	123.0	13	1130.	1130.	3.00	0.20
		LN	430.0	430.0	94	8.	8.	5.20	5.20
		TOTAL	584.0	553.0		1138.	1138.	8.20	5.40
SWEDEN *	1979	SB	4.0	1.0	100	2.	2.	0.02	0.02
YUGOSLAVIA *	1978	SB	1760.0	1500.0	30-40	275.	275.	N.A.	
		LN	16000.0	15000.0	80	3500.		39.10	N.A.
		TOTAL	17760.0 17760.0	16500.0 16500.0		3775. 3775.	275. 275.	39.10	
AUSTRALIA AND OCEANIA									
AUSTRALIA *	1978	SB	1660.0	1500.0	95	105000.	105000.	5.70	5.20
		LN	35440.0	32440.0	100	89000.	89000.	33.00	33.00
		TOTAL	37100.0	33940.0		194000.	194000.	38.70	38.20
NEW ZEALAND *	1979	SB	139.0	139.0	10	473.	473.	1.60	1.30
		LN	37.0	37.0	100	3370.	3370.	0.10	0.10
		TOTAL	176.0	176.0		3843.	3843.	1.70	1.40
TOTAL AFRICA		SB	1303.0 1303.0	169.0 169.0		1000. 1000.		0.24 0.24	
		LN	79.0 79.0	4.0 4.0		44. 44.	40. 40.	0. 0.	
		TOTAL	1382.0 1382.0	173.0 173.0		1044. 1044.	40. 40.	0.24 0.24	
TOTAL AMERICA		SB	163307.0 68.0	96496.3 24.0		1710603. 590.	631403. 590.	90.74	90.21 0.
		LN	33718.0 14.0	26518.0 1.0		816913. 327.	454386.	32.10 0.	32.10
		TOTAL	197025.0 82.0	123014.3 25.0		2527316. 917.	1085969. 590.	122.84 0.	122.31 0.
TOTAL ASIA		SB	1219.0 873.5	1032.4 784.0		2822. 2200.	2200. 2200.	15.61 12.61	0.05
		LN	18993.5 12255.0	4100.1 243.0		58981. 40583.	17849. 3.	22.02 3.08	4.18
		TOTAL	20212.5 13128.5	5132.5 1027.0		61802. 42783.	20049. 2203.	37.63 15.69	4.23
TOTAL AUSTRAL./OCEA.		SB	1799.0	1639.0		105473.	105473.	7.30	6.50
		LN	35477.0	32477.0		92370.	92370.	33.10	33.10
		TOTAL	37276.0	34116.0		197843.	197843.	40.40	39.60
TOTAL EUROPE EX.USSR		SB	1951.0 1793.0	1644.0 1510.0		1467. 310.	1467. 310.	4.52 1.50	0.22
		LN	141224.0 81185.0	100959.4 61560.0		35265. 34470.	2902. 2770.	655.70 203.00	469.17 64.57
		TOTAL	143175.0 82978.0	102603.4 63070.0		36732. 34780.	4369. 3080.	660.22 204.50	469.39 64.57
EC		SB	33.0 33.0	20.0 10.0		60. 35.	60. 35.	1.50 1.50	
		LN	55073.0 50.0	35221.0 30.0		22.	22.	126.70 1.20	126.30 1.20
		TOTAL	55106.0 83.0	35241.0 40.0		82. 35.	82. 35.	128.20 2.70	126.30 1.20
OECD		SB	162112.0 33.0	95641.0 10.0		1794337. 35.	716337. 35.	100.12 1.50	95.07
		LN	132550.5 3650.0	98039.5 1600.0		901130. 1150.	538788. 1150.	237.33 23.57	219.37 23.57
		TOTAL	294662.5 3683.0	193680.5 1610.0		2695467. 1185.	1255125. 1185.	337.45 25.07	314.59 23.57
OPEC		SB	490.5 338.0	283.7 169.0		5958. 1000.	3336.	0.42 0.24	0.11
		LN	525.0	420.0		17587.	17565.	0.13	0.13
		TOTAL	1015.5 338.0	703.7 169.0		23545. 1000.	20901.	0.55 0.24	0.24
COMECON		SB	52000.0	42000.0		2014000.	514000.	65.00	38.00
		LN	171930.0 73532.0	135660.0 44960.0		1186520. 29820.	567720. 1620.	613.31 181.51	436.80 41.
		TOTAL	223930.0 73532.0	177660.0 44960.0		3200520. 29820.	1081720. 1620.	678.31 181.51	474.80 41.
DEV.COUNTRIES		SB	6442.0 979.5	3539.7 677.0		24353. 1590.	21731. 590.	7.29 1.85	1.96 0.
		LN	4899.5 336.0	4087.1 248.0		28201. 454.	27239. 43.	18.94 0.	4.18
		TOTAL	11341.5 1315.5	7626.8 925.0		52554. 2044.	48970. 633.	26.23 1.85	6.14 0.
TOTAL WORLD		SB	221579.0 4037.5	142980.7 2487.0		3835163. 4100.	1254543. 3100.	183.41 14.35	134.97 0.
		LN	323491.5 93533.0	251058.5 61808.0		2159572. 75424.	1133747. 2813.	894.92 206.08	660.55 64.57
		TOTAL	545070.5 97570.5	394039.2 64295.0		5994736. 79524.	2388290. 5913.	1078.33 220.43	795.53 64.57

TABLE 1.2 SUBBITUMINOUS COAL AND LIGNITE (CONTINUATION)

EGYPT	13.0					
ETHIOPIA *				6.2		
MALAWI	12.0					
MALI				1.0		
MOROCCO *	50.0			13.7		
MOSAMBIQUE	240.0	155.0				
NIGERIA *		21.0	131.8	780.0		
RUANDA						1000.0
SOUTH AFRICA *	25290.0	33762.0				
SWAZILAND	1820.0	3000.0				
TANZANIA *	200.0	1500.0				
ZAIRE	600.0					
ZAMBIA *	24.0	98.0				
ZIMBABWE-RHODESIA	734.0	5820.0				
AMERICA						
CANADA *	1607.0	93613.0	2760.5	272802.0	219.3	37710.0
USA *	107183.0	1072000.0	83707.0	1447200.0		9890.0
ARGENTINA *			117.0	3397.5	38.7	21.5
BRAZIL *	189.0	1447.0	720.7	9960.6		
CHILE *	26.5	291.3	897.0	3223.3		81.7
COLOMBIA *	1010.0	7200.0	19.1	526.2		
CUBA *						120.4
ECUADOR *				28.1		
FALKLAND ISLANDS						12.0
HAITI				8.9		
MEXICO *	1200.0	1300.0	299.5	390.0		
PERU *		835.0		33.0		
URUGUAY *						19.8
VENEZUELA *	134.0	4700.0	4.9	3354.0		
ASIA						
AFGHANISTAN	66.0	400.0				
BANGLADESH *	242.0			1.0		
BURMA	2.3	120.0		26.4		
CHINA,P.R.OF	99000.0	1326000.0		13365.0		473.0
CHINA,REP.OF *			109.2			
INDIA *	12610.0	91139.0	524.0	92.7		
INDONESIA *	10.9	4.0	223.7	6288.5		8299.0
IRAN *	193.0					
ISRAEL *						215.0
JAPAN *	1050.0		5.9			215.0
KOREA,D.P.R.OF	380.0	2700.0	234.0	1716.0		
KOREA,REP.OF *	116.3	1049.0				
MALAYSIA *		177.0		87.5		
PAKISTAN *			393.8			
PHILIPPINES *			64.0			
SRI LANKA *						21.9
THAILAND *			34.0			
TURKEY *	186.2	924.0	570.3	92.3		
VIETNAM *	150.0	700.0				
USSR						
USSR *	104000.0	2480000.0	61470.0	1952400.0	3593.7	37445.0
EUROPE						
AUSTRIA *		4.0	32.7	32.3		24.1
BELGIUM *	440.0	2617.0				10.8
BULGARIA *	30.0	1200.0	1850.0	350.0		1.9
CZECHOSLOVAKIA *	2700.0	5500.0	1716.0	972.0		30.1
DENMARK *						241.2
DENMARK/GREENLAND *				19.5		
FINLAND *					1006.2	
FRANCE *	550.0	200.0	24.3	27.3		132.4
GERMAN DEM.REPUBLIC *			7500.0			460.1
GERMANY,FED.REP.OF *	23991.0	186300.0	10545.0		441.0	
GREAT BRITAIN *	45000.0	145000.0				1892.0
GREECE *			511.5	379.5		1032.0
HUNGARY *	225.0	350.0	1320.0	1386.0		102.3
IRELAND *	55.0	40.0			94.3	41.5
ITALY *			14.7	7.3		132.9
NETHERLANDS *		1194.0				27.5
NORWAY *	18.0	150.0				
POLAND *	27000.0	84000.0	3600.0	7200.0		1358.8
PORTUGAL *	5.3	5.0	16.5			
ROMANIA *	30.0	320.0	363.0			6.9
SPAIN *	396.0	2375.0	237.8	884.0		6.5
SWEDEN *			0.8	1.6	387.0	
SWITZERLAND *						6.0
YUGOSLAVIA *	70.0	22.0	8670.0	1964.5		15.0
AUSTRALIA AND OCEANIA						
AUSTRALIA *	25400.0	503000.0	10902.0	108600.0		
NEW CALEDONIA	2.0	8.0				
NEW ZEALAND *	35.0	175.0	126.9	2053.9		34.4
TOTAL AFRICA	52525.9 7119.0	144356.0 110496.0	133.1 133.1	794.4 794.4		1250.0 1250.0
TOTAL AMERICA	111349.5 1010.0	1181186.3 8035.0	88525.6 19.1	1740925.6 568.1	258.0	47855.4 233.9
TOTAL ASIA	113926.7 99711.3	1423213.0 1329920.0	2158.5 691.7	21644.4 15108.4		9223.9 9088.9
TOTAL AUSTRAL./OCEA.	25437.0 2.0	503133.0 8.0	11028.9	110653.9		34.4 34.4
TOTAL EUROPE EX.USSR	100532.3 30595.0	429477.0 90742.0	36402.3 23704.8	13224.0 11929.3	1928.5	5521.2 5479.7
EC	70036.0 550.0	335351.0 200.0	10584.0 24.3	54.1 27.3	535.3	2478.3 2436.8
OECD	205918.5 550.0	2007347.0 350.0	109455.9 535.8	1832099.7 406.8	2147.8	51396.3 3754.8
OPEC	380.8 193.0	4725.0 21.0	359.9 131.8	10450.6 780.0		8299.0 8299.0
COMECON	134135.0 30125.0	2572270.0 91070.0	77819.0 14499.0	1962308.0 9558.0	3593.7	39524.7 2079.7
DEV.COUNTRIES	22490.1 7658.3	214368.3 113239.0	4105.7 609.9	26301.5 1389.9	38.7	9920.9 9684.4
TOTAL WORLD	487771.4 138437.3	6161363.3 1539201.0	199718.3 24548.7	3839662.2 28400.7	5780.2	101329.9 18006.9

EGYPT *	386.4					
ETHIOPIA *				4.8		
MALAWI	351.6					
MALI				29.0		
MOROCCO *	1465.0			386.8		
MOSAMBIQUE	7032.0	4541.5				
NIGERIA *		635.3	3862.3	22854.0		
RUANDA						29300.0
SOUTH AFRICA *	740997.0	989226.6				
SWAZILAND	53326.0	87900.0				
TANZANIA *	5860.0	43950.0				
ZAIRE	17580.0					
ZAMBIA *	703.2	2871.4				
ZIMBABWE-RHODESIA	21506.2	170526.0				
AMERICA						
CANADA *	47085.1	2737000.9	80881.5	7993098.6	6425.5	1104903.0
USA *	3140461.9	31409600.0	2452615.1	42402960.0		289777.0
ARGENTINA *			3428.1	99546.7	1133.9	629.4
BRAZIL *	5537.7	42397.1	21117.1	291845.6		
CHILE *	776.4	8535.1	26282.1	94501.3		2393.8
COLOMBIA *	29593.0	210960.0	558.2	15417.7		
CUBA *						3527.7
ECUADOR *				822.7		
FALKLAND ISLANDS						352.8
HAITI				261.1		
MEXICO *	35160.0	38090.0	8775.9	11427.0		
PERU *		24465.5		964.9		
URUGUAY *						579.6
VENEZUELA *	3926.2	137710.0	143.1	98272.2		
ASIA						
AFGHANISTAN	1933.8	11720.0				
BANGLADESH *	7090.6			29.0		
BURMA	67.4	3516.0		773.5		
CHINA,P.R.OF	2900700.0	38851800.0		391594.5		15858.9
CHINA,REP.OF *			3199.6			
INDIA *	369473.0	2670372.7	15354.4	2717.0		
INDONESIA *	319.7	117.2	6538.4	184232.5		243160.7
IRAN *	5654.9					
ISRAEL *						6299.5
JAPAN *	30765.0		174.0			6299.5
KOREA,D.P.R.OF	8790.0	79110.0	6856.2	50278.8		
KOREA,REP.OF *	3407.6	30735.7				
MALAYSIA *		5186.1		2417.2		
PAKISTAN *			11536.9			
PHILIPPINES *			1874.0			
SRI LANKA *						642.5
THAILAND *			995.9			
TURKEY *	5435.7	27073.2	16709.0	2703.5		
VIETNAM *	4393.0	20510.0				
USSR						
USSR *	3047200.0	72664000.0	1801071.0	57205320.0	105295.4	1097138.5
EUROPE						
AUSTRIA *		117.2	958.1	946.4		705.5
BELGIUM *	12892.0	76678.1				315.0
BULGARIA *	879.0	35160.0	54205.0	10255.0		30.2
CZECHOSLOVAKIA *	79110.0	161150.0	50278.8	28479.6		881.9
DENMARK *						7068.0
DENMARK/GREENLAND *				371.3		
FINLAND *					29481.7	
FRANCE *	14115.0	5860.0	712.0	799.9		3880.5
GERMAN DEM.REPUBLIC *			219750.0			13480.9
GERMANY,FED.REP.OF *	702936.3	5458590.0	308968.5		12921.3	
GREAT BRITAIN *	1318500.0	4748500.0				55435.6
GREECE *			14986.9	11119.3		30237.6
HUNGARY *	6592.5	10255.0	38676.0	40609.8		2998.6
IRELAND *	1611.5	1172.0			2763.0	1215.9
ITALY *			431.6	212.7		3895.1
NETHERLANDS *		34984.2				806.3
NORWAY *	527.4	4395.0				
POLAND *	791100.0	2461200.0	105480.0	210960.0		39872.8
PORTUGAL *	156.2	146.5	483.4			
ROMANIA *	1465.0	15236.0	10635.9			201.6
SPAIN *	11661.4	69587.5	6968.7	25902.4		189.0
SWEDEN *			22.9	45.7	11339.1	
SWITZERLAND *						176.4
YUGOSLAVIA *	2051.0	644.6	254031.0	37559.8		441.0
AUSTRALIA AND OCEANIA						
AUSTRALIA *	744220.0	14737900.0	319428.6	3181980.0		
NEW CALEDONIA	58.6	234.4				
NEW ZEALAND *	1025.5	3667.5	3718.8	60180.4		1007.9
TOTAL AFRICA	953008.9 208586.7	4279630.8 3237532.8	3901.0 3901.0	23274.6 23274.6		36625.0 36625.0
TOTAL AMERICA	3267540.3 29593.0	34608758.6 235425.5	2593801.0 558.2	51009119.8 16645.6	7559.4	1402163.8 6853.9
TOTAL ASIA	3338052.7 2921541.1	41700140.9 38966656.0	63238.5 20267.1	634766.0 442675.8		270261.1 263961.6
TOTAL AUSTRAL./OCEA.	745304.1 58.6	14741796.9 234.4	323147.4	3242160.4		1007.9 1007.9
TOTAL EUROPE EX.USSR	2945597.3 896433.5	12583676.1 2658740.6	1066588.9 694550.6	387462.0 349528.5	56505.0	161770.0 160554.1
EC	2052054.8 14115.0	9825784.3 5860.0	310112.1 712.0	1584.0 799.9	15684.3	72614.5 71398.5
OECD	6333412.9 14115.0	58815267.1 10255.0	3207059.1 15698.9	53680520.3 11919.2	62930.5	1505910.4 110014.5
OPEC	11157.8 5654.9	138442.5 635.3	10543.8 3862.3	386201.4 22854.0		243160.7 243160.7
COMECON	3930741.5 882662.5	75367311.0 2668351.0	2280096.7 474828.7	57495624.4 280049.4	105295.4	1158072.3 60933.8
DEV.COUNTRIES	658960.3 224788.2	6780991.7 3317902.7	120413.6 17870.1	829228.5 40722.8	1133.9	290683.8 283754.4
TOTAL WORLD	14291702.2 4096712.9	180528003.3 45098509.3	5851747.6 719276.9	112502102.8 832124.5	169359.9	2968946.4 469002.5

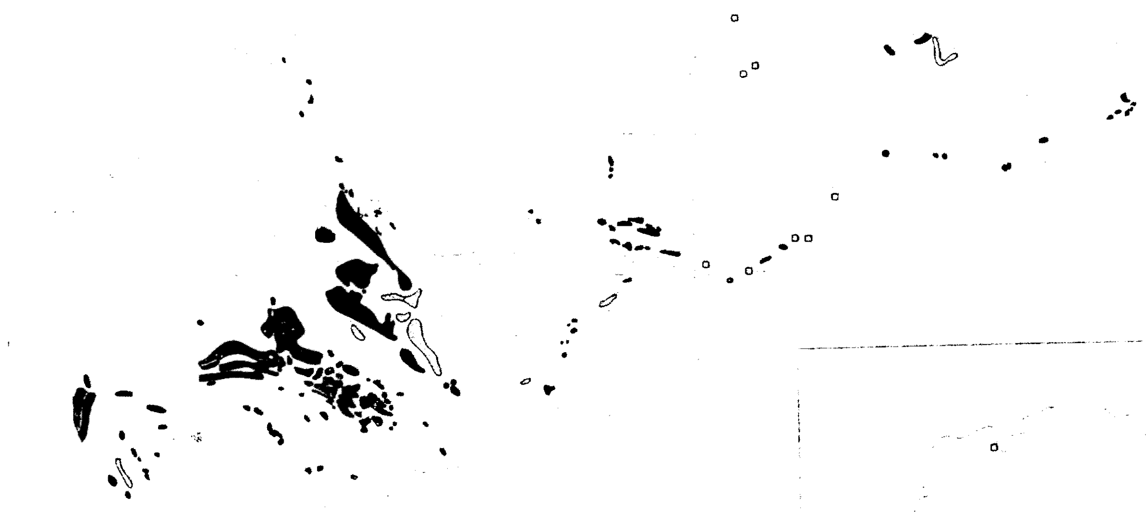
TABLE 1.4

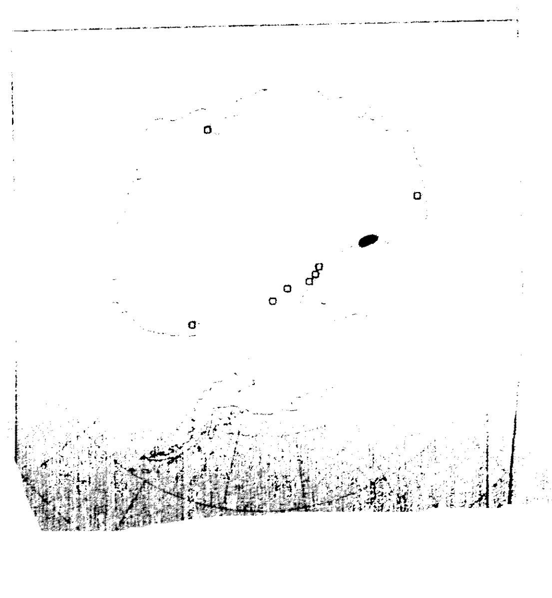
SOLID FOSSIL FUELS IN MT CE

TABLE 1.4 SOLID FOSSIL FUELS ...

NAME OF CONTINENT REGION OR COUNTRY	YEAR OF REF.	BITUMINOUS COAL/ANTHRACITE: PROVED RECOVERABLE RESERVES (10^6 T CE)	BITUMINOUS COAL/ANTHRACITE: ADDITIONAL RESOURCES (10^6 T CE)	SUBBITUMINOUS COAL/LIGNITE: PROVED RECOVERABLE RESERVES (10^6 T CE)	SUBBITUMINOUS COAL/LIGNITE: ADDITIONAL RESOURCES (10^6 T CE)	PEAT: PROVED RECOVERABLE RESERVES (10^6 T CE)	PEAT: ADDITIONAL RESOURCES (10^6 T CE)
AFRICA							
ALGERIA *		47.9					
BOTSWANA		3500.0	100000.0				
BURUNDI *							250.0
CENTRAL AFRICAN REP.				1.3			
EGYPT *		13.0					
ETHIOPIA *					0.2		
MALAWI		12.0					
MALI					1.0		
MOROCCO *		50.0			15.7		
MOZAMBIQUE		240.0	155.0				
NIGERIA *			21.0	131.8	788.0		
RWANDA							1000.0
SOUTH AFRICA *		25290.0	33762.0				
SWAZILAND		1820.0	3000.0				
TANZANIA *		200.0	1500.0				
ZAIRE		600.0					
ZAMBIA *		24.0	98.0				
ZIMBABWE-RHODESIA		734.0	5820.0				
AMERICA							
CANADA *		1607.0	93413.0	2766.5	272802.8	219.3	37710.0
USA *		107183.0	1072000.0	83707.0	1447200.0		9890.0
ARGENTINA *				117.0	3397.5	38.7	21.5
BRAZIL *		189.0	1447.0	720.7	9960.4		
CHILE *		26.5	291.3	897.0	3225.3		81.7
COLOMBIA *		1010.0	7200.0	19.1	526.2		
CUBA *							120.4
ECUADOR *					28.1		
FALKLAND ISLANDS							12.0
HAITI					8.9		
MEXICO *		1200.0	1300.0	299.5	390.0		
PERU *			835.0		33.0		
URUGUAY *							19.8
VENEZUELA *		134.0	4700.0	4.9	3354.0		
ASIA							
AFGHANISTAN		66.0	400.0				
BANGLADESH *		242.0			1.0		
BURMA		2.3	120.0		26.4		
CHINA, P.R. OF		99000.0	1326000.0		13365.0		473.0
CHINA, REP. OF *				109.2			
INDIA *		12610.0	91139.0	524.0	92.7		
INDONESIA *		10.9	4.0	223.2	6287.5		8299.0
IRAN *		193.0					
ISRAEL *							215.0
JAPAN *		1050.0		5.9			215.0
KOREA, D.P.R. OF		300.0	2700.0	234.0	1716.0		
KOREA, REP. OF *		116.3	1049.0				
MALAYSIA *			177.0		82.5		
PAKISTAN *				393.8			
PHILIPPINES *				64.0			
SRI LANKA *							21.9
THAILAND *				34.0			
TURKEY *		186.2	924.0	570.3	97.3		
VIETNAM *		150.0	700.0				
USSR							
USSR *		104000.0	2480000.0	61470.0	1952400.0	3593.7	37445.0
EUROPE							
AUSTRIA *			4.0	32.7	32.3		24.1
BELGIUM *		440.0	2617.0				10.8
BULGARIA *		30.0	1200.0	1850.0	350.0		1.3
CZECHOSLOVAKIA *		2700.0	5500.0	1716.0	972.0		30.1
DENMARK *							241.2
DENMARK/GREENLAND *					19.5		
FINLAND *						1006.2	
FRANCE *		550.0	200.0	24.3	27.3		132.4
GERMAN DEM. REPUBLIC *				7500.0			460.1
GERMANY, FED. REP. OF *		23991.0	186300.0	10545.0		441.0	
GREAT BRITAIN *		45000.0	145000.0				1892.0
GREECE *				511.5	379.5		1032.0
HUNGARY *		225.0	350.0	1320.0	1386.0		102.3
IRELAND *		55.0	40.0			94.3	41.3
ITALY *				14.7	7.3		132.9
NETHERLANDS *			1194.0				27.5
NORWAY *		18.0	150.0				
POLAND *		27000.0	84000.0	3600.0	7200.0		1356.8
PORTUGAL *		5.3	5.0	16.5			
ROMANIA *		50.0	320.0	363.0			6.9
SPAIN *		398.0	2375.0	237.8	884.8		6.5
SWEDEN *				0.8	1.6	387.0	
SWITZERLAND *							6.0
YUGOSLAVIA *		70.0	22.0	8670.0	1964.5		15.8
AUSTRALIA AND OCEANIA							
AUSTRALIA *		25400.0	503000.0	10902.0	108600.0		
NEW CALEDONIA		2.0	8.0				
NEW ZEALAND *		35.0	125.0	126.9	2053.9		34.4
TOTAL AFRICA		32525.9	144356.0	133.1	794.4		1250.0
		7119.0	110496.0	133.1	794.4		1250.0
TOTAL AMERICA		111349.5	1181186.3	88525.6	1740925.6	258.0	47855.4
		1010.0	8035.0	19.1	568.1		233.9
TOTAL ASIA		113924.7	1423213.0	2156.3	21664.4		9223.9
		99711.3	1329920.0	691.7	15108.4		9008.9
TOTAL AUSTRAL./OCEA.		25437.0	503133.0	11028.9	110653.9		34.4
		2.0	8.0				34.4

NAME OF CONTINENT REGION OR COUNTRY	YEAR OF REF.	BITUMINOUS COAL/ANTHRACITE: PROVED RECOVERABLE RESERVES (10^{15} J)	BITUMINOUS COAL/ANTHRACITE: ADDITIONAL RESOURCES (10^{15} J)	SUBBITUMINOUS COAL/LIGNITE: PROVED RECOVERABLE RESERVES (10^{15} J)	SUBBITUMINOUS COAL/LIGNITE: ADDITIONAL RESOURCES (10^{15} J)	PEAT: PROVED RECOVERABLE RESERVES (10^{15} J)	PEAT: ADDITIONAL RESOURCES (10^{15} J)
AFRICA							
ALGERIA *		1257.0					
BOTSWANA		102590.0	2930000.0				
BURUNDI *							7325.0
CENTRAL AFRICAN REP.				38.1			
EGYPT *		380.9					
ETHIOPIA *					4.8		
MALAWI		351.6					
MALI					29.0		
MOROCCO *		1465.0			386.8		
MOZAMBIQUE		7032.0	4541.5				
NIGERIA *			615.3	3862.3	22854.0		
RWANDA							29300.0
SOUTH AFRICA *		740997.0	989226.6				
SWAZILAND		53326.0	87900.0				
TANZANIA *		5860.0	43950.0				
ZAIRE		17580.0					
ZAMBIA *		703.2	2871.4				
ZIMBABWE-RHODESIA		21506.2	170526.0				
AMERICA							
CANADA *		47085.1	2737000.9	80881.5	7993898.6	6425.5	1104903.0
USA *		3140461.9	31409600.0	2452615.1	42402960.0		289777.0
ARGENTINA *				3428.1	99546.7	1133.9	629.9
BRAZIL *		5537.7	42397.1	21117.1	291843.6		
CHILE *		776.4	8535.1	26282.1	94501.3		2393.8
COLOMBIA *		29593.0	210960.0	558.2	15417.7		
CUBA *							3527.7
ECUADOR *					822.7		
FALKLAND ISLANDS							351.6
HAITI					261.1		
MEXICO *		35160.0	38090.0	8775.9	11427.0		
PERU *			24465.5		966.9		
URUGUAY *							579.6
VENEZUELA *		3926.2	137710.0	143.6	98272.2		
ASIA							
AFGHANISTAN		1933.8	11720.0				
BANGLADESH *		7090.6			29.0		
BURMA		67.4	3516.0		773.5		
CHINA, P.R. OF		2900700.0	38851800.0		391594.5		13858.9
CHINA, REP. OF *				3199.6			
INDIA *		369473.0	2670372.7	15353.2	2717.8		
INDONESIA *		319.7	117.2	6538.4	184232.5		243160.7
IRAN *		5654.9					
ISRAEL *							6299.5
JAPAN *		30765.0		174.0			6299.5
KOREA, D.P.R. OF		8790.0	79110.0	6856.2	50278.8		
KOREA, REP. OF *		3407.6	30735.7				
MALAYSIA *			5186.1		2417.2		
PAKISTAN *				11536.9			
PHILIPPINES *				1874.0			
SRI LANKA *							642.5
THAILAND *				995.9			
TURKEY *		5455.7	27073.2	16709.0	2703.5		
VIETNAM *		4395.0	20510.0				
USSR							
USSR *		3047200.0	72664000.0	1801071.0	57205320.0	105295.4	1097138.5
EUROPE							
AUSTRIA *			117.2	958.1	946.4		705.5
BELGIUM *		12892.0	76678.1				315.8
BULGARIA *		879.0	35160.0	54205.0	10255.0		38.2
CZECHOSLOVAKIA *		79110.0	161150.0	50278.8	28479.6		881.9
DENMARK *							7068.8
DENMARK/GREENLAND *					571.3		
FINLAND *						29481.7	
FRANCE *		16115.0	5860.0	712.0	799.9		3880.5
GERMAN DEM. REPUBLIC *				219750.0			13480.9
GERMANY, FED. REP. OF *		702936.3	5458590.0	308968.5		12921.3	
GREAT BRITAIN *		1318500.0	4248500.0				55435.6
GREECE *				14986.9	11119.3		30237.6
HUNGARY *		6592.5	10255.0	38676.0	40609.8		2994.5
IRELAND *		1611.5	1172.0			2763.0	1210.1
ITALY *				431.6	212.7		3893.1
NETHERLANDS *			34984.2				806.3
NORWAY *		527.4	4395.0				
POLAND *		791100.0	2461200.0	105480.0	210960.0		39812.8
PORTUGAL *		155.3	146.5	483.4			
ROMANIA *		1465.0	35234.0	10635.9			201.6
SPAIN *		11661.4	69587.5	6968.7	25902.4		190.4
SWEDEN *				22.9	46.9	11339.1	
SWITZERLAND *							175.8
YUGOSLAVIA *		2051.0	644.6	254031.0	57559.8		463.0
AUSTRALIA AND OCEANIA							
AUSTRALIA *		744220.0	14737900.0	319428.6	3181980.0		
NEW CALEDONIA		58.6	234.4				
NEW ZEALAND *		1025.5	3662.5	3718.2	60180.4		1007.9
TOTAL AFRICA		953008.9	4229630.8	3901.0	23274.6		36625.0
		208586.7	3237532.8	3901.0	23274.6		36625.0
TOTAL AMERICA		3262540.4	34608758.6	2553801.2	51009120.1	7559.4	1402163.8
		29593.0	235425.5	558.2	16645.4		6853.9
TOTAL ASIA		3337952.7	41700140.9	63238.3	634744.0		270261.1
		2921541.1	38966656.0	20267.1	442675.2		263961.6
TOTAL AUSTRAL./OCEA.		745304.1	14741796.9	323147.6	3242160.4		1007.9
		58.6	234.4				1007.9





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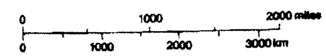
11ème Conference Mondiale de l'Energie
11. Weltenergiekonferenz
München
8.–12. September 1980

COAL

World Coal Deposits

- Bituminous coal and anthracite
- Bituminous coal and anthracite (combined)
- Subbituminous coal and Lignite
- Subbituminous coal and Lignite (combined)
- Prospective area
- Indication of coal



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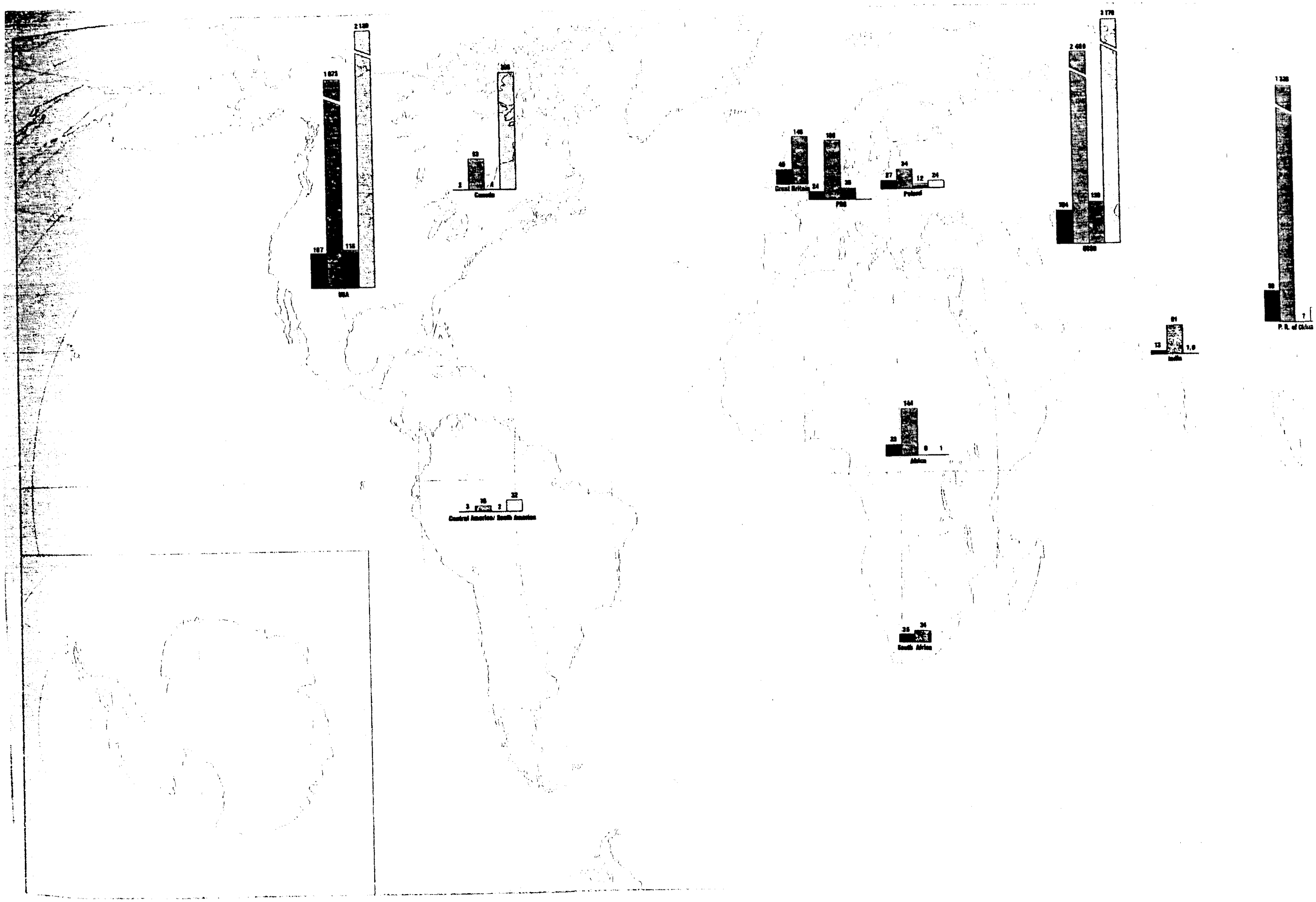

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USSR
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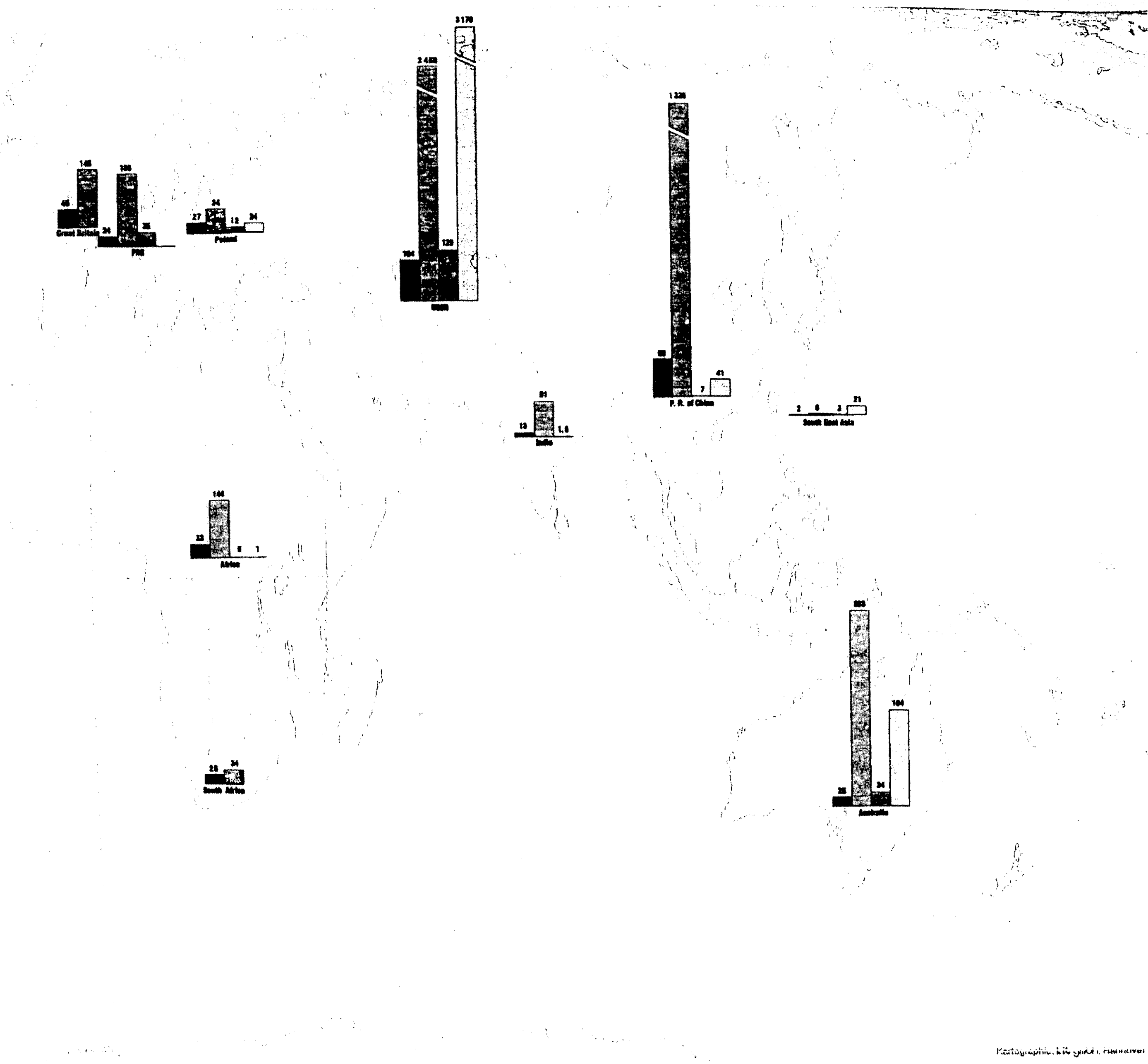
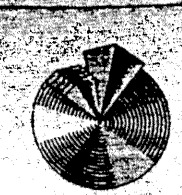
South Africa





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COAL

Reserves and Resources

Recoverable reserves (10^9 t)	Bituminous coal / anthracite	
Additional resources (10^9 t)		
Recoverable reserves (10^9 t)	Subbituminous coal / lignite	
Additional resources (10^9 t)		

0 1000 2000 miles
0 1000 2000 3000 km

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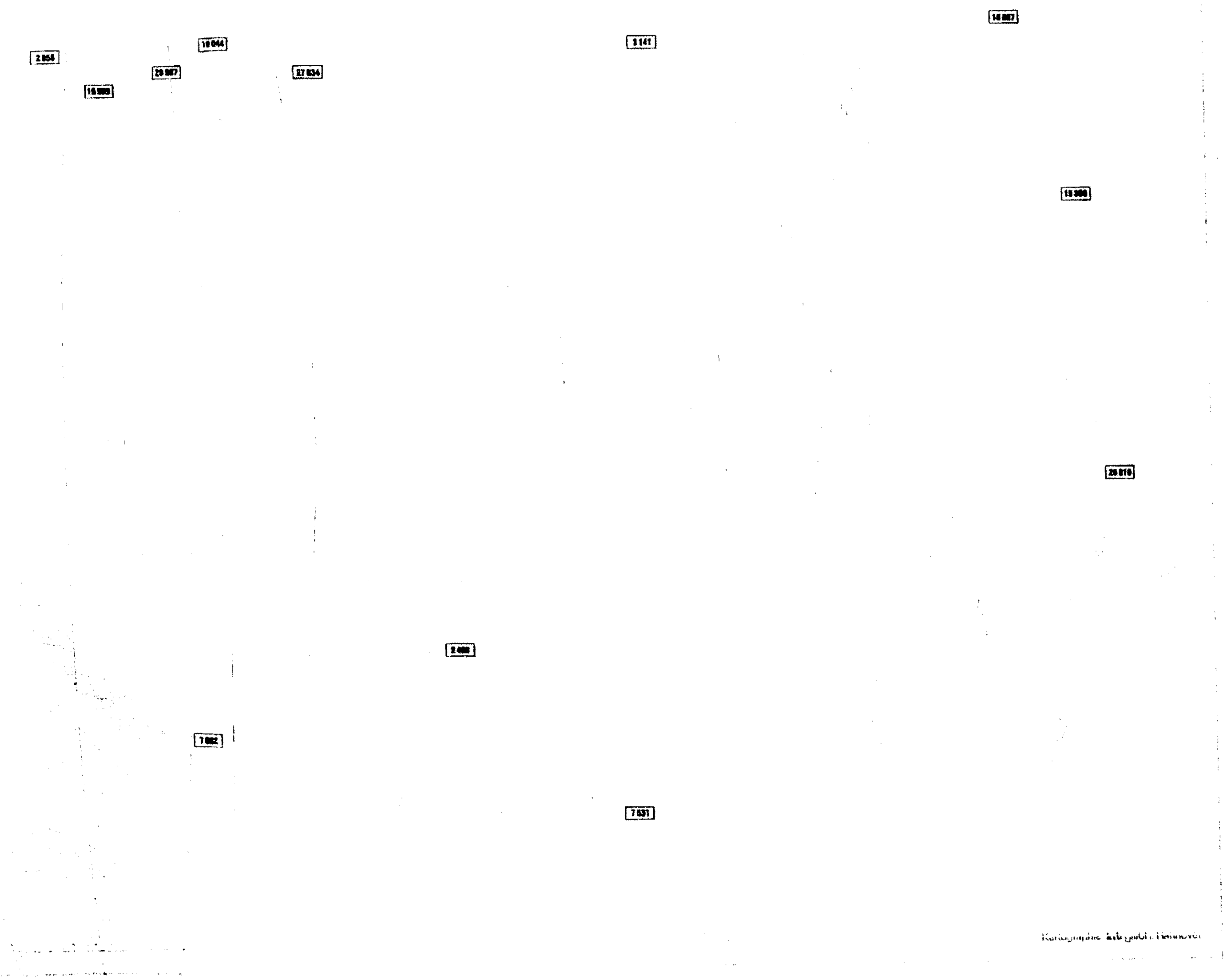

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COAL

Main Trade Routes

Export/Import (1000 t)

0 1000 2000 miles
0 1000 2000 3000 km

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[redacted]

World Energy Conference

Conférence Mondiale de l'Energie

1986

SURVEY OF ENERGY RESOURCES

ENQUETE SUR LES RESSOURCES ENERGETIQUES

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Section 1

Coal (including lignite)

CONTENTS

Section 1

Charbon (dont lignite)

TABLEAU DES MATIERES

Commentary

by

PROFESSOR DR. HANS-DIETER SCHILLING
Bergau-Forschung GmbH
Federal Republic of Germany

Inventories of coal reserves and resources during the past three years have reconfirmed their huge volume and comparatively uniform distribution around the globe. However, long-term security of coal supplies can be secured only by the active improvement and implementation of mining technologies; provision of adequate transport, trans-shipment and unloading capacities and the availability of technologies for economic utilisation and conversion of coal, with increasing emphasis on environmental compatibility.

As to the availability of coal, trade volumes soared during the past decade. International coal trade increased from 197 to 300 x 10^6 tonnes per year and accounts for about 10% of the world's coal production. There are some indications that world coal trade could double to 600 x 10^6 tonnes by the year 2000, equivalent to an average growth of 4.6% per year. This would represent a roughly constant proportion of the forecast production.

The handling capacities of the coal export ports were drastically increased in the past decade. The total maritime export capacity currently amounts to 491 x 10^6 tonnes. In contrast to the concerns expressed by many institutions in the late seventies about the adequacy of the energy infrastructure, we are facing now a tremendous capacity surplus: more than 50% of the existing capacity is idle at present. Earlier plans for a capacity extension of approximately 600 x 10^6 tonnes by 1990, are unlikely now to be realised.

Today Western Europe is the most important region for imports (approximately 103 x 10^6 tonnes in 1984), followed by East Asia, in particular Japan (88 x 10^6 tonnes in 1984). The total maritime capacity is slightly below 200 x 10^6 tonnes per year, but it is planned to boast this to 225 x 10^6 tonnes per year by 1990. Japan alone has at present a trans-shipment capacity of approximately 110 x 10^6 tonnes per year and plans exist to boost this capacity to approximately 130 x 10^6 tonnes per year by 1990.

The impetus of development work on coal refining processes has been restricted during the recent past for well-known reasons, but the fact remains that they will be needed in the long run for securing adequate continuity of supplies and for satisfying the existing oil and gas based supply structure.

In the next decade or two coal will, however, still be used predominantly for power and heat generation and for metallurgical applications where it will continue to be indispensable as both a heat supplier and a reducing agent. In certain regions metallurgical applications account for up to 30% of the total coal consumption (world average about 10%).

During the coming years environmental compatibility, especially of coal-based heat and power installations will be given increasing attention. There are suggestions that emissions of sulphur dioxide and nitrogen oxides, are increasingly threatening fauna and vegetation but firm evidence of this is still lacking. Considering the international character of this problem it appears necessary that nations worldwide actively investigate its solution. In the meantime, some countries, e.g. Japan, the USA and the Federal Republic of Germany, are making major efforts to reduce SO_2 and NO_x emissions, particularly from power stations in the expectation that these will help. Past endeavours were related mainly to SO_2 retention for which worldwide almost 200 different methods are either on the drawing board or marketable now. Methods of NO_x reduction are being developed or on the point of being launched. Further endeavours are focussed on simultaneous SO_2 and NO_x removal.

Application of such retention techniques makes power generation much more expensive. Many countries are therefore actively pursuing the development of fluidised-bed combustion in which a large proportion of the sulphur and nitrogen oxides can either be retained in the firing system or be prevented from forming.

Concluding, it can be said that the situation of coal resources and their availability has become less tense in the last few years thanks to more active commitments to coal extraction, transport, refinement and utilisation as requested by the World Energy Conference for many years, particularly since 1973.

Observations

de

PROFESSEUR HANS-DIETER SCHILLING
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République Fédérale d'Allemagne

Les bilans des réserves et des ressources de charbon de ces trois dernières années confirment de nouveau leur énorme volume et leur répartition relativement uniforme sur la planète. Cependant, la sécurité à long terme de l'approvisionnement en charbon ne peut être garantie que par le perfectionnement et la mise en oeuvre active des techniques d'abattage, la prévision de moyens adéquats de transport, de transbordement et de déchargement, et enfin la disponibilité de méthodes permettant une exploitation et une transformation rentables du charbon, sans oublier l'importance accrue de la compatibilité avec l'environnement.

En ce qui concerne la disponibilité du charbon, cette dernière décennie a vu les volumes commerciaux monter en flèche. Le commerce international est en effet passé de 197 à 300 x 10^6 t/a, ce qui représente environ 10% de la production mondiale de charbon. Certaines indications laissent penser que le commerce mondial du charbon pourrait doubler d'ici l'an 2 000, suivant ainsi un essor annuel moyen de 4,6% pour atteindre 600 x 10^6 tonnes. Ce volume représenterait une part approximativement constante de la production prévue.

La capacité de manutention des ports d'exportation de charbon a également considérablement augmenté au cours de cette même décennie. Elle s'élève à présent au total à 491 x 10^6 t. Alors que, vers la fin des années 70, de nombreux établissements s'inquiètaient de la suffisance de l'infrastructure énergétique, nous faisons maintenant face à un énorme excédent de capacité puisque plus de la moitié reste inexploitée. Il est d'ailleurs fort probable que les projets antérieurs visant encore à accrotre cette capacité à 600 x 10^6 t en 1990 soient abandonnés.

La première zone d'importation (soit environ 103 x 10^6 t en 1984) est à présent l'Europe de l'Ouest, suivie de l'Extrême-Orient, avec notamment le Japon (88 x 10^6 t en 1984). La capacité maritime totale est légèrement inférieure à 200 x 10^6 t/a, mais elle devrait passer à 225 x 10^6 t/a en 1990. Au Japon, la capacité de transbordement est de l'ordre de 110 x 10^6 t/a, chiffre qui devrait augmenter à environ 130 x 10^6 t/a en 1990.

L'élan pris par les travaux de développement des méthodes de raffinage a récemment dû ralentir, pour des raisons bien connues; à long terme, ils devront toutefois être poursuivis pour garantir la bonne continuité des approvisionnements et satisfaire la structure d'offre actuelle fondée sur le pétrole et le gaz.

Cependant, dans les dix ou vingt années à venir, les utilisations principales du charbon resteront l'électricité et l'énergie thermique ainsi que la métallurgie où il sera toujours indispensable en tant que substance d'apport thermique et agent réducteur. Dans certaines régions, les cas d'emploi métallurgiques représentent parfois 30% de la consommation totale de charbon, alors que la moyenne mondiale est de l'ordre de 10%.

Dans les années à venir, la compatibilité avec le milieu, notamment de centrales thermiques et électriques, prendra toujours plus d'importance. Bien que rien ne soit encore prouvé, les émanations d'acide sulfureux et d'oxydes d'azote attaqueraient la faune et la végétation. Compte tenu de la portée planétaire de ce problème, il semble nécessaire que les pays impliqués se concertent pour trouver une solution. Dans l'attente, certains pays, dont le Japon, les Etats-Unis et la République Fédérale d'Allemagne, règlent partiellement le problème en prenant d'importantes mesures, surtout dans les centrales électriques, pour réduire les dégagements de SO_2 et de NO_x. Jusqu'ici, les efforts ont principalement porté sur la rétention de SO_2 pour laquelle il existe à travers le monde près de 200 différentes méthodes, à l'état de projet ou déjà applicables. Quant à la réduction du NO_x, des méthodes sont en voie de mise au point ou prêtes à être mises en oeuvre. Par ailleurs, d'autres recherches s'intéressent à l'élimination simultanée de SO_2 et de NO_x.

La mise en oeuvre de ces techniques de rétention augmente considérablement le coût de la production. De nombreux pays travaillent donc dynamiquement à la mise au point de la combustion en lit fluidisé, selon laquelle une part importante de l'acide sulfureux et des oxydes d'azote ne peut pas se former ou est retenue dans le système de combustion.

Pour conclure, nous pouvons dire que la question des ressources de charbon et de sa disponibilité est moins grave qu'elle ne l'était il y à quelques années, grâce aux mesures plus intensives prises à l'égard de l'abattage, du transport, du raffinage et de l'utilisation, comme le prescrit la Conférence Mondiale de l'Energie de longue date, et notamment depuis 1973.

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Definitions and Introduction to the Tables

This Section covers Bituminous Coal (including anthracite), Sub-Bituminous Coal and Lignite. Data for peat are given in Section 7. There is no internationally accepted system of demarcation between coals of different rank, but reference is made to the standards used by individual countries where available.

Table 1 summarises the reserves data for coal (including lignite).

Table 2 gives figures for coal production and consumption, and coal characteristics.

The following definitions apply:

Proved Amount in Place is the tonnage that has been both carefully measured and has also been assessed as exploitable under present and expected local economic conditions with existing available technology.

Maximum Depth of Deposits and Minimum Seam Thickness relate to Proved Amount in Place.

Proved Recoverable Reserves are the tonnage of Proved Amount in Place that can be recovered (extracted from the earth in raw form) under present and expected local economic conditions with existing available technology.

Percentage Recoverable by Surface Mining and Percentage Recoverable of Coking Quality relate to Proved Recoverable Reserves.

Estimated Additional Amount in Place is the indicated and inferred tonnage *additional* to the Proved Amount in Place. It includes estimates of amounts which could exist in unexplored extensions of known deposits or in undiscovered deposits in known fuel-bearing areas as well as amounts inferred through knowledge of favourable geological conditions. The estimates are based on the results of geological and exploratory information about an area or on evidence of duplication or parallelism of geological conditions that occur in known deposits. Deposits whose existence is merely speculative are not included.

Estimated Additional Reserves Recoverable is the quantity of the Estimated Additional Amount in Place which might become recoverable within foreseeable economic and technological limits.

Annual Production is the amount produced in the year shown.

Annual Internal Consumption is the total amount of solid fossil fuel consumed internally in the year shown, *including imports*.

Characteristics of Production for these ranges and/or average values are given. The following apply:

Sulphur Content – dry

Heat Value – moist, ash free

Carbon Content – dry, ash free

Volatile Matter – dry, ash free

Moisture Content – moist, as mined

Ash – dry

Table 3 provides an estimate of Total World Reserves of coal. In addition to WEC data for Proved Amount in Place and Proved Recoverable Reserves, it also includes an estimate of Accessible Coal in Significant Coalfields based on figures from the International Energy Agency, Coal Information 1986. Data have been given for individual countries where they are available from both sources.

The distinction between Proved Recoverable Reserves and Accessible Coal in Significant Coalfields is important. The WEC definition of Proved Recoverable Reserves includes the words "*...that can be recovered under present and expected local economic conditions with existing available technology*".

The IEA defines Accessible Coal in Significant Coalfields as being the *"amount of coal likely to be considered for extraction from Significant Coalfields within the next twenty years"*, where a Significant Coalfield is a *"coalfield whose collective physical characteristics, render it likely either to make a significant contribution to, or to enter into the detailed commercial mining and market evaluations required in order to achieve world coal supply over the next twenty years"*.

In comparing Proved Reserves and Accessible Coal in Significant Coalfields it is important to recognise that the former takes *economic* conditions and *existing available technology* into account without limitation as to time, whilst the latter concentrates on the *physical characteristics* which render it likely to make a significant contribution to world coal supplies in the next twenty years.

A final comment applies to all the Tables. There are no internationally agreed standards for estimating coal reserves and although the WEC attempts to establish precisely worded definitions it is a matter of judgement for each country to determine the quantities which in its opinion, meet these definitions.

For the reasons given above, care is needed when comparing the reserves of different countries and when comparing Proved Recoverable Reserves with Accessible Coal in Significant Coalfiels. In most instances only a fraction of Proved Recoverable Reserves are considered to be Accessible Coal. However, there are instances where the value for Accessible Coal is significantly greater than Proved Recoverable Reserves. Where this occurs it is generally due to the particular criteria applied by the Member Country to its assessment of reserves.

Définitions et Introduction aux Tableaux

Cette section traite des Charbons Bitumineux (dont l'anthracite), des Charbons Sous-Bitumineux et de la Lignite. La tourbe est traitée à la section 7. Bien qu'il n'existe pas de délimitation agréee entre les différentes catégories de charbons, les normes adoptées dans certains pays sont utilisées dans toute la mesure du possible.

Le Tableau 1 offre un résumé des données pour le charbon (y compris la lignite).

Le Tableau 2 donne les chiffres de production et de consommation de charbon ainsi que les caractéristiques du charbon.

Les définitions suivantes sont applicables:

Proved Amount in Place (quantités prouvées en place): tonnages minutieusement mesurés et jugés exploitables, dans les conditions économiques actuelles et prévues et avec les moyens technologiques disponibles.

Maximum Depth of Deposits and Minimum Seam Thickness (profondeur maximale des gisements et epaisseur minimale des veines) en rapport aux quantités prouvées en place.

Proved Recoverable Reserves (réserves prouvées récupérables): tonnages des quantités prouvées en place qui sont récupérables (extraites du sol sous forme brute), dans les conditions économiques actuelles et prévues et avec les moyens technologiques disponibles.

Percentage Recoverable by Surface Mining and Percentage Recoverable of Coking Quality (pourcentage récupérable par exploitation à ciel ouvert et pourcentage récupérable de qualité coke) en rapport avec les réserves prouvées récupérables.

Estimated Additional Amount in Place (quantités additionnelles estimées en place): tonnages évalués et déduits, additionnels aux réserves prouvées en place. Ce terme englobe les quantités évaluées qui pourraient exister dans les extensions inexplorées de gisements connus ou dans des gisements non encore découverts de zones carbonifères, ainsi que les quantités déduites de la présence de conditions géologiques favorables. Les évaluations sont établies d'après les conclusions d'informations géologiques et d'exploration sur une région ou selon des preuves d'analogie ou de parallélisme de conditions géologiques présentes dans des gisements connus. En sont exclus les gisements dont l'existence est purement spéculative.

Estimated Additional Reserves Recoverable (réserves additionnelles estimées récupérables): tonnages des quantités additionnelles estimées en place qui peuvent devenir récupérables dans les limites économiques et technologiques prévisibles.

Annual Production (production annuelle): quantités produites pendant l'année spécifiée.

Annual Internal Consumption (consommation nationale annuelle): quantité totale de combustibles fossiles solides consommée pendant l'année spécifiée, importations comprises.

Characteristics of Production (caractéristiques de production) en gammes ou moyennes, dont les suivantes:

- Teneur en soufre – à sec
- Pouvoir calorifique – humide, sans cendres
- Teneur en carbone – à sec, sans cendres
- Matières volatiles – à sec, sans cendres
- Humidité – à l'extraction
- Taux de cendres – à sec

Le tableau 3 offre une évaluation du Total des Réserves Mondiales en charbon. En plus des données de la CME sur les Quantités Prouvées en Place et sur les Réserves Prouvées Récupérables, il offre également une évaluation du Charbon Accessible en Gisements Importants à partir des chiffres publiés sur le Bulletin des Charbons de 1986 de l'Agence de l'Energie Internationale. Des données émanant des deux sources sont fournies pour certains pays. La distinction entre les Réserves Prouvées

Récupérables et le Charbon Accessible en Gisements Importants est à retenir.

La définition de la CME des Réserves Prouvées Récupérables comprend les mots "*....qui peuvent être récupérées dans les conditions économiques actuelles et prévues pour une région donnée et avec les moyens technologiques disponibles*".

La AEI définit Charbon Accessible en Gisements Importants en tant que "quantités de charbon suceptibles d'être considérées pour extraction dans des Gisements Importants au cours des vingt années à venir" tandis que Gisement Important s'entend en tant que "gisement dont l'ensemble des caractéristiques physiques le rend suceptible soit d'apporter une importante contribution à l'approvisionnement mondial en charbon dans les vingt années à venir, soit de qualifier pour des évaluations de marché et d'exploitation minière détaillées en vue d'atteindre le même objectif".

Lorsque l'on compare les Réserves Prouvées et le Charbon Accessible en Gisements Importants, il est important de se rappeler que le premier prend en ligne de compte les conditions économiques et les moyens technologiques actuels disponibles sans limitations de temps tandis que le second se concentre sur les caractéristiques physiques qui le rendent suceptibles d'apporter une importante contribution à l'approvisionnement mondial en charbon dans les vingt années à venir.

Un dernier commentaire s'applique à tous les Tableaux. Il n'existe pas de normes internationales officielles pour évaluer les réserves en charbon et bien que la CME ait essayé d'établir des définitions précises, c'est à chaque pays individuel de juger les quantités qui, dans leur opinion, correspondent à ces définitions.

Pour les raisons ci-dessus, il est nécessaire d'utiliser un certain degré de discernement lorsque l'on compare les Réserves Prouvées Récupérables et le Charbon Accessible en Gisements Importants. Dans la plupart des cas, seule une fraction des Réserves Prouvées Récupérables peut-être convertie en Charbon Accessible. Toutefois dans certains cas la valeur du Charbon Accessible est beaucoup plus importante que celle des Réserves Prouvées Récupérables. Ceci est généralement dû au critère particulier utilisé par un pays membre pour évaluer ses réserves.

Name of Coun
Afghanistan
Albania
Algeria
Antartica
Argentina
Australia
Austria
Bangladesh
Belgium
Botswana
Brazil
Bulgaria
Burma
Canada
Central Africa
Chile
China
Colombia
Czechoslovak
Denmark
Denmark (Gr
Ecuador
Egypt (Arab
Ethiopia
France
German Dem
Germany (Fe
Great Britain
Greece
Haiti
Honduras

RANK OF
BT = Bitu

Table 1.1 Resources and Reserves

Name of Country	Notes	Rank of Fuel (see foot note)	Year of Refer.	Proved Amount in Place: Tonnage (10^6 tonnes)	Proved Amount in Place: Maximum Depth of Deposits (m)	Proved Amount in Place: Minimum Seam Thickness (m)	Proved Recoverable Reserves: Tonnage (10^6 tonnes)	Proved Recoverable Reserves: By Surface Mining (%)	Proved Recoverable Reserves: Of Coking Quality (%)	Estimated Additional Amount in Place (10^6 tonnes)	Estimated Additional Reserves Recoverable (10^6 tonnes)
Afghanistan	a	BT	1965	112	250	0.8	66	–	–	400	–
Albania	a	LN	U	15	–	–	U	U	–	U	–
Algeria		BT	1981	C	600	0.30	43	0	100	U	U
Antartica	a	BT	1986	U	U	U	U	U	U	U	U
Argentina	a,b	SB	1984	195	600	1	130	30	–	385	–
		LN	1984	–	–	–	–	–	–	7350	–
Australia	a,b	BT	1984	48540	600	1.5	27442	20	40	507000	240000
		SB	1981	2986	600	1.5	2060	53	0	100400	55700
		LN	1981	39300	500	15	36200	100	0	87000	77000
Austria		BT	1984	1.0	U	U	3.0	–	–	6.0	U
		LN	1984	177.0	U	U	61.0	58.3	0	80.0	64.6
Bangladesh	a	BT	1981	1054	1158	0.3	–	–	–	–	–
Belgium		BT	1984	715	1000	0.8	410	0	63	1400	900
Botswana	a	BT	1977	7000	–	–	3500	–	–	100000	–
Brazil	a,b	BT	1984	19.67	250	1.39	19.67	0	0	1.15	1.15
		SB	1984	3078	870.0	0.5	2323	90.0	8.0	27915	14200
Bulgaria		BT	1979	36	–	–	30	N	65	1200	–
		LN	1979	4418	–	–	3700	65	–	700	–
Burma		BT	1975	4.5	–	–	2.3	–	–	120	–
		LN	1975	U	–	–	U	–	–	80	–
Canada	a-c	BT	1984	4903	1220	1.0	3548	88	66	25687	3949
		SB	1984	1280	60	0.6	880	100	0	27818	5146
		LN	1984	2839	46	1.5	2418	100	0	4217	1090
Central African Republic		LN	1979	4.0	–	–	4.0	100	–	U	–
Chile		BT	1984	78.5	900	0.7	30.6	0	7	125.0	75
		SB	1984	4500	U	U	1150	U	U	U	U
China	a	BT	1984	610600	1000	0.6	U	13	30	1700000	U
		LN	1984	126500	U	U	U	70	U	300000	U
Colombia	a,b	BT	1979	2025	–	–	1010	U	20	7200	–
		SB	1979	47	–	–	24	–	–	590	–
		LN	1979	1.0	–	–	1.0	–	–	200	–
Czechoslovakia		BT	1984	5750	–	–	2700	–	–	5500	–
		SB	1984								
		LN	1984	7220	–	–	2860	U	–	1620	–
Denmark	a	LN	1984	63	U	U	U	U	U	U	U
Denmark (Greenland)	a,b	SB	1981	0	560	–	–	–	–	680	370
Ecuador	a	LN	1981	U	100	200	17.51	–	–	5.71	–
Egypt (Arab Republic of)	a,b	BT	1965	25.0	–	–	13.0	–	–	–	–
		SB	1979	–	400	0.65	39.9	–	–	–	–
Ethiopia		LN	1984	23.4	75	0.05	11	U	U	U	U
France		BT	1984	906	1250	0.80	332	12.5	70.8	–	–
		SB	1984	160	1250	1.50	49	0	–	–	–
		LN	1984	U	30	2	U	100	U	8	8
German Democratic Republic		LN	1984	47000	20	2	21000	100	0	0	0
Germany (Federal Republic of)		BT	1984	44000	1500	0.30	23919	–	60	186300	–
		LN	1984	55000	600	2.00	35150	100	–	U	–
Great Britain	a-h	BT	1984	U	1200	0.60	4600	U	39	185400	40000
		LN	1984	400	200	U	U	C	C	U	U
Greece		LN	1984	5312	–	–	3000	U	–	U	–
Haiti		LN	1979	13	–	–	U	–	–	27	–
Honduras		SB	1979	21	–	–	U	–	–	U	–

Continued ...

RANK OF FUEL

BT = Bituminous including anthracite LN = Lignite SB = Sub-bituminous

Table 1.1 Resources and Reserves (Cont.)

Name of Country	Notes	Rank of Fuel (see foot note)	Year of Refer.	Proved Amount in Place: Tonnage (10^6 tonnes)	Proved Amount in Place: Maximum Depth of Deposits (m)	Proved Amount in Place: Minimum Seam Thickness (m)	Proved Recoverable Reserves: Tonnage (10^6 tonnes)	Proved Recoverable Reserves: By Surface Mining (%)	Proved Recoverable Reserves: Of Coking Quality (%)	Estimated Additional Amount in Place (10^6 tonnes)	Estimated Additional Reserves Recoverable (10^6 tonnes)
Hungary	a	BT	1984	1407	900	0.4	596	N	26.0	702	77
		SB	1984	2841	600	1	982	N	0	1952	369
		LN	1984	5465	140	1	2883	100	0	3337	1124
India	a-c	BT	1981	26331	1200	0.5	U	U	U	85547	U
		LN	1981	1581	110	4	1581	95	0	1943	1943
Indonesia	a	BT	1984	774	300	2	U	U	U	U	U
		SB	1984	4440	300	2	U	U	U	U	U
		LN	1984	18018	100	12	U	U	U	U	U
Iran (Islamic Republic of)		BT	1972	385	–	–	193	–	–	U	–
Ireland	a	BT	1984	6.87	335	0.2	5.4	2	–	38.62	22.53
		SB	1984	12.05	150	0.05	9.16	2	–	33.40	20.42
Italy	a	BT	1984								
		SB	1984	60	400	1.40	27	0	0	280	U
		LN	1984	15	150	3	12	100	0	22	20
Japan		BT	1984	8479	1200	0.6	997	U	52	U	U
		LN	1984	175	300	0.6	18	U	0	U	U
Korea (Republic of)		BT	1984	199.81	670	0.5	132.17	0	0	1149.08	515.59
Korea (Dem. Republic of)		BT	1978	2000	–	–	300	–	–	2700	–
		SB	U	300	–	–	300	–	–	2200	–
Madagascar		BT	1977	1000	–	–	–	–	–	U	–
		LN	1977	75	–	–	U	–	–	–	–
Malawi		BT	1977	25.0	–	–	12.0	0	0	U	–
Malaysia		BT	1984	U	U	U	7.3	U	U	70	10
		SB	1984	U	U	U	U	U	U	305	26
		LN	1984	U	U	U	U	U	U	120	U
Mali		LN	1979	0	–	–	–	–	–	3	–
Mexico	a	BT	1984	1597	500	0.8	1274	14	96	1960	1168
		SB	1984	804	300	0.8	643	26	0	792	586
Mongolia		BT	1984	12000	–	–	U	–	–	U	–
		LN	U	12000	–	–	U	–	–	U	–
Morocco		BT	1981	134	600	0.5	45	–	–	–	–
		LN	1981	44	100	1	–	–	–	–	–
Mosambique	a	BT	1976	–	–	–	240	83	40	155	–
Netherlands		BT	1984	1406	1500	1	497	0	U	U	U
New Caledonia		BT	U	4.0	–	–	2.0	–	–	8	–
New Zealand		BT	1984	36	200	0.5	33	85	80	450	129
		SB	1984	356	400	2	152	15	–	1400	318
		LN	1984	1634	300	1	57.7	100	U	8857	3628
Niger		BT	1979	4.5	–	–	U	–	–	–	–
Nigeria		BT	1979	U	–	–	U	–	–	21	–
		SB	1979	338	–	–	169	24	–	1000	–
Norway		SB	1984	35	450	0.6	30	0	75	100	90
Pakistan	a	SB	1979	145	1000	0.5	102	U	U	310	217
Peru		BT	1981	27.5	–	–	U	–	–	856	–
Philippines		SB	1979	170	–	–	82	–	–	U	–
Poland	a-f	BT	1983	63000	1200	0.4	28300	0	32.1	100500	30000
		LN	1983	13200	350	3	14400	99.6	–	20400	U
Portugal	a-d	BT	1984	27.8	900	0.30	19.5	0	0	39	27.3
		SB	1984	0			0	0	0	0	0
		LN	1984	37.7	152	0.5	32.8	100	0	2.3	2.1
Romania		BT	1966	70	C	C	C	0	C	C	C
		SB	1966	2800	C	C	C	0	0	C	C
		LN	1966	1100	C	C	C	C	0	C	C

Continued ...

RANK OF FUEL

BT = Bituminous including anthracite LN = Lignite SB = Sub-bituminous

Table 1.1 Resources and Reserves (Cont.)

Name of Country	Notes	Rank of Fuel (see foot note)	Year of Refer.	Proved Amount in Place: Tonnage (10^6 tonnes)	Proved Amount in Place: Maximum Depth of Deposits (m)	Proved Amount in Place: Minimum Seam Thickness (m)	Proved Recoverable Reserves: Tonnage (10^6 tonnes)	Proved Recoverable Reserves: By Surface Mining (%)	Proved Recoverable Reserves: Of Coking Quality (%)	Estimated Additional Amount in Place (10^6 tonnes)	Estimated Additional Reserves Recoverable (10^6 tonnes)
South Africa		BT	1984	115530	400	1.0	58404	U	C	17100	7900
Spain	a	BT	1984	948.7	500	0.5	415.3	28.7	15.0	2582.4	247.2
		SB	1984	463.8	500	0.5	231.2	45.4	–	907	105.6
		LN	1984	315	250	0.5	236.3	100.0	–	199.1	189.1
Swaziland		BT	1961	2020	–	–	1820	U	–	3000	–
Sweden		BT	1984								
		SB	1984	4	15	0.5	1	100	0	20	–
Taiwan, China		BT	1981	220	1000	0.25	100	0	60	0	0
		SB	1981	220	1000	0.25	100	0	5	0	0
Tanzania (United Republic of)		BT	1979	304	487	1.0	200	–	–	1500	–
Thailand		SB	1984	15	–	–	14	–	U	–	–
		LN	1984	–	300	60	865	57	U	1418	800
Turkey		BT	1984	135	1200	0.60	94	–	>85	1238	866
		LN	1984	5292	600	0.70	4763	70	–	2841	2272
United States of America	a-f	BT	1984	237640	670	0.20	131971	18.4	U	458069	U
		SB	1984	164366	305	1.52	99163	34.4	0	276238	U
		LN	1984	40886	61	0.76	32709	100	0	392796	U
USSR	a	BT	1984	136000	1800	0.4	108800	17	C	2163000	975200
		SB	1984	51800	600	0.7	41400	41	0	2085900	1042800
		LN	1984	105000	300	1	94500	93	0	960000	528600
Venezuela	a	BT	1984	508.8	U	U	372	65	–	2250.6	1052.2
		LN	1984								
Vietnam		BT	1965	300	–	–	150	U	U	700	–
		LN	1965	12.0	–	–	U	–	–	U	–
Yugoslavia		BT	1971	80	–	–	70	–	–	22	–
		SB	1978	1760	–	–	1500	30-40	–	275	–
		LN	1978	16000	–	–	15000	80	–	3500	–
Zaire		BT	1978	600	–	–	600	–	–	U	–
Zambia	a,b	BT	1984	–	126	0.5	71.9	44	–	18	–
Zimbabwe		BT	1977	1535	–	–	734	36	50	5820	–
		SB	1979	965	–	–	0	–	–	U	–

RANK OF FUEL

BT = Bituminous including anthracite LN = Lignite SB = Sub-bituminous

Coal (including lignite)
Charbon (dont lignite)

Table 1.2 Production, Internal Consumption and Characteristics

Name of Country	Notes	Rank of Fuel (see foot note)	Year of Refer.	Annual Production (10^6 tonnes)	Annual Internal Consumption (10^6 tonnes)	Characteristics of Production: range and/or average	Heat Value (MJ/kg)	Sulphur Content (%)	Carbon Content (%)	Volatile Matter (%)	Moisture Content (%)	Ash Content (%)
Afghanistan	a	BT	1984	0.17	0.17							
Albania	a	SB/LN	1980	1.0	1.0							
Argentina	a,b	SB	1984	0.51	0.51	range	20-25	0.5-1.1	50-58	42-50	10-12	16-18
						average	22.6	0.8	54	46	11	17
Australia	c,d	BT	1984	104	38	range	13-30	0-0.5	39-84	20-45	1-19	2.5-31
		SB	1981			range	13-30	0-0.5	39-84	20-45	1-19	2.5-31
		LN	1984	35	35	range	5.8-12.5	–	–	–	48-66	1-4
						average	9.5					
Austria		BT	1984	0	3.4	average	28.5	U	U	U	U	U
		SB	1984	–	3.4							
		LN	1984	2.9	3.7	average	12.5	U	U	U	U	U
Belgium		BT	1984	6.2	14.8	range	33.5-34.5	0.7-1.1	84-86	24.7-33.7	7-10.5	16.4-18
						average	34	0.9	85	29.8	–	13.9
Botswana	a	BT	1980	0.3								
Brazil	a,b	BT	1984	0.118	0.074	average	–	6.05	24.2	9.9	2.2	65.9
		SB	1984	23	22.9	range	13-24	0.3-5.5	26.6-40.9	19.5-27.1	2.5-11.3	29.5-53.6
						average	19.5	2.9	34.9	24.2	6.0	39.7
Bulgaria		BT	1984	0.2	7.1							
		LN	1984	32	32							
Canada	a-c	BT	1984	32.062	23.359	range	—	—	see	notes	—	—
		SB	1984	15.422	15.422	range	16-20	0.2-0.5	31-40	26-34	19-25	6-20
						average	18	0.3	36	29	20	15
		LN	1984	9.918	9.918	range	12-17	0.4-0.6	26-32	23-31	30-38	6-13
						average	14	0.5	28	26	36	10
Chile		BT	1984	1.182	1.890	range	32.2-33.4	0.8-4	50-60	40-50	4-12	4-17
						average	32.6	2	55	45	9	8
		SB	1984	0.190	0.190	range		0.3-3.7	35-40	22-36	15-25	7-23
						average	23	2	37	29	20	15
China	a	BT	1984	759	714							
		LN	1984	30	30							
Colombia	a,b	ALL	1984	6.1	5.7							
Czechoslovakia		BT	1984	26.4	28.5							
		LN	1984	103	99							
Denmark	a	LN	1984	0	0.003							
Egypt (Arab Republic of)	a,b	BT	1984	N								
France		BT	1984	15.7	38	range	–	–	–	4-40	2-4	–
						average	26.39	U	U	U	U	16.91
		SB	1984	1.2		range	–	–	–	36-42	10-12	–
						average	18.93	U	U	U	U	24.62
		LN	1984	0.6		range	–	1.25-2	37-44	54-62	58 60	17 20
						average	8.0	1.50	40	58	59	18
German Democratic Republic		LN	1984	296.3	297.0	range	8.1-10.6	N	U	U	50-55	U
						average	8.9	N	U	U	–	U
Germany (Federal Republic of)		BT	1984	79.427	80.934	range	32-35	0.8-1.0	78-94	6-40	0-10	6-10
		LN	1984	126.8	129							

Continued ...

RANK OF FUEL

BT = Bituminous including anthracite LN = Lignite SB = Sub-bituminous

stics

isture ntent	Ash Content
%	%
10-	16-
12	18
11	17
1-	2.5-
19	31
1-	2.5-
19	31
48-	1-
66	4
U	U
U	U
7-	16.4-
10.5	18
–	13.9
2.2	65.9
2.5-	29.5-
11.3	53.6
6.0	39.7
19-	6-
25	20
20	15
30-	6-
38	13
36	10
4-	4-
12	17
9	8
15-	7-
25	23
20	15
2-	–
4	
U	16.91
10-	–
12	
U	24.62
58	17
60	20
59	18
50-	U
55	
–	U
0-	6-
10	10

Continued ...

Table 1.2 Production, Internal Consumption and Characteristics (Cont.)

Name of Country	Notes	Rank of Fuel (see foot note)	Year of Refer.	Annual Production (10^6 tonnes)	Annual Internal Consumption (10^6 tonnes)	Characteristics of Production: range and/or average	Heat Value (MJ/kg)	Sulphur Content (%)	Carbon Content (%)	Volatile Matter (%)	Moisture Content (%)	Ash Content (%)
Great Britain	a-h	BT	1983	116.5	111.5	range	24.6-	0.5-	75-	6-	3-	1.2-
							35.3	3.3	93	46	18	30
						average	29.7	1.73	83	37	11.6	15
		LN	1984	0	0	average	28.34	0.2	U	U	51	6.9
Greece		LN	1984	32.50	31.02	average	13.5	1	39	60	56	31
Hungary		BT	1984	2.6	3.9	average	15.7	U	U	U	U	41
		SB	1984	15.3	15.3	average	12.3	U	U	U	U	27
		LN	1984	7.1	7.1	average	6.6	U	U	U	U	21
India	a-c	BT	1984	144	140	range	31-	0.2-	80-	23-	0.5-	5-
							37	5.4	92	40	11	45
		LN	1984	7.7	7.7	range	25-	1-	44-	52-	50-	4-
							27	1.6	48	56	55	8
						average	26	1.4	45	55	52	6
Indonesia	a	BT	1984	1.458	0.229	range	33-	low	75-	15-	0.5-	3.6-
							34		80	19	1.7	4.4
		SB	1984			average	31.4	low	49	42.5	6	1.5
		LN	1984			range	25-	0.16-	36-	29-	18-	4.4-
							27	0.41	44	32	23	8.9
Iran (Islamic Republic of)		BT	1984	0.85	0.90							
Ireland	a	BT	1984	0.07	1.49	average	33	0.8	85	23	4	27
Italy	a	BT	1984	0	19.7							
		SB	1984	0	0.5							
		LN	1984	1.2	1.3	range	6.3-	0.5-	40-	40-	45-	25-
							9.5	1	60	60	60	40
						average	8.4	0.7	50	50	50	32
Japan		BT	1984	16.6	105	range	21-	0.25-	32.3-	29.2-	1-	6.2-
							34	2.9	54.8	45.1	6	35.4
						average	28.3	0.8	43.5	37.7	2.3	16.5
Korea (Republic of)		BT	1984	21.37	24.15	range	16.23-	0.3-	46.2-	3.4-	2.1-	16.8-
							27.28	0.9	79.1	5.6	6.2	49.5
						average	19.71	0.4	57.7	4.1	3	38.2
Korea (Dem. Republic of)		BT	1984	38	38							
Malaysia		BT	1984	0	0.386							
		SB	1984	0	0							
		LN	1984	0	0							
Mexico	a	BT	1984	7.12	7.12	range	23-	0-	30-	15-	5-	30-
							27	1	40	18	7	45
						average	25	1	35	16	6	40
		SB	1984	1.96	1.60	range	18-	0-	35-	17-	4-	20-
							20	1	50	26	8	50
						average	19	1	45	23	6	40
Mongolia		BT	1984	0.4	0.4							
		LN	1984	4.6	4.6							
Morocco		BT	1981	0.70	1.0	average	35	2	93	6	6	8.4
Mosambique	a	BT	1984	0.39	0.44							
Netherlands		BT	1984	0	9	average	29.3	U	U	U		U
New Zealand		BT	1984	0.58	0.23	range	27-	0.25-	45-	30-	3-	1.4-
							34	5.5	61	41	23	8
		SB	1984	1.5	1.5	range	14-	0.16-	30-	33-	18-	2-
							24	4.24	44	36	30	10
		LN	1984	N	N	range	8.6-	0.2-	34-	43-	43-	6-
							14	3.3	46	51	60	18
Niger		BT	1984	0.05	0.05							
Nigeria		BT		0								
		SB	1984	0.05	0.05							
Norway		SB	1984	0.45	1.92	range	32.2-	0.84-	78-	38-	2-	5.9-
							32.4	1.04	86	41	4	7.2
						average	32.3	0.94	83	40	2.7	6.6

Continued ...

RANK OF FUEL

BT = Bituminous including anthracite LN = Lignite SB = Sub-bituminous

Table 1.2 Production, Internal Consumption and Characteristics (Cont.)

Name of Country	Notes	Rank of Fuel (see foot note)	Year of Refer.	Annual Production (10^6 tonnes)	Annual Internal Consumption (10^6 tonnes)	Characteristics of Production: range and/or average	Heat Value (MJ/kg)	Sulphur Content (%)	Carbon Content (%)	Volatile Matter (%)	Moisture Content (%)	Ash Content (%)
Pakistan	a	SB	1984	1.9	1.9							
Peru		BT	1981	0.09	0.14							
Philippines		SB	1984	1.2	1.2							
Poland	a-f	BT	1984	191.5	156.8	range	16.7-32.8	0.49-2.50	U	15-40	7-14.8	6.4-27.1
						average	23.6	0.74	U	30		16.7
		LN	1984	50.4	50.4	range	7.1-8.8	0.32-0.75	U	U	U	7.8-19.6
						average	8.2	0.54	U	U	U	14.4
Portugal	a-d	BT	1984	0.195	0.066	range	19.3-20.9	U	94.1-96.4	3.6-5.9	5-8	41.3-46.7
						average	U	U	U	U	8	44.6
		SB	1984	0	0.498							
		LN	1984	0	0							
Romania		BT	1984	8.5	13							
		SB	1984	0.8	U							
		LN	1984	35	35							
South Africa	a	BT	1984	162.034	159.107	range	28.8-36.1	0.3-1.73	75.86-91.81	5.0-43.8	1.1-7.3	6.1-34.9
Spain	a	BT	1984	15.011	23.394	average	20.368	1.89	26.4	14.9	10.8	31.7
		SB	1984	6.899	6.941	average	14.361	5.6	21.7	29.9	16.6	41
		LN	1984	17.405	17.4	average	8.874	2.5	9.5	36.7	43.5	37.8
Swaziland		BT	1984	0.18								
Sweden		BT	1984		2.2							
		SB	1981	0.028		range	22-25	0.3-0.5		40-42	12-17	35-40
						average	24	0.45	76	41	14	39
Taiwan, China		BT	1981	1.21		range	32.45-36.01	0.7-3.0	78-88	25-46	0.7-3.0	3-30
						average	33.91	1.9	82	45	2.0	18
		SB	1981	1.23		range	29.31-32.45	0.7-4.5	73-78	46-56	2.5-7	3-45
						average	30.98	2.2	76.5	50	4	20
Thailand		LN	1984	2.362	2.298	range	10.46-25.11	0.71-4	13-40.5	20-39.5	19-35	1.06-47
Turkey		BT	1984	3.6	6	range	24.3-26.8	0.9	67-62	33-38	8-14	11-16
						average	25.5	0.9	66	34		14
		LN	1984	22	21	range	4.8-20.9	0.7-6.5	30-55	45-70	6-55	8-44
						average	11.7	2	40	60	33	31
United States of America	a-f	BT	1984	592.9	485.1	average	27.580	2.02	U	U	U	11.0
		SB	1984	162.5	177.9	average	20.705	0.49	U	U	U	7.81
		LN	1984	57.2	55.8	average	14.718	0.74	U	U	U	14.09
USSR	a	BT		520	C							
		SB	1984	70	C	range	9.3-33.1	0.1-7.3	62-95.7	2.4-62.7	4.1-58	10-52
						average	19.5	1.44	80.6	33.5	13.2	26.3
		LN	1984	122.3	C							
Venezuela	a	BT	1984	0.05	0.04							
		SB	1984	0	0.08							
Vietnam		BT	1984	6	5							
Yugoslavia		BT	1984	0.4	5.2							
		LN	1984	65	64							
Zaire		BT	1984	0.13	0.16							
Zambia	a,b	BT	1984	0.514	0.460	range	33.4-33.9	0.5-1.5	81.7-84.5	20.7-23.8	3-8	16-18
						average	33.5	1.1	84.3	22.9	4	17
Zimbabwe		BT	1984	2.3	2.2							

RANK OF FUEL
BT = Bituminous including anthracite   LN = Lignite   SB = Sub-bituminous

; (Cont.)

isture ntent	Ash Content
%	%
7-	6.4-
14.8	27.1
	16.7
U	7.8-
	19.6
U	14.4
5-	41.3-
8	46.7
8	44.6
1.1-	6.1-
7.3	34.9
10.8	31.7
16.6	41
43.5	37.8
12-	35-
17	40
14	39
0.7-	3-
3.0	30
2.0	18
2.5-	3-
7	45
4	20
19-	1.06-
35	47
8-	11-
14	16
	14
6-	8-
55	44
33	31
U	11.0
U	7.81
U	14.09
4.1-	10-
58	52
13.2	26.3
3-	16-
8	18
4	17

Table 1.3 World Totals

Name of Country	Proved Amount in Place			Proved Recoverable Reserves			Accessible Coal in Significant Coalfields		
	BT	SB	LN	BT	SB	LN	BT	SB	LN
	10^6 tonnes	10^6 tonnes	10^6 tonnes	10^6 tonnes	10^6 tonnes	10^6 tonnes	10^6 tonnes	10^6 tonnes	10^6 tonnes
Australia	48540	2986	39300	27442	2060	36200	20800		35000
Austria	1.0	–	177.0	3.0	–	61.0			
Belgium	715			410			800		
Botswana	7000			3500			2970		
Canada	4903	1280	2839	3548	880	2418	1400	2200	1300
China	610600		126500	U		U	70720		
Colombia	2025	47	1.0	1010	24	1.0	2450		
Czechoslovakia	5750		7220	2700		2860	1000	5000	
France	906	160	U	332	49	U	360		
German Democratic Republic			47000			21000			13000
Germany (Federal Republic of)	44000		55000	23919		35150	13500		12000
Great Britain	U		400	4600		U	14000		
Greece			5312			3000			1500
India	26331		1581	U		1581	19005		500
Japan	8479		175	997		18	842		
Mexico	1597	804	N	1274	643	N	1000		
New Zealand	36	356	1634	33	152	57.7		150	
Poland	63000		13200	28300		14400	36500		10900
South Africa	115530			58404			30000		
Spain	948.7	463.8	315	415.3	231.2	236.3	374		1188
Turkey	135		5292	94		4763	100		3000
United States of America	237640	164366	40886	131971	99163	32709	55000	37000	
USSR	136000	51800	105000	108800	41400	94500	73830	21043	77375
Venezuela	508.8	–		372	–		1553		20
Zimbabwe	1535	965		734	0		1000		
Other Africa	3185	338	123	3000	170	4	349	231	62
Other Asia	16830	5070	30017	844	498	867	2298	387	1767
Other West Europe	1440	117	116	522	72	45			
Other East Europe	1523	4601	25898	696	2482	21583	100	750	520
Other Central and South America	28	23195	13	27	14280	18	1100	5224	
World Total (rounded)	**1 340 000**	**257 000**	**508 000**	**404 000**	**162 000**	**272 000**	**351 051**	**71 985**	**158 132**

RANK OF FUEL
BT = Bituminous including anthracite LN = Lignite SB = Sub-bituminous

Notes to the Tables

Afghanistan

(a) One main coalfield with approx. 10 x 10^6 tonnes of Accessible Coal in Significant Coalfields of bituminous quality plus other minor areas of bituminous and sub-bituminous coal and lignite. Source : Concise Guide to World Coalfields, IEA Coal Research, 1983.

Albania

(a) In addition to lignite there are small deposits of sub-bituminous coal. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Antartica

(a) Numerous unexplored deposits of mainly bituminous coal. None are expected to make a significant contribution to coal supplies over the next 20 years. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Argentina

(a) Sub-bituminous coal basically from Rio Turbio Mine.

(b) Lignite in Austral Basin.

Australia

(a) Measured plus indicated resources used for proved reserves.

(b) Inferred resources assessed in known coal bearing areas used for additional resources. The total given includes 112,900 Mt for Queensland, of which 90,200 Mt is sub-bituminous. These Queensland figures are regarded as conservative.

(c) Production and consumption data shown for Bituminous includes Sub-bituminous.

(d) Range figures for coal characteristics cover Bituminous and Sub-bituminous.

Bangladesh

(a) Coal deposits are considered too deep to mine and the country imports about 1.8 x 10^6 tonnes of coal annually. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Botswana

(a) Coal reserves are large but there is only one coal mine currently producing some 300,000 tonnes per year. Further exploitation is planned. Botswana could play a major part in future world coal supply. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Brazil

(a) Nearly all the coal reserves are of the sub-bituminous type, according to the Brazilian standards.

(b) There is a small reserve of "anthracite-like" coal in the Barro Branco seam in the state of Santa Catarina, formed by a coal that was influenced by intrusions of diabase.

Canada

(a) Coal reserve data are those presented in "Coal Mining in Canada: 1983" CANMET Report 83-20E, Energy, Mines and Resources Canada (March 1984), less production to Dec. 84 as given in "Statistical Review of coal in Canada" Energy, Mines and Resources Canada (Dec. 85).

(b) Alberta's coal resources and reserves are assessed by its Energy Resources Conservation Board (ERCB). Howoever, ERCB's criteria and procedures for defining resources and reserves differ from those used by Energy, Mines and Resources Canada (EMR) and a direct correlation between the two systems is not possible. Nevertheless, there appears to be a reasonable correlation between EMR's definition of "reserves" and ERCB's "mine permit reserves" as reported in "Reserves of Coal: Province of Alberta" ERCB Report ST 85-31, Energy Resources Conservation Board, Province of Alberta (July, 85), so that designations have been equated.

(c) The quality of Canada's bituminous coal has been subdivided into Eastern (which includes coalfields in Nova Scotia and New Brunswick) and Western (coalfields in British Columbia and Alberta) because of basic differences between coals from these two regions.

		Sulphur content (%)	Heat value (MJ/kg)	Carbon content (%)	Volatile matter (%)	Moisture content (%)	Ash (%)
East	range	2	30	53	34	8	3-20
Canada	average	1-8	24-33	40-62	29-35	3-9	5
West	range	0.4	30	59	23	8	7-20
Canada	average	0.2-0.6	25-34	35-68	16-36	3-10	10

China

(a) Estimates of Recoverable Reserves range between 170 000 x 10^6 tonnes and 640 000 x 10^6 tonnes. Lignite constitutes 8% of the total reserves. Sources: China's Coal Prospects, He Bingzhang, Coal and Energy Quarterly, and PRC Sets Coal Targets. Prof. Qu Yu. Xiang Jiaotony, University Bulk Systems International, Jan. 1985.

Colombia

(a) Production figure for bituminous coal includes sub-bituminous.

(b) Various sources have suggested measured coal reserves around 4 000 million tonnes and potential additional reserves of about 12 000 million tonnes.

Denmark	(a)	There is only one deposit of workable coal. Lignite mining ceased many years ago as it became uneconomic and the remaining resources too small. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.
Denmark (Greenland)	(a)	Sub-bituminous deposits exist at Nugssuaq. Basic investigation gives 340 x 10^6 tonnes total and 183 x 10^6 tonnes mineable. For the total area containing the strata these figures should be doubled. Source: Shekhar, S.C., Frandren, N., Thomsen, E. 1982. Coal on Nugssuaq, West Greenland published Geological Survey of Greenland, Denmark.
	(b)	No coal has been mined since 1950 because local demand is low and no export market exists. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.
Ecuador	(a)	Data based on preliminary studies.
Egypt (Arab Republic of)	(a)	The only developed coal deposit is at Al Maghara in the Sinai. Production was interrupted for many years but mine reconstruction has begun and early indication are favourable. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.
	(b)	Bituminous probable reserves are given as 18.5 x 10^6 tonnes, with a minimum seam thickness of 0.6m in reference (ii).
Great Britain	(a)	The NCB does not carefully measure coal in place that cannot be recovered for various technical, environmental or economic reasons. Data strictly on the basis of WEC definition are therefore not available. However, it is estimated that coal in place in seams over 60cm thick and less than 1200m deep total 190,000 x 10^6 tonnes. This is interpreted as proved recoverable reserves plus additional resources in place.
	(b)	Data for recoverable reserves refer to deep mining only: additional surface mineable quantities are relatively small. The assessment covers existing mines and certain new mine projects, and includes the extractable and saleable coal which is sufficiently proved, of adequate thickness and quality, and in a suitable mining environment, to support current deep mining plans.
	(c)	Coking quality defined as British Coal Rank code, 201 to 600 inclusive and does not take account of other quality factors such as sulphur content.
	(d)	The figure of 185 400 x 10^6 tonnes (for estimated additional amount in place) is the balance of 190 000 x 10^6 tonnes of coal in place defined in the notes above, after deducting proved recoverable reserves.
	(e)	No detailed assessment has been made by the NCB of offshore coal deposits, unless they are accessible for existing mines.
	(f)	Heat value of 29.7MJ/g on a moist ash free basis is a corrective figure rather than a substantial change. The 1981 submission was in error and included some dry ash free evaluation in aggregation. Similarly we reduce the range to 24.6 to 35.3MJ/kg.
	(g)	The carbon content figures previously submitted for 1981 were wrong and are corrected for both average and range.
	(h)	The information on lignite refers only to the Crumlin deposit in Co Antrim, N. Ireland. Additional deposits of lignite also occur near Coagh, Co Tyrone and Ballymoney, Co Antrim but have not been explored in detail. It is therefore impossible at this stage to provide details of the deposits characteristics. A reasonable estimate for the reserves of lignite which may occur in N. Ireland is in the order of 1000m tons.
Hungary	(a)	The data refer to geological reserves.
India	(a)	Sulphur content generally less than 1% in Gondwana and 2-5% in Tertiary Coals.
	(b)	Ash generally 10-45% in Gondwana Coals and 5-10% In Tertiary Coals.
	(c)	The reserves are mostly of Bituminous coals. There are almost no reserves of Anthracite Coal.
Indonesia	(a)	Proved amount in place includes measured, indicated, inferred and hypothetic resources especially for lignite deposits in South Sumatra.
Ireland	(a)	Characteristics data are averages for the largest producers of coal.
Italy	(a)	Coal characteristics are not indicated because all hard coal is imported.
Mexico	(a)	Lignite – Found in negligible amounts.
Mosambique	(a)	Coal resources in the province Tete 1.5 billion tonnes. Source: Aschinjanz, Svedov, Stand und Entwicklungsaussichten der Energiewirtschaft in Mozambique. Archiv fur Energiewirtschaft Juli 1983.
Pakistan	(a)	Recovery factor for all reserves estimated at 70%. In addition to the proved and additional resources there are possible resources of 270 Mt of which 189 Mt may be recoverable.

Poland

(a) Proved Amount in Place data from the latest geological investigations.

(b) About 91% of deposits of bituminous coal are a depth of up to 1000 m and about 9% up to 1200m.

(c) Seam thickness for bituminous coal are 0.8 – 1.0 m for energy coal and anthracite and 0.4 – 0.7 for coking coal.

(d) 98% of hard coal production is from the Upper Silesian Basin.

(e) Coal characteristics are given approximately.

(f) Editors note. The data for lignite appear to have been provided from different sources within the country which explains the inconsistency between Proved Amount in Place and Proved Recoverable Reserves. However, since most of the lignite is recoverable by surface mining the Proved Recoverable Reserves should only be slightly lower than Proved Amount in Place.

Portugal

(a) There is only one anthracite producing mine – Germunde Mine (Peojao) with proved recoverable reserves of 3.5 x 106 tonnes.

(b) Because Cabo Mondego Mine is flooded, the amount of sub-bituminous coal known in place is no longer exploitable under present and expected local economic conditions with the existing available technology.

(c) Anthracite sold by producer in 1984: 0.19 x 106 tonnes.

(d) The sub-bituminous coal is imported and used mainly for coking and cement production.

South Africa

(a) Characteristics: Heat Value and Sulphur Content – dry, ash free; Moisture and Ash – air dry.

Spain

(a) Proved Recoverable Reserves refer to surface mining using an Rm ratio of $25m^3$ per tonne for bituminous coal and sub-bituminous coal, and an Rm ratio of $20m^3$ per tonne for black lignite. The rest is considered as underground mining.

United States of America

(a) The criteria for coking coal are not rigidley defined. Under conservative criteria, 8.5% of bituminous resources were found to meet requirements of premium grade coking coals. "Premium" coking coals are strongly coking, low-ash, low-sulphur coals that can be used in blends with inferior grades for metallurgical processing. They include low–, medium–, and high volatile coals. In this case, the criteria exclude high volatile C bituminous and all coal of more than 8% ash or 1% sulphur (Sheridan 1976). Under the broadest criteria, 71.1% of bituminous resources could be considered as having coking properties. This percentage includes "latent-grade" coking coal (of 12.1-16.9% ash and 1.9% or more sulphur) and includes high volatile C bituminous coal, with only moderate coking potential, that are generally unsuitable for coke production except in some blends (Sanner and Benson 1979).

(b) The estimates of Additional Amount in Place compare 1974 US Geological Survey identified resources (Averitte 1975) with 1984 Energy Information Administration (EIA) Demonstrated Reserve Base of Coal, which employ the same data sources in some areas but not in others. Consequently, these estimates are subject to revision, but are currently the best available. Further, an additional 1,677,686 x 10^6 tonnes of coals of various ranks have been estimated as hypothetical resources in unmapped and unexplored areas. These resources meet world energy conference criteria for "estimated additional amount in place" but are not available by rank at this time.

(c) Sulphur, ash and heat value for bituminous coal do not include anthracite because the only data available for 1984 are for culm, dredge and refuse bank production and do not represent mined anthracite. The impact of this exclusion is minor, however, as mined anthracite comprised less than 0.4% of consumption of combined bituminous and anthracite.

(d) Ash content data are best available 1984 data on "as received" basis, for receipts at electric power plants; "dry basis" cannot be derived with information available.

(e) Heat values are converted from Btu/pound to Joules/kg using the relationship: Btu/lb(2.32406×10^{-3})=Joules(Int)/kg.

(f) High and low heat values considered for "range" were converted to "moist, ash-free" basis. Average heat values were computed independent of ash and sulphur, on an "as received" basis and consequently are not available on a moist, ash-free basis.

USSR

(a) All characteristics data are the average for the three types of coal.

Venezuela

(a) Data do not include Antartica.

Zambia

(a) The data in the table refer to Maamba Mining Licence Area 3460 only.

(b) There exists a further 180 x 10^6 tonnes of as yet unexploited coal in the Northern and Central Provinces of Zambia.

Afghanistan

Albania

Algeria

Argentina

Australia

Austria

Bangladesh

Belgium

Botswana

Brazil

Bulgaria

Burma

Canada

Central Africa

Chile

China

Colombia

Czechoslova

References for the Tables

Afghanistan	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Albania	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production data and consumption from Concise Guide to World Coalfields, IEA Coal Research, 1983.
Algeria	(i)	Reserves data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Argentina	(i)	Data supplied by WEC Member Committee from Yacimientos Carboniferos Fiscales, State Company.
Australia	(i)	Reserves and coal characteristics data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Austria	(i)	Data supplied by WEC Member Committee.
Bangladesh	(i)	Reserves data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.
Belgium	(i)	All data except for consumption figure supplied by WEC Member Committee.
	(ii)	Consumption data from 1984 Energy Statistics Yearbook, United Nations.
Botswana	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production data from Concise Guide to World Coalfields, IEA Coal Research, 1983.
Brazil	(i)	Data supplied by WEC Member Committee from:
		Tecnologia dos carvões, Eckart Hoffmann/DNPM-MME.
		Informativo anual da indústria carbonífera, Equipe técnica do carvão/DNPM-MME.
Bulgaria	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Burma	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Canada	(i)	Data supplied by WEC Member Committee from:
		"Coal Mining in Canada: 1983" CANMET Report 83-20E, Energy, Mines and Resources Canada (March 1984).
		"Reserves of Coal: Province of Alberta" ERCB Report St 85-31, Energy Resources Conservation Board, Province of Alberta (July 1985).
		"Statistical Review of Coal in Canada" Energy, Mines and Resources Canada (Dec. 1985).
Central African Republic	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
Chile	(i)	Data supplied by WEC Member Committee from:
		Bituminous: ENACAR S.A.
		Sub-bituminous: CORFO
		Producción y Consumo Nacional: Comisión Nacional de Energía
China	(i)	Data supplied by WEC Member Committee from:
		Ministry of Coal
		Bureau of State Statistics
Colombia	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Czechoslovakia	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.

Denmark	(i)	Data supplied by WEC Member Committee from:
		Danmarks Brenhulsreserver – DGU 1984
Denmark (Greenland)	(i)	Data supplied by WEC Member Committee.
Ecuador	(i)	Data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.
Egypt (Arab Republic of)	(i)	Bituminous reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Sub-bituminous reserves data from: Country Paper Egypt, United Nations Symposium on World Coal Prospects 15-23 Oct. 1979, Katowice, Poland. Paper TCD/NRET/AC.12/CP/9.
Ethiopia	(i)	Reserves data from:
		Assefa, G.; Saxena, G.N., 1984.
		A review of Ethiopian Lignites, Occurrence, Prospects and Possibilities, Energy Exploration and Exploitation, Vol. 3, No. 1, pp 35-42.
	(ii)	Other data supplied by WEC Member Committee from:
		Belachew Texera and W. Heemann: Report on the Lignite of Chilgo area, 1982.
France	(i)	Data supplied by WEC Member Committee from:
		MRICE (DIGEC) based on data from Charbonnages de France.
	(ii)	Characteristics data data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.
	(iii)	Consumption data from 1984 Energy Statistics Yearbook, United Nations.
German Democratic Republic	(i)	WEC Member Committee report that all reserves data are confidential.
	(ii)	Reserves data obtained from Fossile Brennstaffe-Erkundungsstand und Perspectiven, Gindorf, Frieberg, Neue Bergbautechnik, 11. Jahrg. Heft 2, Febr. 1981.
	(iii)	Production and characteristics data supplied by WEC Member Committee from Statistics on Brown Coal 1984 of the GDR for the ECE (Quest/Coal/A.B/Z/Rev. 4).
Germany (Federal Republic of)	(i)	All data supplied by WEC Member Committee except lignite production and consumption which is from 1984 Energy Statistics Yearbook, United Nations.
Great Britain	(i)	Data for bituminous coal from National Coal Board.
	(ii)	Data for lignite from WEC Member Committee.
Greece	(i)	Data supplied by WEC Member Committee from National Energy Council
Haiti	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
Honduras	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
Hungary	(i)	Data supplied by WEC Member Committee from Central Office of Geology.
Iceland	(i)	Data supplied by WEC Member Committee from National Energy Council.
India	(i)	Reserves data from WEC Survey of Energy Resources, 1983. from Department of coal.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Indonesia	(i)	Data supplied by WEC Member Committee from:
		A one day seminar on Indonesia Coal Quality, Perum Tambang Baturbara, Jakarta, 23 July 1985.
		General Policy on Energy, National Energy Co-ordinating Agency, April 1984.
		Asian Coal Development Project Interim Report Volume I, Monenco Limited, 31 May 1984.
Iran (Islamic Republic of)	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Ireland	(i)	Data supplied by WEC Member Committee from Energy in Ireland, 1984, Department of Energy, Dublin.
Italy	(i)	Data supplied by WEC Member Committee from AGIP Coal.
Japan	(i)	Data supplied by WEC Member Committee from Japan Coal Association.
	(ii)	Consumption data from 1984 Energy Statistics Yearbook, United Nations.
Korea (Republic of)	(i)	Data supplied by WEC Member Committee from Coal Statistics, 1985, Dai Han Coal Corporation.

Korea (Dem. Republic of)	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Madagascar	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
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Malaysia	(i)	Proved Recoverable Reserves from 5th Regional Congress of S.E. Asia, GEOSEA V, 9-13 April 1984, published by Geological Society of Malaysia.
	(ii)	Other data supplied by WEC Member Committee from: National Electricity Board. National Energy Balances Malaysia.
Mali	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
Mexico	(i)	Data supplied by WEC Member Committee from: Bituminous Proved Amount in Place and Proved Recoverable Reserves estimated by Camera Minera de Mexico. Asamblea General Ordinaria 1985. Sub-bituminous Proved Amount in Place estimated by WEC Member Committee taking into account data already reported and cumulative production. Sub-bituminous Proved Recoverable Reserved from Programa Nacional de Energeticos 1984-1988. Secretarià de Energia, Minas e Industria Paraestatal. Sub-bituminous Production and Consumption from Comision Federal de Electricidad.
Mongolia	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
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Morocco	(i)	All data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983, except Consumption data which is from 1984 Energy Statistics Yearbook, United Nations.
Mosambique	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
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Netherlands	(i)	Data supplied by WEC Member Committee.
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	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
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	)ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Philippines	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Poland	(i)	Data supplied by WEC Member Committee from: Balance of Minerals and Underground waters in Poland. Central Office of Geology. Warsaw, 1984. Statistical Report "Fuel and Energy Economy in 1984". Chief Statistical Office. Warsaw, July 1985. Internal Reports. Energy Institute. Warsaw 1985

Portugal	(i)	Data supplied by WEC Member Committee from:
		Direccão- Geral de Geologia e Minas ("Recursos Nacionais de Carvão, Dr. J. L. Silva Freire, 1982").
		Electricidade de Portugal – EDP, E.P. ("Projecto do Empreendimento de Rio Maior").
		Empresa Carbonifera do Douro, SARL ("Relatorio do Exercicio de 1984"; unpublished data).
		Direccao-Geral de energia ("Combustiveis – sintese anual 1984").
Romania	(i)	WEC Member Committee report that all reserves data are confidential.
	(ii)	Reserves data from Matveyev, AK, 1966 Ugol'nyye mestorozhdeniya zarbeznykh stran Evraziya published Nedra, Moscow p. 231-243.
	(iii)	Production data Data supplied by WEC Member Committee from Anuarul statistic al Republicii Socialiste Romania, 1985 (Statistical Survey of the Socialiste Republic of Romania, 1985).
	(iv)	Consumption data estimated from 1984 Energy Statistics Yearbook, United Nations.
South Africa	(i)	Data supplied by WEC Member Committee from the following sources:
		Reserves data De Jager, F.S.J. (1983): Coal Reserves of the Republic of South Africa – An evaluation at the end of 1982. Bulletin 74, Geological Survey, 17p.
		Production and Consumption South Africa's Mineral Industry, 1984. Minerals Bureau, Department Mineral and Energy Affairs, Johannesburg, June 1985.
		Coal Characteristics Van Vuuren, M.C.J. and Boshoff, H.P. (1985): Average analyses of coal samples taken by the National Institute for Coal Research during 1984, including more detailed analyses on some colliery products not previously analysed. Bulletin 98, NICR, CSIR, Petrorea, 26p.
Spain	(i)	Data supplied by WEC Member Committee from Inventario Nacional de Carbon; Instituto Geologico y Minero.
Swaziland	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production data for Concise Guide to World Coalfields, IEA Coal Research, 1983.
Sweden	(i)	Data supplied by WEC Member Committee.
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Syria (Arab Republic of)	(i)	Data supplied by WEC Member Committee from Ministry of Petroleum and Mineral Resources.
Taiwan, China	(i)	Data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.
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Thailand	(i)	Data supplied by WEC Member Committee from:
		Thailand Energy Situation 1984.
		Monenceo Report on lignite, 1984.
		EGAT Power Development Plant (1985-2001), May 1985.
Turkey	(i)	Data supplied by WEC Member Committee.
United States of America	(i)	Data supplied by WEC Member Committee from:
		US Department of Energy (DOE), Energy Information Administration (EIA). Coal Production 1984 (containing appendix on Demonstration Reserve Base of Coal in the United States), DOE/EIA-0118(84), Washington, DC 1985.
		William S. Sanner & David C. Benson. Demonstrated Reserve Base of US Coals with Potential for Use in the Manufacture of Metallurgical Coke, US Department of the Interior, Bureau of Mines, IC 8805, Washington, DC, 1979.
		Eugene T. Sheridan. Supply and Demand for United States Coking Coals and Metallurgical Coke. US Department of the Interior, Bureau of Mines, Special Publication, Wash., DC, 1976.
		Paul Averitt. Coal Resources of the United States, January 1, 1974. US Dept. of the Interior, Geological Survey, Bulletin 1412. Washington, DC 1975.
		US Department of Energy, Energy Information Administration – Weekly Coal Production, DOE/EIA-0218; Quarterly Coal Report, DOE/EIA-0121; Cost and Quality of Fuels for Electric Utility Plants, DOE/EIA-0191; Electric Power Annual, DOE-0348; Electric Power Monthly, DEO/EIA-0266 – publications and file data.
USSR	(i)	Data supplied by WEC Member Committee.

Venezuela	(i)	Data supplied by WEC Member Committee from:
		Direccion de Energia.
		Division de Carbon – Ministerio de Energia y Minas.
Vietnam	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Yemen, Arabian Republic of	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production data from Concise Guide to World Coalfields, IEA Coal Research, 1983.
Yugoslavia	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.
Zambia	(i)	Data supplied by WEC Member Committee from Maamba Collieries Ltd.
Zimbabwe	(i)	Reserves data from WEC Survey of Energy Resources, 1980.
	(ii)	Production and consumption data from 1984 Energy Statistics Yearbook, United Nations.

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1989

SURVEY OF ENERGY RESOURCES

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1 Coal (Including Lignite)

Commentary

Since it was last determined on the occasion of the World Energy Conference in 1986, the volume of coal deposits classified as proved recoverable reserves has risen dramatically. At 1 075 billion tonnes, hard coal (bituminous, including anthracite) resources have advanced by more than 80% and lignite (including sub-bituminous) deposits, at 521 billion tonnes, have increased nearly 30% on the values recorded by the 1986 Conference in Cannes. This growth is due primarily to the substantial rise in the reserves of the People's Republic of China; these were included in the "proved amount in place" category at the 1986 Conference, but not in the "proved recoverable" figures. With some 610 billion tonnes hard coal, China has by far the largest volume of hard coal reserves, followed by the USA (113 billion tonnes) and the Soviet Union (104 billion tonnes). These three nations account for more than 75% of total proved recoverable reserves. At present they produce approximately two-thirds of the world's hard coal. As far as lignite is concerned, some 60% of the proved recoverable reserves are concentrated in these three countries.

Compared with oil and gas, coal has thus further improved its long-term position as the world's most widely available fossil energy source. With current annual production of about 3.3 billion tonnes hard coal and 1.2 billion tonnes lignite, sufficient reserves are available for several hundred years even if output should increase. Not least because of the level of reserves, coal is generally expected to regain its mid-sixties status as the world's primary energy source in consumption terms. The volume required to attain this position can be provided if production capacity is developed in good time. With lead times of three to five years for open and near-surface extraction of geologically favourable deposits, investment decisions have to be taken accordingly early. Although very little project-related exploration has taken place in recent years, considerable potential is available for short-term implementation. This does not refer to existing capacity reserves which, depending on the reference price level, amount to roughly 0.1 to 0.2 billion tonnes worldwide.

However, a marked increase in prices can be expected in conjunction with this development. Today's low-price suppliers, with currently inflated capacities, are moving into less propitious geological conditions so that new capacity must largely be generated either with difficult deposits or by creating a new infrastructure. Moreover, transportation distances are generally rising in the producing countries. Although cost forecasts are difficult to make, especially since companies are unwilling to provide pertinent data, experts agree that the cost increases incurred in exploiting new capacity will emphatically exceed inflation rates. Independent of rising production costs, relative currency values in exporting and importing countries play a major role in determing prices on the world market. Similarly, bilateral currency ratios between overseas suppliers affect their competitiveness. The direction and extent of currency fluctuations are totally unpredictable so that prices cannot be reliably forecast.

Pronounced technological advances in extraction and upgrading processes are unlikely in the foreseeable future, but the existing scope for introducing the highest possible technical standards still has to be fully exploited. New developments with proven commercial feasibility are essential in all sectors of the coal industry if this primary energy is to become sufficiently widely accepted to generate additional volume requirements. Environmentally friendly equipment for minimizing harmful dust, sulphur-dioxide and nitrogen-oxide emissions when burning coal represents state-of-the-art technology, but has not yet been installed in most countries. Modern coal-combustion technology is also available for alleviating the CO_2 problem, by ensuring economical and high-efficiency use of primary energy sources.

Even as coal utilisation continues to expand, producing countries will still concentrate on meeting domestic demand first. Currently, some 90% of world production is consumed in the source country, with only approximately 10% being traded between producing and importing nations. Growing domestic demand and a rise in import requirements will sustain this ratio in future.

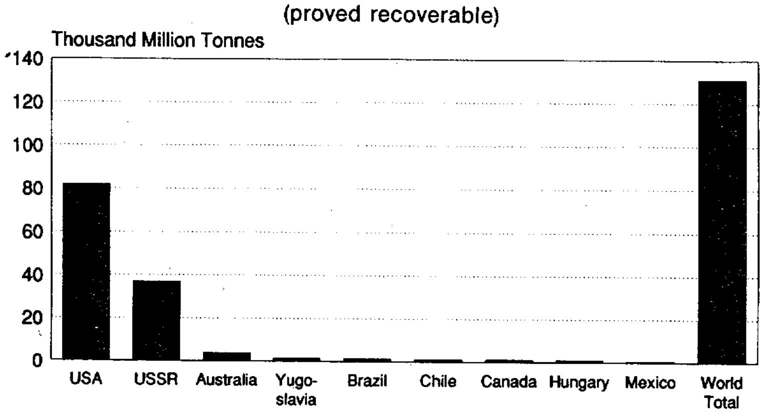
On the basis of the following criteria:
- availability of coal reserves
- profitability of coal deposits
- coal types, and
- export potential

only a few countries are expected to join today's exporters in the coming years, so that the world market for coal will continue to be satisfied by a relatively small number of exporting nations. This situation will be reinforced as traditional exporting countries decline in significance.

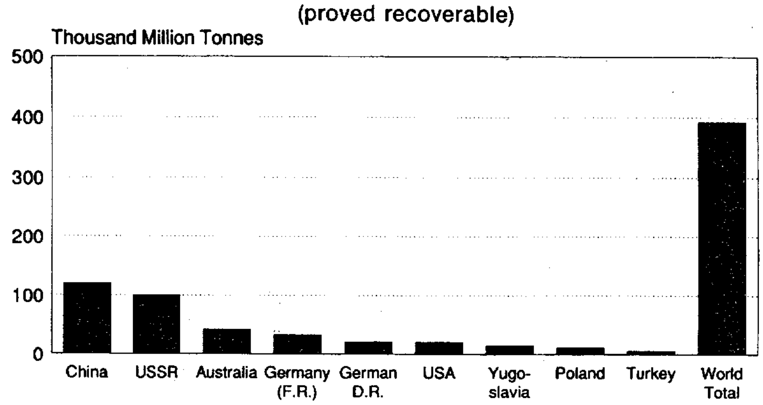
An analysis of utilisation categories shows that power generation is not only the most important, but also offers the best expansion prospects for the future. With coal-fired power generation of 4 700 TWh, the proportion of the world's electrical power requirement satisfied by coal is some 44%. Coal utilisation in the steel industry is less pronounced in absolute terms, but relatively much more important, comprising 80% of this sector's total energy consumption. The heating market, including all other areas of industry, households and minor consumption, remains more or less stable but marked by major differences in regional and national significance in the coal-producing countries.

F H Esser
Sophia-Jacoba Mining Company, Federal Republic of Germany

Countries with Major Reserves of Sub-bituminous Coal
(proved recoverable)



Countries with Major Reserves of Lignite
(proved recoverable)



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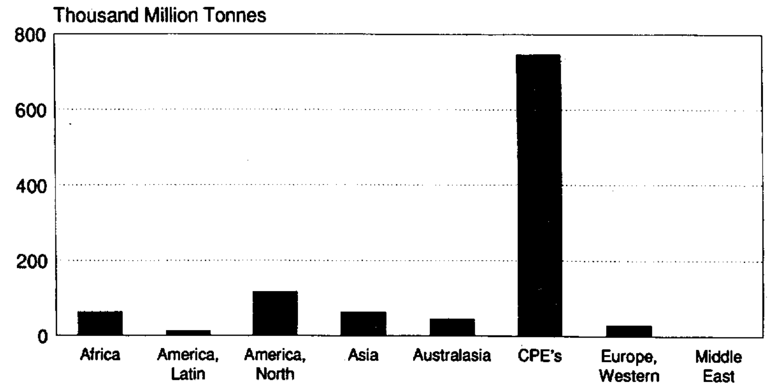
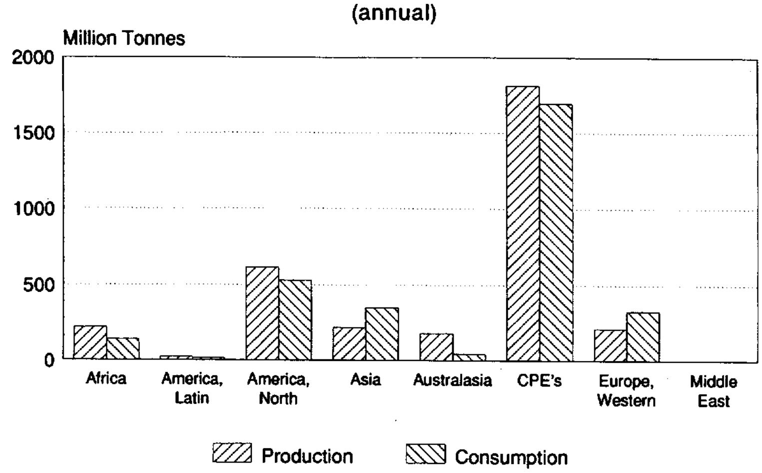
Proved Recoverable Reserves of Bituminous Coal



Production and Consumption of Bituminous Coal

(annual)



Countries with Major Reserves of Bituminous Coal

(proved recoverable)

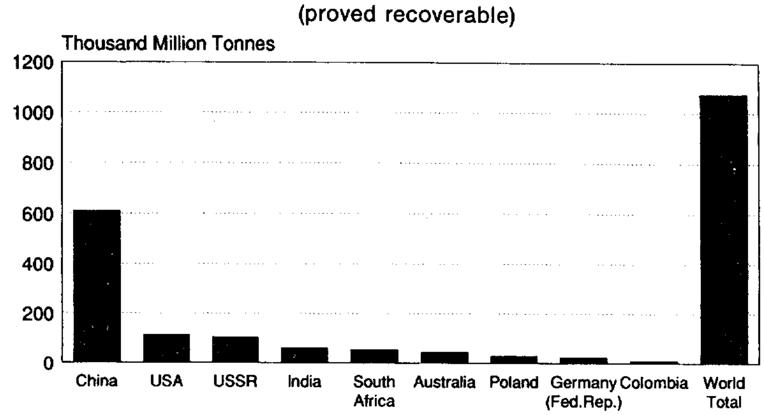


Table 1.1 Proved Recoverable Reserves at end 1987
Million tonnes

	Bituminous including Antracite	Sub-Bituminous	Lignite	Total
AFRICA				
Algeria	43	–	–	43
Botswana *(a)*	3 500	–	–	3 500
Cen. African Rep.	–	–	4.0	4.0
Egypt *(a,b)*	13	40	–	53
Ethiopia	–	–	11	11
Malawi	12	–	–	12
Morocco	45	–	–	45
Mozambique *(a)*	240	–	–	240
Niger	70	–	–	70
Nigeria	21	169	–	190
South Africa *(a)*	55 333	–	–	55 333
Swaziland	1 820	–	–	1 820
Tanzania	200	–	–	200
Zaire	600	–	–	600
Zambia	–	55	–	55
Zimbabwe	734	–	–	734
Total Africa	**62 631**	**264**	**15**	**62 910**
AMERICA, LATIN				
Argentina *(a,b)*	–	130	–	130
Brazil *(a,b)*	–	1 245	–	1 245
Chile *(a)*	31	1 150	–	1 181
Colombia *(a)*	9 666	*	*	9 666
Ecuador	–	–	23	23
Mexico *(a,b)*	1 252	634	–	1 886
Peru	960	–	100	1 060
Venezuela	417	–	–	417
Total America, Latin	**12 326**	**3 159**	**123**	**15 608**
AMERICA, NORTH				
Canada *(b)*	3 831	1 135	2 000	6 966
USA *(a)*	112 972	81 758	20 511	215 241
Total America, North	**116 803**	**82 893**	**22 511**	**222 207**
ANTARCTICA				
Antarctica *(a)*	N	–	–	N
Total Antarctica	N	–	–	N
ASIA				
Afghanistan *(a)*	66	–	–	66
Burma	2.3	–	–	2.3
India	60 648	–	1 900	62 548
Indonesia *(a)*	1 000	400	1 600	3 000
Japan	856	–	17	873
Korea (South)	158	–	–	158
Malaysia	4.0	–	–	4.0
Pakistan *(a)*	–	102	–	102

– Unknown or zero   N Less than 0.1   * see notes   All sub-totals and totals are rounded.

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Table 1.1 Proved Recoverable Reserves (continued)
Million tonnes

	Bituminous including Antracite	Sub-Bituminous	Lignite	Total
Philippines	–	82	–	82
Taiwan, China	100	100	–	200
Thailand	–	14	900	914
Total Asia	**62 834**	**698**	**4 417**	**67 949**
AUSTRALASIA				
Australia *(a,b)*	45 340	3 700	41 900	90 940
New Caledonia	2.0	–	–	2.0
New Zealand *(a)*	27	81	9.0	117
Total Australasia	**45 369**	**3 781**	**41 909**	**91 059**
CPE'S				
Albania *(a)*	–	*	*	*
Bulgaria	30	–	3 700	3 730
China	610 700	–	120 000	730 700
Czechoslovakia	1 870	–	3 500	5 370
German Dem. Rep.		–	21 000	21 000
Hungary *(a)*	596	982	2 883	4 461
Korea (North)	300	300	–	600
Mongolia *(a)*	*	–	*	*
Poland *(a,b)*	28 700	–	11 700	40 400
Romania *(a)*	*	*	*	*
USSR	104 000	37 000	100 000	241 000
Vietnam	150	–	–	150
Yugoslavia	70	1 500	15 000	16 570
Total CPE's	**746 416**	**39 782**	**277 783**	**1 063 981**
EUROPE, WESTERN				
Austria	–	–	65	65
Belgium	410	–	–	410
France	213	45	–	258
Germany (Fed.Rep)	23 919	–	35 150	59 069
Greece		–	3 000	3 000
Ireland	5.0	9.0	–	14
Italy	–	27	12	39
Netherlands	497	–	–	497
Norway	–	9.6	–	9.6
Portugal *(a,b)*	3.0	–	33	36
Spain	379	155	236	770
Sweden	–	1.0	–	1.0
Turkey	175	–	5 929	6 104
United Kingdom *(a-h)*	3 300	–	500	3 800
Total Europe, Western	**28 901**	**247**	**44 925**	**74 073**
MIDDLE EAST				
Iran	193	–		193
Total Middle East	**193**	**–**	**–**	**193**
WORLD TOTALS	**1 075 473**	**130 823**	**391 683**	**1 597 980**

– Unknown or zero N Less than 0.1 * see notes All sub-totals and totals are rounded.

Table 1.2 Production in 1987
Million tonnes

	Bituminous including Antracite	Sub-Bituminous	Lignite	Total
AFRICA				
Algeria	N	–	–	N
Botswana	0.3	–	–	0.3
Egypt *(c)*	1.3	–	–	1.3
Morocco	0.8	–	–	0.8
Mozambique	N	–	–	N
Niger	N	–	–	N
Nigeria	–	N	–	N
South Africa *(b)*	214	–	–	214
Swaziland	0.2	–	–	0.2
Zaire	N	–	–	N
Zambia	–	0.8	–	0.8
Zimbabwe	4.8	–	–	4.8
Total Africa	**221**	**1.0**	–	**222**
AMERICA, LATIN				
Argentina	–	0.4	–	0.4
Brazil	–	6.8	–	6.8
Chile	1.7	–	–	1.7
Colombia	15	–	–	15
Mexico	7.0	4.1	–	11
Peru	0.2	–		0.2
Venezuela	0.2	–	–	0.2
Total America, Latin	**24**	**11**	–	**35**
AMERICA, NORTH				
Canada	33	19	10	61
USA	581	182	71	833
Total America, North	**613**	**200**	**81**	**894**
ASIA				
Afghanistan	0.2	–	–	0.2
Burma	N	–	N	N
India	180	–	11	191
Indonesia *(b)*	1.7	–	–	1.7
Japan	13	–	–	13
Korea (South)	24	–	–	24
Pakistan	–	2.4	–	2.4
Philippines	–	1.2	–	1.2
Taiwan, China	0.2	1.0	–	1.2
Thailand	–	–	6.9	6.9
Total Asia	**219**	**5.0**	**18**	**242**

– Unknown or zero   N Less than 0.1   * see notes   All sub-totals and totals are rounded.

Table 1.2 Production in 1987 (continued)
Million tonnes

	Bituminous including Antracite	Sub-Bituminous	Lignite	Total
AUSTRALASIA				
Australia *(c)*	179	*	45	224
New Zealand	0.5	1.8	N	2.4
Total Australasia	**180**	**2.0**	**45**	**226**
CPE'S				
Albania *(b)*	–	–	2.3	2.3
Bulgaria	0.2	–	37	37
China	985	–	33	1 018
Czechoslovakia	26	–	100	126
German Dem. Rep.	–	–	303	303
Hungary	2.4	–	20	23
Korea (North)	40	–	–	40
Mongolia	0.7	–	7.1	7.8
Poland	193	–	73	266
Romania *(b)*	8.8	–	39	47
USSR	550	95	115	760
Vietnam	5.6	–	–	5.6
Yugoslavia	0.4	–	71	71
Total CPE's	**1 811**	**95**	**801**	**2 707**
EUROPE, WESTERN				
Austria	–	–	2.8	2.8
Belgium	4.4	–	–	4.4
France	14	1.6	0.4	16
Germany (Fed.Rep.)	77	–	109	186
Greece	–	–	45	45
Ireland	N	–	–	N
Italy	–	–	1.1	1.1
Norway	–	0.4	–	0.4
Portugal	0.3	–	–	0.3
Spain	14	4.9	16	35
Turkey	3.5	–	44	47
United Kingdom	100	–	–	100
Total Europe, Western	**213**	**7.0**	**217**	**438**
MIDDLE EAST				
Iran	0.7	–	0.5	1.2
Total Middle East	**0.7**	**–**	**0.5**	**1.2**
WORLD TOTALS	**3 282**	**320**	**1 162**	**4 765**

– Unknown or zero N Less than 0.1 * see notes All sub-totals and totals are rounded.

Table 1.3 Consumption in 1987
Million tonnes

	Bituminous including Antracite	Sub-Bituminous	Lignite	Total
AFRICA				
Algeria	1.1	–	–	1.1
Egypt *(c)*	1.3	–	–	1.3
Morocco	1.6	–	–	1.6
Mozambique	N	–	–	N
Niger	N	–	–	N
Nigeria	–	N	–	N
South Africa	130	–	–	130
Zaire	0.1	–	–	0.1
Zambia	–	0.5	–	0.5
Zimbabwe	4.8	–	–	4.8
Total Africa	**140**	**0.5**	**–**	**140**
AMERICA, LATIN				
Argentina	–	1.7	–	1.7
Brazil	–	16	–	16
Chile	2.0	–	–	2.0
Colombia *(a)*	5.1	–	–	5.1
Mexico	7.0	4.1	–	11
Peru	0.1	–		0.1
Venezuela	N	N	–	0.1
Total America, Latin	**14**	**22**	**–**	**36**
AMERICA, NORTH				
Canada	21	19	10	50
USA	510	181	68	759
Total America, North	**531**	**200**	**78**	**809**
ASIA				
Afghanistan	0.2	–	–	0.2
Burma	N	–	N	0.1
Hong Kong	8.0	–	–	8.0
India	178	–	11	189
Indonesia *(b)*	2.9	–	–	2.9
Japan	104	–	–	104
Korea (South)	43	–	–	43
Malaysia	0.6	–	–	0.6
Pakistan	–	3.2	–	3.2
Philippines	–	2.1	–	2.1
Taiwan, China	14	0.2	–	14
Thailand	–	–	6.8	6.8
Total Asia	**350**	**6.0**	**18**	**374**
AUSTRALASIA				
Australia *(c)*	45	*	45	90
New Caledonia	0.2	–	–	0.2
New Zealand	0.2	1.8	N	2.1
Total Australasia	**45**	**2.0**	**45**	**92**

– Unknown or zero N Less than 0.1 * see notes All sub-totals and totals are rounded.

Table 1.3 Consumption in 1987 (continued)
Million tonnes

	Bituminous including Antracite	Sub-Bituminous	Lignite	Total
CPE'S				
Albania *(b)*	–	0.2	2.3	2.5
Bulgaria	7.2	–	37	44
China	887	–	33	920
Czechoslovakia	28	–	96	125
German Dem. Rep. *(a)*	7.5	–	309	316
Hungary	4.9	–	21	26
Korea (North)	42	–	–	42
Mongolia	0.1	–	7.1	7.2
Poland	165	–	73	238
Romania *(b)*	14	–	39	53
USSR	530	95	115	740
Vietnam	5.1	–	–	5.1
Yugoslavia	4.4	–	71	75
Total CPE's	**1 695**	**95**	**803**	**2 594**
EUROPE, WESTERN				
Austria	3.4	–	3.3	6.7
Belgium	12	–	–	12
Denmark *(b)*	12	–	N	12
Finland	6.4	–	–	6.4
France	28	–	–	28
Germany (Fed.Rep)	75	–	111	186
Greece *(a)*	1.6	–	43	44
Ireland	3.3	–	–	3.3
Italy	21	0.5	1.1	23
Netherlands	10	–	–	10
Norway	–	1.6	–	1.6
Portugal	2.8	–	–	2.8
Spain	25	5.5	16	46
Sweden *(a)*	4.3	–	–	4.3
Turkey	7.2	–	41	49
United Kingdom	116	–	–	116
Total Europe, Western	**328**	**8.0**	**215**	**551**
MIDDLE EAST				
Iran	1.0	–	0.5	1.5
Israel	3.3	–	–	3.3
Total Middle East	**4.3**	**–**	**0.5**	**4.8**
WORLD TOTALS	**3 108**	**332**	**1 160**	**4 601**

– Unknown or zero   N Less than 0.1   * see notes   All sub-totals and totals are rounded.

Table 1.4 Resources and Reserves at end 1987

	Rank of fuel (see foot-notes)	Proved Amount in Place: Tonnage	Proved Amount in Place: Maximum depth of deposits	Proved Amount in Place: Minimum seam thickness	Proved Recoverable Reserves: Tonnage	Proved Recoverable Reserves: By surface mining	Proved Recoverable Reserves: Of coking quality	Estimated Additional Amount in Place	Estimated Additional Reserves Recoverable
		Mtonnes	m	m	Mtonnes	%	%	Mtonnes	Mtonnes
Afghanistan *(a)*	BT	112	250	0.8	66	–	–	400	–
Albania *(a)*	LN	15	–	–	*	–	–	–	–
Algeria	BT	–	600	0.30	43	0	100	–	–
Antarctica *(a)*	BT	N	–	–	N	–	–	–	–
Argentina *(a,b)*	SB	195	600	1	130	30	–	385	–
	LN	–	–	–	–	–	–	7 350	–
Australia *(a,b)*	BT	66 220	600	1.5	45 340	45	–	500 000	250 000
	SB	4 100	600	1.5	3 700	–	0	–	–
	LN	46 500	500	15	41 900	100	0	204 000	183 000
Austria	LN	350	–	–	65	58.3	0	80	65
Bangladesh *(a)*	BT	1 054	1158	0.3	–	–	–	–	–
Belgium	BT	715	1000	0.8	410	0	63	1 400	900
Botswana *(a)*	BT	7 000	–	–	3 500	–	–	100 000	–
Brazil *(a,b)*	SB	3 276	870	0.680	1 245	21	24.0	6 980	15 207
Bulgaria	BT	36	–	–	30	N	65	1 200	–
	LN	4 418	–	–	3 700	65	–	700	–
Burma	BT	4.5	–	–	2.3	–	–	120	–
	LN	–	–	–	–	–	–	80	–
Canada *(a,b,c)*	BT	5 585	600	0.6	3 831	88	66	24 125	–
	SB	13 150	300	1.5	1 135	100	0	14 990	–
	LN	2 055	50	1.5	2 000	100	0	8 970	–
Cen. African Rep.	LN	4.0	–	–	4.0	100	–	–	–
Chile *(a)*	BT	79	900	0.7	31	0	7	125	75
	SB	4 500	–	–	1 150	–	–	–	–
China	BT	650 000	1000	0.6	610 700	1.3	37	17 981	–
	LN	120 000	–	1.0	120 000	70	0	305 800	–
Colombia *(a)*	BT	16 524	–	–	9 666	–	20	–	–
Costa Rica	SB	25	350	1	–	–	–	22	–
	LN	2.0	–	–	–	–	–	–	–
Czechoslovakia	BT	5 400	1800	0.6	1 870	–	62	3 600	1 460
	LN	6 100	500	1.0	3 500	85	0	1 630	1 000
Denmark *(a)*	LN	63	–	–	–	–	–	–	–
Ecuador	LN	28	100	200	23	–	–	5.7	–
Egypt *(a,b)*	BT	25	–	–	13	–	–	–	–
	SB	–	400	0.65	40	–	–	–	–
Ethiopia	LN	23	75	0.05	11	–	–	–	–
France	BT	790	1250	0.6	213	17.612	52	200	50
	SB	151	1250	2.0	45	0	–	–	–
	LN	30	–	–	–	–	–	165	85
German Dem. Rep.	LN	47 000	20	2	21 000	100	0	–	–
Germany (Fed.Rep.)	BT	44 000	1500	0.3	23 919	–	60	186 300	–
	LN	55 000	600	2.0	35 150	100	–	–	–
Greece	LN	5 312	–	–	3 000	–	–	–	–
Greenland *(a)*	SB	–	560	–	–	–	–	680	370

Rank of fuel – BT = Bituminous including anthracite SB = Sub-bituminous LN = lignite

– Unknown or zero N Less than 0.1 * see notes

Estimated Additional Amount in Place	Estimated Additional Reserves Recoverable
Mtonnes	Mtonnes
400	–
–	–
–	–
–	–
385	–
7 350	–
500 000	250 000
–	–
204 000	183 000
80	65
–	–
1 400	900
100 000	–
6 980	15 207
1 200	–
700	–
120	–
80	–
24 125	–
14 990	–
8 970	–
–	–
125	75
–	–
17 981	–
305 800	–
–	–
22	–
–	–
3 600	1 460
1 630	1 000
–	–
5.7	–
–	–
–	–
–	–
200	50
–	–
165	85
–	–
186 300	–
–	–
–	–
680	370

Table 1.4 Resources and Reserves at end 1987 (continued)

	Rank of fuel (see foot-notes)	Proved Amount in Place			Proved Recoverable Reserves			Estimated Additional Amount in Place	Estimated Additional Reserves Recoverable
		Tonnage	Maximum depth of deposits	Minimum seam thickness	Tonnage	By surface mining	Of coking quality		
		Mtonnes	m	m	Mtonnes	%	%	Mtonnes	Mtonnes
Haiti	LN	13	–	–	–	–	–	27	–
Honduras	SB	21	–	–	–	–	–	–	–
Hungary *(a)*	BT	1 407	900	0.4	596	N	26	702	77
	SB	2 841	600	1	982	N	0	1 952	369
	LN	5 465	140	1	2 883	100	0	3 337	1 124
India	BT	129 154	600	1.2	60 648	60	10	110 177	47 177
	LN	2 100	110	0.5	1 900	100	0	3 932	3 932
Indonesia *(a)*	BT	–	300	2	1 000	–	–	–	–
	SB	–	300	2	400	–	–	–	–
	LN	–	100	12	1 600	–	–	–	–
Iran	BT	3 754	–	–	193	–	–	–	–
	LN	2 295	–	–		–	–		
Ireland	BT	7.0	335	0.3	5.0	2	0	30	18
	SB	12	115	0.5	9.0	2.0	–	29	18
Italy	SB	60	500	1.4	27	0	0	280	–
	LN	15	150	3	12	100	0	22	20
Japan	BT	8 348	1200	0.6	856	–	52	–	–
	LN	175	300	0.6	17	–	0	–	–
Korea (North)	BT	2 000	–	–	300	–	–	2 700	–
	SB	300	–	–	300	–	–	2 200	–
Korea (South)	BT	238	707	0.5	158	0	0	1 377	593
Madagascar	BT	1 000	–	–	–	–	–	–	–
	LN	75	–	–	–	–	–	–	–
Malawi	BT	25	–	–	12	0	0	–	–
Malaysia	BT	15	100	0.55	4.0	–	–	78	–
	SB	–	–	–	–	–	–	305	26
	LN	–	100	0.3	–	–	–	270	–
Mali	LN	–	–	–	–	–	–	3.0	–
Mexico *(a,b)*	BT	1 569	500	0.8	1 252	14	96	1 960	1 168
	SB	793	300	0.8	634	36	0	792	586
Mongolia *(a)*	BT	12 000	–	–	*	–	–	–	–
	LN	12 000	–	–	*	–	–	–	–
Morocco	BT	134	600	0.5	45	–	–	–	–
	LN	44	100	1	–	–	–	–	–
Mozambique *(a)*	BT	–	–	–	240	83	40	155	–
Netherlands	BT	1 406	1500	0.8	497	0	–	2 750	1 375
New Caledonia	BT	4.0	–	–	2.0	–	–	8.0	–
New Zealand *(a)*	BT	49	400	0.5	27	90	70	267	15
	SB	277	400	1	81	20	–	953	9.0
	LN	1 556	300	1	9.0	100	–	5 500	28
Niger	BT	–	–	–	70	–	–	–	–
Nigeria	BT	–	–	–	21	–	–	21	–
	SB	338	–	–	169	24	–	1 000	–
Norway	SB	38	450	0.6	9.6	0	75	100	90
Pakistan *(a)*	SB	145	1000	0.5	102	–	–	310	217

Rank of fuel – BT = Bituminous including anthracite SB = Sub-bituminous LN = lignite

– Unknown or zero N Less than 0.1 * see notes

Table 1.4 Resources and Reserves at end 1987 (continued)

	Rank of fuel (see foot-notes)	Proved Amount in Place			Proved Recoverable Reserves			Estimated Additional Amount in Place	Estimated Additional Reserves Recoverable
		Tonnage	Maximum depth of deposits	Minimum seam thickness	Tonnage	By surface mining	Of coking quality		
		Mtonnes	m	m	Mtonnes	%	%	Mtonnes	Mtonnes
Peru	BT	–	–	–	960	–	–	–	–
	LN	–	–	–	100	–	–	–	–
Philippines	SB	170	–	–	82	–	–	–	–
Poland *(a,b)*	BT	63 800	1200	0.4	28 700	0	32.3	100 500	30 000
	LN	13 000	350	3	11 700	99.6	–	20 400	10 200
Portugal *(a,b)*	BT	7.5	900	0.3	3.0	10	0	–	–
	LN	38	152	0.5	33	100	0	–	–
Romania *(a)*	BT	70	–	–	*	0	–	–	–
	SB	2 800	–	–	*	0	0	–	–
	LN	1 100	–	–	*	–	0	–	–
South Africa *(a)*	BT	121 218	400	1.0	55 333	58.7	4.1	5 000	–
Spain	BT	532	1000	0.5	379	5.0	5.0	2 188	379
	SB	292	800	0.5	155	7	0	738	158
	LN	408	250	0.5	236	100.0	–	199	189
Swaziland	BT	2 020	–	–	1 820	–	–	3 000	–
Sweden	SB	4.0	15	0.5	1.0	100	0	20	–
Taiwan, China	BT	220	1000	0.25	100	0	60	–	–
	SB	220	1000	0.25	100	0	5	–	–
Tanzania	BT	304	487	1.0	200	–	–	1 500	–
Thailand	SB	15	–	–	14	–	–	–	–
	LN	1 648	–	–	900	100	0	–	–
Turkey	BT	593	–	0.6	175	–	–	–	766
	LN	7 847	–	0.7	5 929	–	–	–	382
United Kingdom *(a-h)*	BT	190 000	1200	0.60	3 300	8	10	186 700	*
	LN	1 000	200	–	500	–	–	–	–
USA *(a,b,c)*	BT	225 943	671	0.20	112 972	18.9	–	469 885	–
	SB	163 516	305	1.52	81 758	34.1	0	276 934	–
	LN	41 023	61	0.76	20 511	100	0	392 733	–
USSR	BT	130 000	1800	0.5	104 000	20	–	2 100 000	–
	SB	47 000	600	0.7	37 000	40	0	1 900 000	–
	LN	110 000	300	1	100 000	90	0	1 200 000	–
Venezuela	BT	642	–	–	417	65	–	2 117	918
Vietnam	BT	300	–	–	150	–	–	700	–
	LN	12	–	–	–	–	–	–	–
Yugoslavia	BT	80	–	–	70	–	–	22	–
	SB	1 760	–	–	1 500	45	–	275	–
	LN	16 000	–	–	15 000	80	–	3 500	–
Zaire	BT	600	–	–	600	–	–	–	–
Zambia	SB	69	250	1.50	55	79	0	18	14
Zimbabwe	BT	1 535	–	–	734	36	50	5 820	–
	SB	965	–	–	–	–	–	–	–

Rank of fuel – BT = Bituminous including anthracite SB = Sub-bituminous LN = lignite

– Unknown or zero N Less than 0.1 * see notes

Estimated Additional Amount in Place	Estimated Additional Reserves Recoverable
Mtonnes	Mtonnes
–	–
–	–
–	–
100 500	30 000
20 400	10 200
–	–
–	–
–	–
–	–
–	–
5 000	–
2 188	379
738	158
199	189
3 000	–
20	–
–	–
–	–
1 500	–
–	–
–	–
–	766
–	382
186 700	*
–	–
469 885	–
276 934	–
392 733	–
2 100 000	–
1 900 000	–
1 200 000	–
2 117	918
700	–
–	–
22	–
275	–
3 500	–
–	–
18	14
5 820	–
–	–

Table 1.5 Characteristics

	Bituminous		Sub-bituminous		Lignite	
	average	range	average	range	average	range
Argentina						
Heat value – MJ/kg			22.60	20 – 25		
Sulphur content – %			0.8	0.5 – 1.1		
Carbon content – %			54	50 – 58		
Volatile material – %			46	42 – 50		
Moisture content – %			11	10 – 12		
Ash – %			17	16 – 18		
Australia *(d)*						
Heat value – MJ/kg		13 – 30		see note	9.50	5.8 – 12.5
Sulphur content – %		0 – 0.5		see note		
Carbon content – %		39 – 84		see note		
Volatile material – %		20 – 45		see note		
Moisture content – %		1 – 19		see note		48 – 66
Ash – %		2.5 – 31		see note		1 – 4
Austria						
Heat value – MJ/kg	28.50				11.60	
Sulphur content – %					0.7	
Carbon content – %					50.0	
Volatile material – %					16.3	
Moisture content – %					17.5	
Ash – %					13.9	
Belgium						
Heat value – MJ/kg	31.40					
Sulphur content – %	0.9					
Carbon content – %	84					
Volatile material – %	30.3					
Moisture content – %	9					
Ash – %	13.1					
Brazil						
Heat value – MJ/kg				13 – 24		
Sulphur content – %				1.65 – 4.08		
Carbon content – %				39.51 – 37.23		
Volatile material – %				17.88 – 37.43		
Ash – %				25.34 – 42.61		
Canada *(d)*						
Heat value – MJ/kg		see note	19.00	17 – 20	15.00	12 – 17
Sulphur content – %		see note	0.3	0.2 – 0.5	0.5	0.3 – 0.8
Carbon content – %		see note	37	33 – 38	29	26 – 31
Volatile material – %		see note	28	25 – 30	27	23 – 31
Moisture content – %		see note	21	18 – 27	34	32 – 40
Ash – %		see note	14	8 – 17	11	8 – 13
Chile						
Heat value – MJ/kg	34.30		23.00			
Sulphur content – %	2.0		2	0.3 – 3.7		
Carbon content – %	45		37	35 – 40		
Volatile material – %	48		29	22 – 36		
Moisture content – %			20	15 – 25		
Ash – %	15.6		15	7 – 23		
China						
Sulphur content – %		0.2 – 0.6			1.1	
Carbon content – %	76	60 – 95				
Volatile material – %	41	4 – 55				
Ash – %	23	8 – 40				
Czechoslovakia						
Heat value – MJ/kg	24.40	11.7 – 28.0			12.30	8.8 – 19.4
Sulphur content – %	0.65	0.6 – 1.5			1.8	0.7 – 6.0
Volatile material – %	28.3	14.7 – 38.7			52.9	45.1 – 58.9
Moisture content – %	10.7	2.5 – 16.3			32.7	21.5 – 44.4
Ash – %	18.0	5.2 – 55.4			30.2	6.6 – 41.1
France						
Heat value – MJ/kg	25.90	18.2 – 29.8	18.20		8.00	
Sulphur content – %		0.5 – 2.0			1.50	1.25 – 2
Carbon content – %					40	37 – 44
Volatile material – %		4.0 – 40			58	54 – 62
Moisture content – %					59	58 – 60
Ash – %	16.91	5.0 – 30	30		18	17 – 20

Table 1.5 Characteristics (continued)

	Bituminous average	Bituminous range	Sub-bituminous average	Sub-bituminous range	Lignite average	Lignite range
German Dem. Rep.						
Heat value – MJ/kg					8.80	8.0 – 11.6
Sulphur content – %					N	N
Moisture content – %						50 – 58
Ash – %						7 – 24
Germany (Fed.Rep)						
Heat value – MJ/kg		32 – 35				
Sulphur content – %	1.0	0.8 – 1.3				
Carbon content – %		78 – 94				
Volatile material – %		6 – 40				
Moisture content – %	3.6	3.4 – 3.9				
Ash – %		6 – 10				
Greece						
Heat value – MJ/kg					13.50	
Sulphur content – %					1	
Carbon content – %					39	
Volatile material – %					60	
Moisture content – %					56	
Ash – %					31	
Hungary						
Heat value – MJ/kg	15.70		12.30		6.60	
Ash – %	41		27		21	
India						
Heat value – MJ/kg	20.41	5.44 – 25.95			5.44	4.60 – 10.05
Sulphur content – %	1	0.4 – 1.00			1	0.5 – 2.00
Carbon content – %	85	76 – 92			71	70 – 73
Volatile material – %	28	9 – 42			23	19 – 27
Moisture content – %	5	0.5 – 11			51	45 – 55
Ash – %	30	8 – 48			4	2 – 12
Indonesia						
Heat value – MJ/kg		33 – 34	31.40			25 – 27
Sulphur content – %		low	low			0.16 – 0.41
Carbon content – %		75 – 80	49			36 – 44
Volatile material – %		15 – 19	42.5			29 – 32
Moisture content – %		0.5 – 1.7	6			18 – 23
Ash – %		3.6 – 4.4	1.5			4.4 – 8.9
Iran						
Heat value – MJ/kg	30.50					
Ireland *(a)*						
Heat value – MJ/kg	33.00					
Sulphur content – %	0.8					
Carbon content – %	85					
Volatile material – %	23					
Moisture content – %	4					
Ash – %	27					
Italy *(a)*						
Heat value – MJ/kg					8.40	6.3 – 9.5
Sulphur content – %					0.7	0.5 – 1
Carbon content – %					50	40 – 60
Volatile material – %					50	40 – 60
Moisture content – %					50	45 – 60
Ash – %					32	25 – 40
Japan						
Heat value – MJ/kg	27.00	21 – 29.8				
Sulphur content – %	1.1	0.25 – 2.7				
Carbon content – %	40.5	32.3 – 46.9				
Volatile material – %	36.2	29.9 – 41.9				
Moisture content – %	2.7	1.3 – 6.0				
Ash – %	19.1	13.9 – 35.0				
Korea (South)						
Heat value – MJ/kg	33.50	33 – 34				
Sulphur content – %	0.7	0.2 – 0.9				
Carbon content – %	91.8	89.9 – 95.1				
Volatile material – %	8.2	4.9 – 9.2				
Moisture content – %	4	2 – 7				
Ash – %	43	17 – 50				

Table 1.5 Characteristics (continued)

	Bituminous average	Bituminous range	Sub-bituminous average	Sub-bituminous range	Lignite average	Lignite range
Mexico						
Heat value – MJ/kg	25.00	23 – 27	19.00	18 – 20		
Sulphur content – %	1	0 – 1	0.8	0 – 1		
Carbon content – %	35	30 – 40	47	35 – 50		
Volatile material – %	16	15 – 18	30	17 – 36		
Moisture content – %	6	5 – 7	6	4 – 8		
Ash – %	40	30 – 45	40	30 – 45		
Morocco						
Heat value – MJ/kg	35.00					
Sulphur content – %	2					
Carbon content – %	93					
Volatile material – %	6					
Moisture content – %	6					
Ash – %	8.4					
Netherlands						
Heat value – MJ/kg	29.30					
New Zealand						
Heat value – MJ/kg	30.80	26 – 33	22.00	15.5 – 26.0	15.50	12.6 – 18.0
Sulphur content – %	1.3	0.2 – 5.0	0.4	0.2 – 4.5	1.1	0.4 – 2.5
Carbon content – %	84	–	75	–	65	–
Volatile material – %	35.5	30 – 41	34.4	32 – 38.4	31	26.5 – 35.5
Moisture content – %	7	2 – 15	21	15 – 35	38	31 – 48
Ash – %	4	1 – 10	6	2 – 12	6	4 – 20
Norway						
Heat value – MJ/kg			31.89	31.10 – 32.19		
Sulphur content – %			0.97	0.77 – 1.13		
Carbon content – %			53.95	52.71 – 54.21		
Volatile material – %			39.11	38.49 – 39.58		
Moisture content – %				2 – 4		
Ash – %			6.94	5.71 – 8.39		
Poland *(c)*						
Heat value – MJ/kg	23.30	16.7 – 32.8			7.90	7.1 – 8.8
Sulphur content – %	0.75	0.49 – 3.5			0.54	0.32 – 0.75
Volatile material – %	30	15 – 40				
Moisture content – %	9.7	7 – 15				
Ash – %	16.7	6.4 – 27.2			14.4	7.8 – 19.6
Portugal						
Heat value – MJ/kg		19.1 – 19.9				
Sulphur content – %	1.25					
Carbon content – %		65 – 75				
Volatile material – %		2.5 – 4.0				
Moisture content – %	9					
Ash – %	40					
South Africa *(c,d)*						
Heat value – MJ/kg		25.0 – 33.6				
Sulphur content – %		0.34 – 2.75				
Carbon content – %		64.0 – 81.4				
Volatile material – %		18.8 – 36.8				
Moisture content – %		1.0 – 8.9				
Ash – %		6.0 – 40.5				
Spain						
Heat value – MJ/kg	20.37		14.36		8.87	
Sulphur content – %	1.89		5.6		2.5	
Carbon content – %	26.4		21.7		9.5	
Volatile material – %	14.9		29.9		36.7	
Moisture content – %	10.8		16.6		43.5	
Ash – %	31.7		41		37.8	
Sweden						
Heat value – MJ/kg			24.00	22 – 25		
Sulphur content – %			0.45	0.3 – 0.5		
Carbon content – %			76			
Volatile material – %			41	40 – 42		
Moisture content – %			14	12 – 17		
Ash – %			39	35 – 40		

Table 1.5 Characteristics (continued)

	Bituminous average	Bituminous range	Sub-bituminous average	Sub-bituminous range	Lignite average	Lignite range
Taiwan, China						
Heat value – MJ/kg	26.77	25.94 – 28.45	26.06	24.26 – 27.19		
Sulphur content – %	1.5	0.8 – 2.0	2.5	2.0 – 3.5		
Carbon content – %	50		43	37 – 50		
Volatile material – %	33	25 – 35	38	36 – 41		
Moisture content – %	1.8	1.5 – 3.0	3.3	2.0 – 5.0		
Ash – %	17	14 – 25	18.63	17 – 28		
Thailand						
Heat value – MJ/kg						8.37 – 18.42
Sulphur content – %						1.2 – 3.5
Carbon content – %						19 – 40
Volatile material – %						25 – 30
Moisture content – %						20 – 30
Ash – %						20 – 30
Turkey						
Heat value – MJ/kg	26.58	22.81 – 30.35			18.70	10.8 – 26.6
Sulphur content – %					5.23	0.48 – 9.98
Carbon content – %	63	58 – 68			35.30	23.23 – 47.37
Volatile material – %	37	32 – 42			44.23	36.15 – 52.31
Moisture content – %	8	2 – 14			20.46	5.66 – 35.26
Ash – %	12	9 – 15			23.32	6.25 – 40.39
United Kingdom						
Heat value – MJ/kg	31.00	27.5 – 35.5				
Sulphur content – %	1.66	0.4 – 2.9				
Carbon content – %	70	55.0 – 93.0				
Volatile material – %	37	5.0 – 44				
Moisture content – %	12.0	2.0 – 19.0				
Ash – %	16.5	2.0 – 21.5				
USA *(d)*						
Heat value – MJ/kg	27.93		20.71		14.82	
Sulphur content – %	1.92		0.44		0.84	
Ash – %	10.52		7.51		14.2	
USSR *(a)*						
Heat value – MJ/kg			19.50	9.3 – 33.1		
Sulphur content – %			1.44	0.1 – 7.3		
Carbon content – %			80.6	62 – 95.7		
Volatile material – %			33.5	2.4 – 62.7		
Moisture content – %			13.2	4.1 – 58		
Ash – %			26.3	10 – 52		
Zambia						
Heat value – MJ/kg			33.62	32.19 – 35.06		
Sulphur content – %			1.59	1.27 – 1.91		
Carbon content – %			77.31	73.49 – 81.14		
Volatile material – %			22.71	26.57 – 18.86		
Moisture content – %			1.15	1.06 – 1.25		
Ash – %			23.41	22.02 – 24.80		

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General Comments on the Data Tables

The Tables cover Bituminous Coal (including anthracite), Sub-Bituminous Coal and Lignite. Data for Peat are given in Section 8. There is no internationally accepted system of demarcation between coals of different rank, but reference is made to the standards used by individual countries where available.

There is an important distinction between "Proved Recoverable Reserves", as used by the WEC, and the IEA term "Accessible Coal in Significant Coalfields".

The WEC definition of Proved Recoverable Reserves includes the words *"...that can be recovered under present and expected local economic conditions with existing available technology"*

The IEA defines Accessible Coal in Significant Coalfields as being the *"amount of coal likely to be considered for extraction from Significant Coalfields within the next twenty years"*, where a Significant Coalfield is a *"coalfield whose collective physical characteristics, render it likely either to make a significant contribution to, or to enter into the detailed commercial mining and market evaluations required in order to achieve world coal supply over the next twenty years"*.

When comparing Proved Reserves and Accessible Coal in Significant Coalfields it is important to recognise that the former takes *economic* conditions and *existing available technology* into account without limitation as to time, whilst the latter concentrates on the *physical characteristics* which render it likely to make a significant contribution to world coal supplies in the next twenty years. For example, to be considered accessable, the coalfield has to be already served by adequate transport infrastructure.

A final comment applies to all the Tables. There are no internationally agreed standards for estimating coal reserves and although the WEC attempts to establish precisely worded definitions it is a matter of judgement for each country to determine the quantities which in its opinion, meet these definitions.

For the reasons given above, care is needed when comparing the reserves of different countries and when comparing Proved Recoverable Reserves with Accessible Coal in Significant Coalfields. In most instances only a fraction of Proved Recoverable Reserves are considered to be Accessible Coal. However, there are instances where the value for Accessible Coal is significantly greater than Proved Recoverable Reserves. Where this occurs it is generally due to the particular criteria applied by the Member Country to its assessment of reserves.

Definitions

Proved Amount in Place is the tonnage that has been both carefully measured and has also been assessed as exploitable under present and expected local economic conditions with existing available technology.

Maximum Depth of Deposits and Minimum Seam Thickness relate to Proved Amount in Place.

Proved Recoverable Reserves are the tonnage of Proved Amount in Place that can be recovered (extracted from the earth in raw form) under present and expected local economic conditions with existing available technology.

Percentage Recoverable by Surface Mining and Percentage Recoverable of Coking Quality relate to Proved Recoverable Reserves.

Estimated Additional Amount in Place is the indicated and inferred tonnage *additional* to the Proved Amount in Place. It includes estimates of amounts which could exist in unexplored extensions of known deposits or in undiscovered deposits in known fuel-bearing areas as well as amounts inferred through knowledge of favourable geological conditions. The estimates are based on the results of geological and exploratory information about an area or on evidence of duplication or parallelism of geological conditions that occur in known deposits. Deposits whose existence is merely speculative are not included.

Estimated Additional Reserves Recoverable is the quantity of the Estimated Additional Amount in Place which might become recoverable within foreseeable economic and technological limits.

Annual Production is the amount produced in 1987. If some other year applies it is recorded in the notes and references.

Annual Internal Consumption is the total amount of solid fossil fuel consumed internally, *including imports*, in 1987. If some other year applies it is recorded in the notes and references.

Characteristics of Production; for these ranges and/or average values are given. The following apply:

- Sulphur Content – dry
- Heat Value – moist, ash free
- Carbon Content – dry, ash free
- Volatile Matter – dry, ash free
- Moisture Content – moist, as mined
- Ash – dry

Notes

Afghanistan

(a) One main coalfield with approx. 10×10^6 tonnes of Accessible Coal in Significant Coalfields of bituminous quality plus other minor areas of bituminous and sub-bituminous coal and lignite. Source : Concise Guide to World Coalfields, IEA Coal Research, 1983.

Albania

(a) In addition to lignite there are small deposits of sub-bituminous coal. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

(b) Production and Consumption data classified as Sub-bituminous includes some Lignite Production.

Antarctica

(a) Numerous unexplored deposits of mainly bituminous coal. None are expected to make a significant contribution to coal supplies over the next 20 years. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Argentina

(a) Sub-bituminous coal basically from Rio Turbio Mine.

(b) Lignite in Austral Basin.

Australia

(a) The large increases in bituminous and sub-bituminous resources is attributable to a substantial increase in New South Wales and reported in 1987 by State authorities.

(b) The increase in Estimated Additional Resources for lignite results from the inclusion of substantial resources in Victoria.

(c) Production and consumption data shown for Bituminous includes Sub-bituminous.

(d) Range figures for coal characteristics cover Bituminous and Sub-bituminous.

Bangladesh

(a) Coal deposits are considered too deep to mine and the country imports about 1.8 x 10^6 tonnes of coal annually. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Botswana

(a) Coal reserves are large but there is only one coal mine currently producing some 300 000 tonnes per year. Further exploitation is planned. Botswana could play a major part in future world coal supply. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Brazil

(a) Coal rank is bituminous (high volatility) to sub-bituminous. Ash content of raw coal is high, with mean values between 50% and 65%; sulphur content varies.

(b) All the important coal deposits are in the southern part of the country. Rio Grande do Sol state accounts for 90.96% of the national coal resources, with 8.5% in Santa Caterine, 0.5% in Parana and 0.04% in Sao Paulo. Coal is situated within Permian Rio Bonifo Formation, with up to 10 coal seams and an accumulated thickness of up to 10 m coal.

Canada

(a) Maximum Depth of Deposits:

For bituminous coal the maximum depth of deposits is 600m as given in the table, except for Sydney Coalfield, Nova Scotia, where the maximum depth is 1 200m.

For sub-bituminous coal the increase in maximum depth reported previously of 60 m to 300 m accounts for the major increase in the Proved Amount in Place tonnage.

(b) Proved Recoverable Reserves:

Reserve tonnages are those presented in CANMET Report 87-35, less production for years 1986 and 1987, except for sub-bituminous coal, where the tonnage represents the remaining mine permit reserves, as published in ERCB Report ST 88-31.

(c) Estimated Additional Reserves Recoverable:

No tonnages are given as, by Energy Mines and Resources Canada definitions, coal reserves are not derived from unexplored or inferred deposits.

(d) Characteristics of Production:

For bituminous coal the characteristics are subdivided according to the table below into Eastern Canada (Nova Scotia and New Brunswick) and Western Canada (Alberta and British Columbia) because of the basic differences in coal quality between these regions.

	Heat Value MJ/kg	Sulphur Content %	Carbon Content %	Volatile Matter %	Moisture Content %	Ash %
Eastern Canada						
range	33-34	1-8	77-86	31-40	3-9	3-20
average	33	2	83	38	8	5
Western Canada						
range	27-36	0.2-0.6	77-91	19-37	3-10	7-20
average	34	0.4	87	26	8	10

Chile

(a) Most of the sub-bituminous coal is located at the extreme south of the country and is very remote from centres of population. There is also a small deposit at Valdivia Osorno which produces about 30 000 tonnes a year for local consumption.

Colombia

(a) Figures for bituminous Proved Amount in Place and Proved Recoverable Reserves includes sub-bituminous coal and possibly small amounts of lignite.

(b) Production figure for bituminous coal includes sub-bituminous.

Denmark

(a) There is only one deposit of workable coal. Lignite mining ceased many years ago as it became uneconomic and the remaining resources too small. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

(b) Consumption figure for bituminous includes all hard coal.

Egypt

(a) The only developed coal deposit is at Al Maghara in the Sinai. Production was interrupted for many years but mine reconstruction has begun and early indication are favourable. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

(b) Bituminous probable reserves are given as 18.5 x 10^6 tonnes, with a minimum seam thickness of 0.6 m in reference (ii).

(c) Bituminous production and consumption figures include all hard coal.

Greece

(a) Consumption figure for bituminous includes all hard coal.

Greenland

(a) Sub-bituminous deposits exist at Nugssuaq. Basic investigation gives 340 x 10^6 tonnes total and 183 x 10^6 tonnes mineable. For the total area containing the strata these figures should be doubled. Source: Shekhar, S.C., Frandren, N., Thomsen, E. 1982. Coal on Nugssuaq, West Greenland published Geological Survey of Greenland, Denmark.

(b) No coal has been mined since 1950 because local demand is low and no export market exists. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Hungary

(a) The data refer to geological reserves.

Indonesia

(a) Proved amount in place includes measured, indicated, inferred and hypothetic resources especially for lignite deposits in South Sumatra.

(b) Production and consumption figures for bituminous coal include sub-bituminous.

Ireland

(a) Coal Characteristics are averages for the largest producers of coal.

Italy

(a) Coal characteristics are not indicated because all hard coal is imported.

Mexico

(a) Bituminous and sub-bituminous Proved Recoverable Reserves estimated from previous values less amount produced.

(b) Lignite - Found in negligible amounts.

Mongolia

(a) Although no data are available for Proved Recoverable Reserves there is production of both Bituminous Coal and Lignite.

Mozambique

(a) Coal resources in the province Tete 1.5 billion tonnes. Source: Aschinjanz, Svedov, Stand und Entwicklungsaussichten der Energiewirtschaft in Mozambique. Archiv fur Energiewirtschaft Juli 1983.

New Zealand

(a) The coal resources and classification system has been extensively revised in the last two years. A greater emphasis has been placed upon the economic and mining evaluation of such coal resources than in the past when only the geological aspects were considered. The new classification has three important levels:

Coal-in-ground: coal that is contained in seams within specified limits, usually coal thickness, quality and depth;

Recoverable coal: that part of the resource which can be currently produced by mining. This category is sub-divided into a number of confidence levels, depending upon the degree of information available;

Coal reserves: restricted to recoverable coal of a high degree of confidence and for which a reliable mining investigation has been completed.

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The data given in the tables equates Proved Amount in Place to New Zealand's "Recoverable Coal" and Proved Recoverable Reserves to "Coal Reserves". For these reasons the quantities quoted in the tables are much lower than in previous years, when less information was available on economics and detailed mining assessment investigations.

The "Coal-in-ground" for New Zealand are now:

Bituminous: 854 Mtonnes
Sub-bituminous: 5 808 Mtonnes
Lignite: 9 043 Mtonnes.

Pakistan

(a) Recovery factor for all reserves estimated at 70%. In addition to the proved and additional resources there are possible resources of 270 Mt of which 189 Mt may be recoverable.

Poland

(a) Proved Amount in Place and Proved Recoverable Reserves data from geological investigations, 1986.
(b) Minimum Seam Thickness for:
Coking Coal – 0.4-0.7m
Steam Coal and Anthracite – 0.1-0.8m
(c) Coal Characteristics are approximate.

Portugal

(a) The anthracite deposit of the carboniferous strip of Douro has the main production of 230 ktonnes per annum. It supplies the 150 MW thermal station of Tapada do Outeiro, of Electricidade de Portugal. In addition to this deposit there was a recommencement of open-cast extraction of the Couto Mineiro of "S. Pedro da Cova", with production of the order of 30 ktonnes per annum. The production of anthracite was of the order of 550 to 700 ktonnes per annum during the period 1942-62; it decreased with the closing of the S. Pedro da Cova mine.
(b) The lignite deposits were exploited up until 1969. Annual production was of the order of 150 ktonnes between 1956 and 1963. Two of the main mines contributing to that production are now exhausted. The reserves of lignite reported are those in the Espadanal (Rio Maior) deposit.

Romania

(a) There are deposits of Bituminous and Sub-bituminous Coal, and Lignite, but Proved Recoverable Reserves data are not available.
(b) Production and consumption figures for bituminous include sub-bituminous.

South Africa

(a) Some anthracite is mined but values not included.
(b) Run of mine production, including unuseable fine-coal discards and non-energy use of coal (3.31 Mtonne).
(c) Characteristics are for Bituminous Coal only.
(d) Moisture Content data on air-dried basis.

Sweden

(a) Annual Consumption includes 1.5 Mtonnes of coke.

United Kingdom

(a) British Coal does not carefully measure coal in place that cannot be recovered for various technical, environmental or economic reasons. Data strictly on the basis of WEC definition are therefore not available. However, it is estimated that coal in place in seams over 60 cm thick and less than 1 200 m deep total 190 000 x 10^6 tonnes. Favourable local conditions in Lancashire allow mining to about 1 400 m.This is interpreted as Proved Recoverable Reserves plus Additional Resources in Place.
(b) Data for Recoverable Reserves refer to deep mining only: additional surface mineable quantities are relatively small. The assessment covers existing mines and certain new mine projects, and includes the extractable and saleable coal which is sufficiently proved, of adequate thickness and quality, and in a suitable mining environment, to support current deep mining plans.
(c) Coking quality defined as British Coal Rank code, 203 to 602 inclusive and sulphur content less than 1.5% on air dried basis.
(d) The figure of 186 700 x 10^6 tonnes (for Estimated Additional Amount in Place) is the balance of 190 000 x 10^6 tonnes of coal in place defined in the notes above, after deducting Proved Recoverable Reserves.
(e) No detailed assessment has been made by British Coal of offshore coal deposits, unless they are accessible for existing mines.
(f) No detailed assessment has been made by British Coal of sub-bituminous coal or lignite although these might be locally extensive.
(g) The information on lignite refers only to the Crumlin deposit in Co. Antrim, N. Ireland. Additional deposits of lignite also occur near Coagh, Co. Tyrone and Ballymoney, Co. Antrim but have not been explored in detail. It is therefore impossible at this stage to provide details of the deposits characteristics. A reasonable estimate for lignite resources which may occur in N. Ireland is in the order of 1 000 Mtonnes.
(h) At 1987/88 rates of output the Proved Recoverable Reserves are equivalent to some 30 years production. Beyond this period British Coal regards any estimate of recoverable reserves as speculative. However, large amounts of coal have been explored that after futher detailed exploration and engineering evaluation are expected to generate significant recoverable reserves. These include a major coalfield that has not yet been exploited, together with extensions of most operating coalfields, and further developments in parts of coalfields that have already been partially exploited.
(j) Annual production refers to the fiscal year 1987/88.

USA

(a) All data reported as "proved" represent both measured and indicated tonnage. These data have been combined prior to depletion adjustments and cannot be recaptured as "measured alone".
(b) Estimated Additional Amount in Place data are current as of end of 1973. These are inferred and include some deeper resources, and are based on different source studies in some areas than Proved Recoverable Reserves. The data have been adjusted to reflect depletion and new source data added since the earlier estimate.
(c) Estimated Additional Reserves Recoverable tonnage. 1 677 686 Mtonnes of hypothetical resources have been identified by US geological survey in 1975. The ranks of the coal were not published. Further not all of this coal has "reasonable certainty" of future recovery.
(d) Coal characteristics. The only data available (heat value, sulphur content and ash) are on an "as received" basis; moisture inherent in coal is not known. Thus, sulphur and ash are presented on the "as received" basis (not "dry") and heat value is "as received", (not "moist, ash free").

USSR

(a) All characteristics data are the average for the three types of coal and supplied for the 1986 Survey of Energy Resources.

References

Afghanistan
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Albania
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Algeria
(i) Reserves data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Antarctica
(i) Concise Guide to World Coalfields, IEA Coal Research, 1983

Argentina
(i) Resources data supplied by WEC Member Committee from Yacimientos Carboniferos Fiscales, State Company, 1986.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Australia
(i) All data except coal characteristics provided by WEC Member Committee from Bureau of Mineral Resources, 1989.
(ii) Coal characteristics supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.

Austria
(i) Data provided by WEC Member Committee in 1989.

Bangladesh
(i) Reserves data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.

Belgium
(i) Data provided by WEC Member Committee from Federation Charbonniere Belge (Fedechar), 1989.

Botswana
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production data from Concise Guide to World Coalfields, IEA Coal Research, 1983.

Brazil
(i) Data provided by WEC Member Committee in 1989 from Informativo Anual da Indústria Carbonífera – Ano base 1987.

Bulgaria
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Burma
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Canada
(i) Data supplied by WEC Member Committee in 1989 from:
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Coal Mining in Canada: 1986 CANMET Report 87-3E, Canada Centre for Mineral and Energy Technology; Energy, Mines and Resources; September 1987.
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Analysis Directory of Canadian Commercial Coals: Supplement No.6 CANMET Report 85-11E Canada Center for Mineral and Energy Technology; Energy, Mines and Resources, March 1986.

Cen. African Rep.
(i) Reserves data from WEC Survey of Energy Resources, 1980.

Chile
(i) Data provided by WEC Member Committee in 1989 with additional information on sub-bituminous coal from Concise Guide to World Coalfields, IEA Coal Research, and WEC Member Committee in 1986.

China
(i) Data supplied by WEC Member Committee from China National Coal Corporation, 1989.

Colombia
(i) Resources and Reserves data from "The Cost and Availability of Colombian Coal", Jamieson ED, IEA Coal Research, 1985. (See note (a))
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Costa Rica
(i) Data supplied by WEC Member Committee in 1989 from:
División de Recursos Carboníferos
Cerencia de Producción Primaria
Refinadora Costarricense de Petróleo

Czechoslovakia
(i) Data provided by WEC Member Committee in 1989.

Denmark
(i) Data supplied by WEC Member Committee from Danmarks Brenhulsreserver - DGU 1984
(ii) Consumption data from 1987 Energy Statistics Yearbook, United Nations.

Ecuador
(i) Data supplied by WEC Member Committee, 1989.

Egypt
(i) Bituminous reserves data from WEC Survey of Energy Resources, 1980.
(ii) Sub-bituminous reserves data from Country Paper Egypt, United Nations Symposium on World Coal Prospects 15-23 Oct. 1979, Katowice, Poland. Paper TCD/NRET/AC.12/CP/9.
(iii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Ethiopia
(i) Reserves data from:
Assefa, G.; Saxena, G.N., 1984.
A review of Ethiopian Lignites, Occurrence, Prospects and Possibilities, Energy Exploration and Exploitation, Vol. 3, No. 1, pp 35-42.
(ii) Other data supplied by WEC Member Committee from Belachew Texera and W. Heemann: Report on the Lignite of Chilgo area, 1982.

Finland
(i) Data provided by WEC Member Committee from Ministry of Trade and Industry, 1989.

France
(i) Data supplied by WEC Member Committee in 1989 from Charbonnages de France.
(ii) Lignite Characteristics data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.

German Dem. Rep.
(i) WEC Member Committee report that all reserves data are confidential.
(ii) Reserves data obtained from Fossile Brennstaffe-Erkundungsstand und Perspectiven, Gindorf, Frieberg, Neue Bergbautechnik, 11. Jahrg. Heft 2, Febr. 1981.
(iii) Production, consumption and characteristics data supplied by WEC Member Committee from Balance Sheet of Solid Fuels 1987 of the GDR, Internal Statistics on Brown Coal of the GDR for the ECE(Quest/Coal/A.B/2/Rev. 6).
(iv) Hard coal consumption data from 1987 Energy Statistics Yearbook, United Nations.

Germany (Fed.Rep.)
(i) Data supplied by WEC Member Committee in 1989 from:
Statistik der Kohlenwirtschaft e.V.
Bergbau-Forschung GmbH
(ii) Lignite production and consumption from 1987 Energy Statistics Yearbook, United Nations.

Greece
(i) Data supplied by WEC Member Committee from National Energy Council for WEC Survey of Energy Resources 1986.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Greenland
(i) Data supplied by Danish WEC Member Committee, 1986.

Haiti
(i) Reserves data from WEC Survey of Energy Resources, 1980.

Honduras
(i) Reserves data from WEC Survey of Energy Resources, 1980.

Hong Kong
(i) Data supplied by WEC Member Committee in 1989 from Hong Kong Energy Statistics for 1977-1987 published by Hong Kong Government.

Hungary
(i) Resources data supplied by WEC Member Committee from Central Office of Geology, 1986.
(ii) Production and Consumption data from 1987 Energy Statistics Yearbook, United Nations.

India
(i) Data provided by WEC Member Committee in 1989 from:
Sub Group II on Coal Exporation, Mine Planning and Development;
Sub Group on Lignite Report – January 1988.

Indonesia
(i) Proved Recoverable Reserves based on data from BP Coal, 1988.
(ii) Other data supplied by WEC Member Committee from:
A one day seminar on Indonesia Coal Quality, Perum Tambang Baturbara, Jakarta, 23 July 1985.
General Policy on Energy, National Energy Co-ordinating Agency, April 1984.
Asian Coal Development Project Interim Report Volume I, Monenco Limited, 31 May 1984.
(iii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Iran
(i) Data provided by WEC Member Committee in 1989 from Ministry of Energy.

Ireland
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Israel
(i) Data provided by WEC Member Committee from "Energy in Israel 1987", Central Bureau of Statistics, Ministry of Energy and Infrastructure.

Italy
(i) Reserves data and characteristics data supplied by WEC Member Committee from AGIP Coal, 1984.
(ii) Production and Consumption data supplied by WEC Member Committee, 1987.

Japan
(i) Data supplied by WEC Member Committee from Japan Coal Association, 1989.
(ii) Percentage bituminous coal of coking quality from 1986 Survey of Energy Resources.

Korea (North)
(i) Reserves and characteristics data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Korea (South)
(i) Data supplied by WEC Member Committee from Ministry of Energy and Resources, 1989 .

Madagascar
(i) Reserves data from WEC Survey of Energy Resources, 1980.

Malawi
(i) Reserves data from WEC Survey of Energy Resources, 1980.

Malaysia
(i) Data provided by WEC Member Committee in 1989 from:
Potential for the Development of the Mineral Industry in Malaysia. A Guide for Mineral Exploration Strategy by Geological Survey of Malaysia, 1985.
National Energy Balances, Ministry of Energy, Telecommunications and Posts, Malaysia.

Mali
(i) Reserves data from WEC Survey of Energy Resources, 1980.

Mexico
(i) All data provided by WEC Member Committee in 1989 as follows:
Bituminous Proved Recoverable Reserves estimated by Cámera Minera de México. Asamblea General Ordinaria 1985.
Sub-bituminous Proved Recoverable Reserves from Programa Nacional de Energéticos 1984-1988; Secretaría de Energía, Minas e Industria Paraestatal.
Production and Consumption from Secretaría de Energía, Minas e Industria Paraestatal. Balance Nacional de Energía, 1987.
Production by Surface Mining from Minera Carbonífera de Río Escondido.
Coal Characteristics from Comisión Federal de Electricidad. Subdirección de Construcción.

Mongolia
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Morocco
(i) Resource data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.
(ii) Production and Consumption data from 1987 Energy Statistics Yearbook, United Nations.

Mozambique
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Netherlands
(i) Data provided by WEC Member Committee in 1989 from:
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CBS, De Nederlandse Energiehuishouding 1987, ISBN 9035710827.

New Caledonia
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Consumption data from 1987 Energy Statistics Yearbook, United Nations.

New Zealand
(i) Data provided by WEC Member Committee in 1989 from:
The Coal Resources of New Zealand. Anckorn, Cave, Kenny, Lavill & Carr, 1988. Coal Geology Report 4, Resource Management & Mining, Ministry of Energy, New Zealand;
Classification of Coal Resource Quantities in New Zealand. A.M.Sherwood, 1987. Coal Geology Report 2, Resource Management & Mining, Ministry of Energy, New Zealand.

Niger
(i) Proved Recoverable Reserves from Glüuckauf 121 (1985) Nr. 16.
(ii) Other resources data from WEC Survey of Energy Resources, 1980.
(iii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Nigeria
(i) Proved Recoverable Reserves from World Coal Letter Nr. 26, 1982.
(ii) Other resources data from WEC Survey of Energy Resources, 1980.
(iii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Norway
(i) Data supplied by WEC Member Committee in 1989.

Pakistan
(i) Reserves data supplied by WEC Member Committee for WEC Survey of Energy Resources, 1983.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Peru
(i) Reserves data from ICT, vol. 46, No. 8, August 1977.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Philippines
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Poland
(i) Data supplied by WEC Member Committee in 1989 from:
Balance of Minerals and Underground waters in Poland. Ministry of Enviroment and Natural Resources, Warsaw, 1987.
Fuel and Energy Economy - Statistical Report 1987. Main Statistical Office, Warsaw, August 1988.
Internal Reports. Power Research Institute, Energy Complex Department, Warsaw, 1988

Portugal
(i) Data supplied by WEC Member Committee in 1989 from:
Direccao-Geral de Geologia e Minas, Ministério da Indústria e Energia.
Empresa Carbonifera do Douro, SA (ECD)
EDM-Empresa de Desenvolvimento Mineiro, E.P.

Romania
(i) WEC Member Committee report that all reserves data are confidential.
(ii) Reserves data from Matveyev, AK, 1966 Ugol'nyye mestorozhdeniya zarbeznykh stran Evraziya published Nedra, Moscow p. 231-243.
(iii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

South Africa
(i) Data supplied by WEC Member Committee in 1989 from the following sources:
Resources and Reserves data: Geological Survey of South Africa – excluding percentage which can be recovered by surface mining which was estimated by the IEA.
Production and Consumption from Minerals Bureau. Production by surface mining by Government Mining Engineer.
Coal Characteristics from Division for Energy Technology CSIR (Analysis of Coal Product Samples, 1987, Bulletin 102).

Spain
(i) Data supplied by WEC Member Committee:
Resources and Reserves from Actualización del Inventario de Recursos Nacional de Carbon; Instituto Geologico y Minero de Espana, Madrid, 1985.
Production and Consumption from "Carbunión 87", Madrid, 1988.
(ii) Lignite and Characteristics data from Survey of Energy Resources, 1986.

Swaziland
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production data from Concise Guide to World Coalfields, IEA Coal Research, 1983.

Sweden
(i) Resources and Reserves data, and Production and Consumption data supplied by WEC Member Committee in 1989 from the Geological Survey of Sweden.
(ii) Characteristics data from 1981 Survey of Energy Resources.

Taiwan, China
(i) Data supplied by WEC Member Committee in 1989 from Mining Bureau, Taiwan Provincial Government.

Tanzania
(i) Reserves data from WEC Survey of Energy Resources, 1980.

Thailand
(i) Data supplied by WEC Member Committee in 1989 from:
National Energy Administration
Mineral Resources Department
Electricity Generating Authority of Thailand

Turkey
(i) Main data provided by WEC Member Committee in 1989.

United Kingdom
(i) Data provided by WEC Member Committee from:
British Coal Corporation Report and Accounts 1987/8
British Coal Marketing Department, internal information.
(ii) Data for lignite from Survey of Energy Resources 1986.
(iii) Additional data from British Coal (private communication).

USA
(i) Data supplied by WEC Member Committee in 1989 from:
US Department of Energy (DOE), Energy Information Administration, Coal Production 1987, DOE/EIA-0118(87), Washington, DC 1988.
Paul Averitt. Coal Resources of the United States, January 1, 1974. US Dept. of the Interior, Geological Survey, Bulletin 1412. Washington, DC 1975.
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USSR
(i) All data supplied by WEC Member Committee in 1989 from VNIIKTEP Research Institute except Consumption figures which are estimated by Survey compilers.

Venezuela
(i) Data supplied by WEC Member Committee in 1989 from:
Ministerio de Energía y Minas. Direccín de Electricidad y otras Energías.
Ministerio de Energía y Minas. Memoria 1987.
Carbozulia.

Vietnam
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Yugoslavia
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Zaire
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

Zambia
(i) Data provided by WEC Member Committee in 1989 from:
British Mining Consultants;
Geological Survey of Zambia;
Sfremines – (a French Consultancy Company).

Zimbabwe
(i) Reserves data from WEC Survey of Energy Resources, 1980.
(ii) Production and consumption data from 1987 Energy Statistics Yearbook, United Nations.

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CONSEIL MONDIAL DE L'ENERGIE

1992

Survey of

Energy Resources

16th Edition

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Solar Energy:

Israel:	Dr H Z Tabor, Scientific Research Foundation
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Geothermal Energy:

Israel:	Mr L Y Bronicki, Ormat Turbines Ltd.
Italy:	Dr R Toneatti, ENEL, National Geothermal Unit
New Zealand:	Mr J T Lumb, J T Lumb Energy Resource Consultants

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1 Coal (Including Lignite)

Commentary

Coal deposits which are classified as proved recoverable reserves are recorded as 1 039 Gtonnes, with bituminous (including anthracite) reserves of 521 Gtonnes and sub-bituminous and lignite reserves as 518 Gtonnes. There are no remarkable changes since the last determinations on the occasion of the World Energy Council Congress in 1989, with the significant exception of the data supported by the People's Republic of China. China has reassessed its proved recoverable reserves as 114 Gtonnes which is much less than three years ago (731 Gtonnes). The major reserves of coal are to be found in the USA with 241 Gtonnes of which 113 Gtonnes is bituminous coal and the former USSR with a total of 241 Gtonnes of which 104 Gtonnes is bituminous coal. These are followed by China with 62 Gtonnes of bituminous coal and South Africa with 55 Gtonnes. If lignite is included, some 63% of the proved recoverable reserves are concentrated in these four countries.

Compared with oil and natural gas, coal has further improved its long term position as the world's most widely available fossil energy source. With current annual production of bituminous and sub-bituminous coal of 3.6 Gtonnes and lignite of 1.1 Gtonnes, there are sufficient reserves for more than 200 years, even if output should increase. Because of the level of reserves, coal is generally expected to cover a considerable portion of the world's primary energy demand. This is also shown by the 4% increase in the world's coal consumption since 1987. The volume required to obtain the expected position can be provided if the production capacity is developed in time. With lead times of 3 to 5 years for opencast operations and driftmines with geologically favourable deposits, investment decisions have to be taken sufficiently early. Although very little exploration has taken place in recent years, considerable potential is available for short-term implementation.

New capacity however must largely be developed in more difficult geological conditions or by creating a new infrastructure. Moreover, transportation distances are generally rising in the producing countries. Although cost forecasts are difficult to make, experts agree that the cost increases incurred in exploiting new capacities will probably exceed inflation rates. In addition to rising production costs, the relation between currency values in exporting and importing countries play a major role in determining prices on the world market. Similarly, bilateral currency ratios between overseas suppliers affect their competitiveness. The direction and extent of currently fluctuations are totally unpredictable so that prices cannot be reliably forecast. The earnings obtained on the world's coal market at present are less than the total production costs. In general an increase of world market prices can be expected.

Pronounced technological advances in extraction and upgrading processes are unlikely in the foreseeable future, but the existing scope for introducing the highest possible technical standards still has to be fully exploited. New developments with proven commercial feasibility are essential in all sectors of the coal industry if this primary energy is to become sufficiently widely accepted to generate additional volume requirements. Environmentally-friendly equipment for minimizing harmful dust, sulphur-dioxide and nitrogen-oxide emissions when burning coal represents state-of-the-art technology. There has been progress in the western industrialized countries, but in many other countries this technology has not yet been installed. Modern coal-combustion technology is also available for alleviating the CO_2 problem by ensuring a high-efficiency use of primary energy sources worldwide. Combined processes which are the subject of intensive improvement show the way.

As coal utilisation continues to expand, producing countries will still concentrate on meeting domestic demand first. Currently, some 90% of world production is consumed in the source country, with only approximately 10% being traded between producing and importing nations. Growing domestic demand and a rise in import requirements will sustain this ratio in the future.

On the basis of the following criteria:

- availability of coal reserves
- profitability of coal deposits
- coal types, and
- export potential

only a few countries such as Columbia, Venezuela and Indonesia are expected to increase their importance as exporters with growing amounts in the years to come. However, the world market for coal will continue to be satisfied by a relatively small number of exporting nations. This situation will be reinforced as traditional exporting countries decline in significance. This refers especially to the countries of the former COMECON.

An analysis of utilisation categories shows that power generation is not only the most important consumer, but also offers the best expansion prospects for the future. With coal-fired power generation of 4 700 TWh, the proportion of the world's electrical power requirement satisfied by coal is some 40%. Coal consumption by the iron and steel industry can be expected to move towards the use of lower quality coking coal (soft and semi- soft) in blends with high-quality coking coal, as well as the introduction and implementation of new technologies such as pulverized coal injection (PCI). The heating market, including all other areas of industry, households and minor consumption, is decreasing. This results, especially in Eastern Europe, in structural changes in favour of oil and natural gas. But there are still major differences in regional and national significance in the coal-producing countries.

F H Esser
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Essen, Germany

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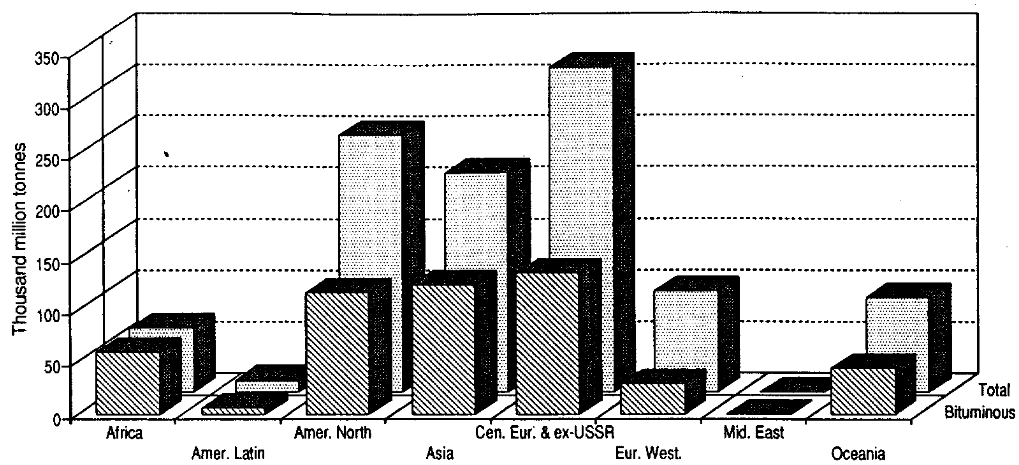
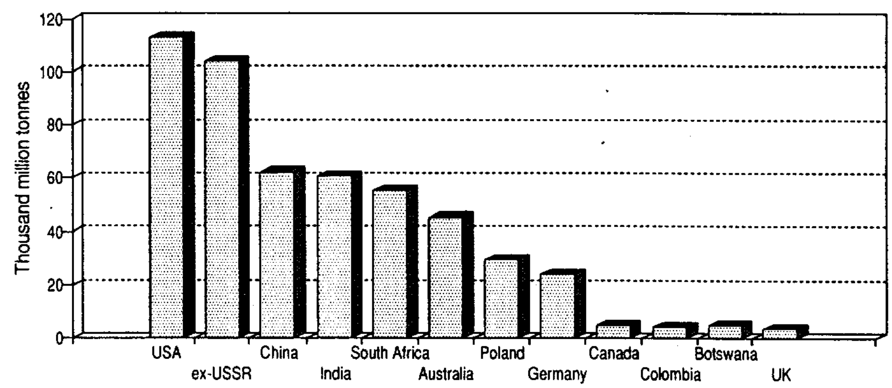
Proved Recoverable Reserves



Countries with major proved reserves

Bituminous Coal



Production and Consumption in 1990

Bituminous Coal

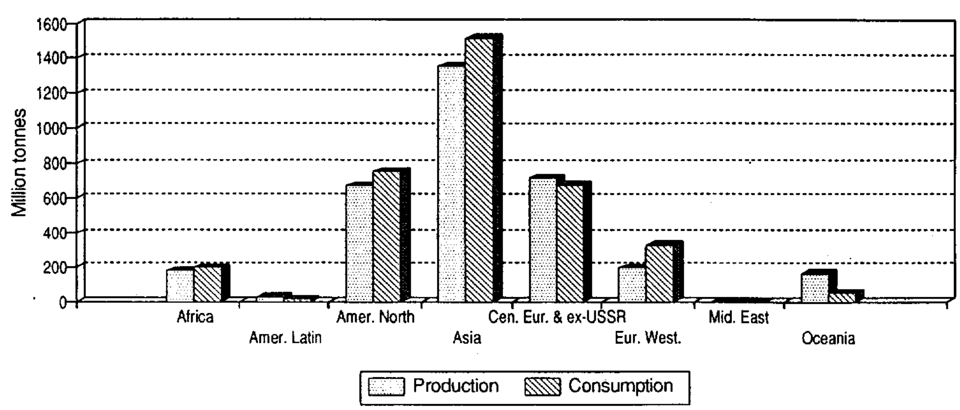


Table 1.1 Proved Recoverable Reserves at end 1990
Million tonnes

	Bituminous including Anthracite	Sub-bituminous	Lignite	Total
AFRICA				
Algeria	43	—	—	43
Botswana (*a*)	3 500	—	—	3 500
Cen. African Rep.	—	—	4	4
Egypt (*a,b*)	13	40	—	53
Ethiopia (*a*)	—	—	*	
Malawi	12	—	—	12
Morocco	45	—	—	45
Mozambique (*a*)	240	—	—	240
Niger	70	—	—	70
Nigeria	21	169	—	190
South Africa	55 333	—	—	55 333
Swaziland	—	999	—	999
Tanzania (*b*)	200	*	—	200
Zaire	600	—	—	600
Zambia	—	55	—	55
Zimbabwe	734	—	—	734
Total Africa	**60 811**	**1 263**	**4**	**62 078**
AMERICA, LATIN				
Argentina (*a*)	—	130	—	130
Brazil (*b*)	—	2 359	—	2 359
Chile (*b*)	31	1 150	—	1 181
Colombia (*a,b*)	4 240	299	N	4 539
Ecuador (*a*)	—	—	24	24
Mexico (*a*)	1 252	417	51	1 720
Peru	960	—	100	1 060
Venezuela	417	—	—	417
Total America, Latin	**6 900**	**4 355**	**175**	**11 430**
AMERICA, NORTH				
Canada (*a*)	4 509	1 287	2 827	8 623
USA (*a,b*)	112 668	95 929	31 963	240 561
Total America, North	**117 177**	**97 216**	**34 790**	**249 184**
ANTARCTICA				
Antarctica (*a*)	N	—	—	N
Total Antarctica	**—**	**—**	**—**	**—**
ASIA				
Afghanistan (*a*)	66	—	—	66
China (*a*)	62 200	33 700	18 600	114 500
India	60 648	—	1 900	62 548
Indonesia	962	7 054	24 047	32 063
Japan	827	—	17	844
Korea (DPR)	300	300	—	600
Korea (Republic of)	203	—	—	203
Malaysia	4	—	—	4
Mongolia (*a*)	*	—	*	
Myanmar (Burma)	2.3	—	—	2.3
Pakistan	—	524	—	524
Philippines	0.3	174	88	263
Taiwan, China (*a*)	100	*	—	100
Thailand	—	170	829	999
Vietnam	150	—	—	150
Total Asia	**125 463**	**41 922**	**45 481**	**212 866**

— Unknown or zero N less than 0.1 * see notes

All totals and sub-totals are rounded

Table 1.1 Pr
Million tonn

CENTRAL EUR
Albania (a)
Bulgaria
Czech & Slova
Hungary
Poland (a,b)
Romania
ex-USSR
Yugoslavia
Total Central
EUROPE, WES
Austria
Belgium
France
Germany
Greece
Greenland (a,
Ireland
Italy
Netherlands
Norway
Portugal
Spain (a)
Sweden
Turkey
United Kingdo
Total Europe
MIDDLE EAST
Iran
Total Middle
OCEANIA
Australia (a)
New Caledor
New Zealand
Total Ocean
WORLD TOTA
— Unknown or z

Total
43
3 500
4
53
12
45
240
70
190
55 333
999
200
600
55
734
62 078
130
2 359
1 181
4 539
24
1 720
1 060
417
11 430
8 623
240 561
249 184
N
—
66
114 500
62 548
32 063
844
600
203
4
2.3
524
263
100
999
150
212 866

otals are rounded

Table 1.1 Proved Recoverable Reserves at end 1990 (continued)
Million tonnes

	Bituminous including Anthracite	Sub-bituminous	Lignite	Total
CENTRAL EUROPE & ex-USSR				
Albania (*a*)	—	*	*	
Bulgaria	30	—	3 700	3 730
Czech & Slovak F.R.	1 870	—	3 500	5 370
Hungary	596	982	2 883	4 461
Poland (*a,b*)	29 600	—	11 600	41 200
Romania	0.6	810	2 307	3 118
ex-USSR	104 000	37 000	100 000	241 000
Yugoslavia	70	1 500	15 000	16 570
Total Central Europe & ex-USSR	**136 167**	**40 292**	**138 990**	**315 449**
EUROPE, WESTERN				
Austria	—	—	59	59
Belgium	410	—	—	410
France	178	32	—	210
Germany	23 919	—	56 150	80 069
Greece	—	—	3 000	3 000
Greenland (*a,b*)	—	183	—	183
Ireland	14	—	—	14
Italy	—	27	7	34
Netherlands	497	—	—	497
Norway	—	13	—	13
Portugal	3	—	33	36
Spain (*a*)	850	400	200	1 450
Sweden	—	1	—	1
Turkey	162	—	6 986	7 148
United Kingdom (*b,d*)	3 300	—	500	3 800
Total Europe, Western	**29 333**	**656**	**66 935**	**96 924**
MIDDLE EAST				
Iran	193	—	—	193
Total Middle East	**193**	—	—	**193**
OCEANIA				
Australia (*a*)	45 340	3 700	41 900	90 940
New Caledonia	2	—	—	2
New Zealand	27	81	9	117
Total Oceania	**45 369**	**3 781**	**41 909**	**91 059**
WORLD TOTALS	**521 413**	**189 486**	**328 284**	**1 039 183**

— Unknown or zero N less than 0.1 * see notes All totals and sub-totals are rounded

Table 1.2 Production in 1990
Million tonnes

	Bituminous including Anthracite	Sub-bituminous	Lignite	Total
AFRICA				
Algeria	N	—	—	N
Morocco (+)	0.5	—	—	0.5
Mozambique (+)	N	—	—	N
Niger (+)	0.2	—	—	0.2
Nigeria	N	—	—	N
South Africa	175	—	—	175
Swaziland	—	0.2	—	0.2
Tanzania (*b*)	N	*	—	N
Zaire (+)	0.1	—	—	0.1
Zambia (+)	—	0.4	—	0.4
Zimbabwe (+)	5	—	—	5
Total Africa	**181**	**1**	—	**182**
AMERICA, LATIN				
Argentina	—	0.3	—	0.3
Brazil	—	4.6	—	4.6
Chile (*a,b*)	2.2	—	—	2.2
Colombia (*b*)	19	2	—	21
Mexico	7	4	—	11
Peru (+)	0.2	—	—	0.2
Venezuela (*a*)	2.3	—	—	2.3
Total America, Latin	**31**	**11**	—	**42**
AMERICA, NORTH				
Canada	38	21	9.4	68
USA	632	222	80	934
Total America, North	**670**	**243**	**89**	**1 002**
ASIA				
Afghanistan (+)	0.1	—	—	0.1
China	1 079	—	—	1 079
India	202	—	9.5	211
Indonesia	3	7.7	—	11
Japan	8.3	—	—	8.3
Korea (DPR) (+)	41	13	—	54
Korea (Republic of)	17	—	—	17
Malaysia	N	N	—	0.1
Mongolia	0.7	—	7.2	7.9
Myanmar (Burma)	N	—	N	N
Pakistan	—	3.1	—	3.1
Philippines	—	1.2	N	1.2
Taiwan, China (*a*)	0.1	0.4	—	0.5
Thailand	N	1.2	11	12
Vietnam	5	—	—	5
Total Asia	**1 356**	**27**	**28**	**1 410**

— Unknown or zero N less than 0.1 * see notes All totals and sub-totals are rounded
+ Indicates that sub-bituminous production is included with bituminous.

Table 1.2 P
Million ton

CENTRAL EU
Albania (*b*)
Bulgaria
Czech & Slo
Hungary
Poland
Romania
ex-USSR (+
Yugoslavia
Total Centr
EUROPE, WE
Austria
Belgium
France
Germany
Greece
Ireland
Italy
Norway
Portugal (*a,*
Spain
Sweden
Turkey
United King
Total Europ
MIDDLE EAS
Iran
Total Middl
OCEANIA
Australia
New Zealar
Total Ocea
WORLD TOT

— Unknown or
+ Indicates that

Total
N
0.5
N
0.2
N
175
0.2
N
0.1
0.4
5
182
0.3
4.6
2.2
21
11
0.2
2.3
42
68
934
1 002
0.1
1 079
211
11
8.3
54
17
0.1
7.9
N
3.1
1.2
0.5
12
5
1 410

tals are rounded

Table 1.2 Production in 1990 (continued)
Million tonnes

	Bituminous including Anthracite	Sub-bituminous	Lignite	Total
CENTRAL EUROPE & ex-USSR				
Albania (*b*)	—	—	2.4	2.4
Bulgaria	0.1	—	32	32
Czech & Slovak F.R.	23	—	86	108
Hungary	1.7	10	5.4	18
Poland	148	—	68	216
Romania	N	5.4	34	40
ex-USSR (+)	543	—	188	731
Yugoslavia	0.3	—	76	76
Total Central Europe & ex-USSR	**716**	**16**	**491**	**1 223**
EUROPE, WESTERN				
Austria	—	—	2.4	2.4
Belgium	1	—	—	1
France	10	1.8	2.3	15
Germany	71	—	357	428
Greece	—	—	52	52
Ireland	N	—	—	N
Italy	—	N	1.5	1.5
Norway	—	0.3	—	0.3
Portugal (*a,b*)	0.3	—	—	0.3
Spain	15	4.7	16	36
Sweden	—	N	—	N
Turkey	2.8	—	43	46
United Kingdom	93	—	—	93
Total Europe, Western	**194**	**7**	**474**	**676**
MIDDLE EAST				
Iran	0.8	—	—	0.8
Total Middle East	**1**	—	—	**1**
OCEANIA				
Australia	163	*	48	211
New Zealand	0.7	1.8	0.2	2.6
Total Oceania	**164**	**2**	**48**	**214**
WORLD TOTALS	**3 310**	**305**	**1 130**	**4 749**

— Unknown or zero N less than 0.1 * see notes

All totals and sub-totals are rounded

+ Indicates that sub-bituminous production is included with bituminous.

Table 1.3 Consumption in 1990
Million tonnes

	Bituminous including Anthracite	Sub-bituminous	Lignite	Total
AFRICA				
Algeria	0.9	—	—	0.9
Egypt (*c* +)	1.3	—	—	1.3
Kenya (+)	0.2	—	—	0.2
Madagascar	N	—	—	N
Mali	—	—	N	N
Mauritius	N	—	—	N
Morocco (+)	1.8	—	—	1.8
Mozambique (+)	N	—	—	N
Namibia	N	—	—	N
Niger (+)	0.2	—	—	0.2
Nigeria	N	—	—	N
South Africa	185	—	—	185
Swaziland	—	0.2	—	0.2
Tanzania (*b*)	N	*	—	N
Tunisia	N	—	—	N
Zaire (+)	0.2	—	—	0.2
Zambia (+)	—	0.4	—	0.4
Zimbabwe (+)	5	—	—	5
Total Africa	**195**	**1**	**—**	**196**
AMERICA, LATIN				
Argentina	1.4	—	—	1.4
Brazil	—	15	—	15
Chile (*a*)	3.7	—	—	3.7
Colombia	3.2	2.2	—	5.4
Cuba (+)	0.2	—	—	0.2
Mexico	7	4	—	11
Panama	N	—	—	N
Peru (+)	0.1	—	—	0.1
Puerto Rico (+)	0.2	—	—	0.2
Venezuela (*a*)	N	N	—	N
Total America, Latin	**16**	**22**	**—**	**37**
AMERICA, NORTH				
Canada	21	21	9.4	51
USA (*e*)	733	—	79	812
Total America, North	**754**	**21**	**88**	**863**
ASIA				
Afghanistan (+)	0.1	—	—	0.1
Bangladesh (+)	0.6	—	—	0.6
Bhutan (+)	N	—	—	N
China	1 064	—	—	1 064
Hong Kong (+)	8.9	—	—	8.9
India	209	—	9.5	219
Indonesia	—	6.6	—	6.6
Japan	114	—	—	114
Korea (DPR) (+)	43	13	—	56
Korea (Republic of)	43	—	—	43
Malaysia	1.8	N	—	1.8
Mongolia	0.7	—	6.6	7.2
Myanmar (Burma)	N	—	N	0.1
Nepal	N	—	—	N

— Unknown or zero N less than 0.1 * see notes All totals and sub-totals are rounded
+ Indicates that sub-bituminous consumption is included with bituminous consumption.

Table 1.3
Million t

Pakistan
Philippine
Taiwan, C
Thailand
Vietnam
Total Asi
CENTRAL
Albania (*b*
Bulgaria (
Czech & S
Hungary
Poland
Romania
ex-USSR
Yugoslavi
Total Cer
EUROPE,
Austria
Belgium
Cyprus (+
Denmark
Finland (+
France (+
Germany
Greece (*a*
Iceland
Ireland
Italy
Luxembo
Malta (+)
Netherlar
Norway
Portugal
Spain
Sweden (
Switzerla
Turkey
United Ki
Total Eu
MIDDLE E
Iran
Israel
Total Mi
OCEANIA
Australia
New Cal
New Zea
Total O
WORLD
— Unknow
+ Indicates

Total
0.9
1.3
0.2
N
N
N
1.8
N
N
0.2
N
185
0.2
N
N
0.2
0.4
5
196
1.4
15
3.7
5.4
0.2
11
N
0.1
0.2
N
37
51
812
863
0.1
0.6
N
1 064
8.9
219
6.6
114
56
43
1.8
7.2
0.1
N

otals are rounded

Table 1.3 Consumption in 1990 (continued)
Million tonnes

	Bituminous including Anthracite	Sub-bituminous	Lignite	Total
Pakistan	—	3.1	—	3.1
Philippines	0.2	2.1	—	2.2
Taiwan, China (*a*)	19	0.4	—	19
Thailand	N	1.4	11	13
Vietnam	4.4	—	—	4.4
Total Asia	**1 510**	**26**	**27**	**1 563**
CENTRAL EUROPE & ex-USSR				
Albania (*b +*)	0.2	—	2.4	2.6
Bulgaria (+)	6.4	—	32	38
Czech & Slovak F.R.	25	—	84	108
Hungary	2.8	11	5.4	19
Poland	120	—	68	188
Romania	N	12	41	53
ex-USSR (+)	516	—	187	703
Yugoslavia (+)	3.6	—	76	79
Total Central Europe & ex-USSR	**674**	**23**	**494**	**1 191**
EUROPE, WESTERN				
Austria	4.3	—	2.5	6.8
Belgium	17	—	—	17
Cyprus (+)	0.1	—	—	0.1
Denmark (+)	10	—	—	10
Finland (+)	6.2	—	—	6.2
France (+)	26	—	2.3	29
Germany	77	—	356	432
Greece (*a +*)	1.4	—	52	53
Iceland	0.1	—	—	0.1
Ireland	3.3	—	—	3.3
Italy	21	N	1.5	23
Luxembourg (+)	0.2	—	—	0.2
Malta (+)	0.3	—	—	0.3
Netherlands	15	—	—	15
Norway	—	1	—	1
Portugal	4.8	—	—	4.8
Spain	25	4	16	45
Sweden (*a*)	—	3.6	—	3.6
Switzerland (+)	0.5	—	—	0.5
Turkey	8.1	—	42	50
United Kingdom	107	—	—	107
Total Europe, Western	**328**	**9**	**472**	**808**
MIDDLE EAST				
Iran	1	—	—	1
Israel	3.7	—	—	3.7
Total Middle East	**5**	**—**	**—**	**5**
OCEANIA				
Australia	51	*	48	99
New Caledonia (+)	0.2	—	—	0.2
New Zealand	0.3	1.7	0.2	2.2
Total Oceania	**52**	**2**	**48**	**101**
WORLD TOTALS	**3 533**	**103**	**1 130**	**4 763**

— Unknown or zero N less than 0.1 * see notes All totals and sub-totals are rounded

+ Indicates that sub-bituminous consumption is included with bituminous consumption.

Table 1.4 Resources and Reserves at end 1990

	Rank of fuel (see foot-notes)	Proved Amount in Place			Proved Recoverable Reserves			Estimated Additional Amount in Place	Estimated Additional Reserves Recoverable
		Tonnage	Maximum depth of deposits	Minimum seam thickness	Tonnage	By surface mining	Of coking quality		
		Mtonnes	m	m	Mtonnes	%	%	Mtonnes	Mtonnes
Afghanistan (*a*)	BT	112	250	0.8	66			400	—
Albania (*a*)	SB	—			*			—	—
	LN	15			*			—	—
Algeria	BT	—	600	0.30	43	0	100	—	—
Antarctica (*a*)	BT	N			N			—	—
Argentina (*a,b*)	SB	195	600	1	130	30		385	—
	LN	—			—			7 350	—
Australia (*a,b*)	BT	66 220	600	1.5	45 340	45	—	500 000	250 000
	SB	4 100	600	1.5	3 700	—	0	—	—
	LN	46 500	500	15	41 900	100	0	204 000	183 000
Austria	LN	350			59	89.8	0	80	61
Bangladesh (*a*)	BT	1 054	1158	0.3	—			—	—
Belgium	BT	715	1000	0.8	410	0	63	1 400	900
Botswana (*a*)	BT	7 000			3 500			100 000	—
Brazil (*b*)	SB	10 176	870	0.680	2 359	21	7.0	22 239	6 204
Bulgaria	BT	36			30	N	65	1 200	—
	LN	4 418			3 700	65		700	—
Canada (*a*)	BT	6 435	*	0.6	4 509	88	66	26 045	—
	SB	12 740	300	1.5	1 287	100	0	23 760	—
	LN	1 615	50	1.5	2 827	100	0	8 230	—
Cen. African Rep.	LN	4			4	100		—	—
Chile (*b*)	BT	79	900	0.7	31	0	7	125	75
	SB	4 500			1 150			—	—
China (*a*)	BT	177 600	1000	0.7	62 200	7	14	363 200	67 300
	SB	71 600	500	0.8	33 700			217 900	48 000
	LN	37 200	400	1.0	18 600	19.6	0	86 800	34 700
Colombia (*a,b*)	BT	5 449	300	0.70	4 240	95	50	13 173	—
	SB	411	200	0.80	299	60	0	3 176	—
	LN	N			N			N	N
Costa Rica	SB	25	350	1	—	—	—	22	—
	LN	2			—			—	—
Czech & Slovak F.R.	BT	5 400	1800	0.6	1 870		62	3 600	1 460
	LN	6 100	500	1.0	3 500	85	0	1 630	1 000
Denmark	LN	63			—			—	—
Ecuador (*a*)	LN	30	100	200	24			6	—
Egypt (*a,b*)	BT	25			13			—	—
	SB	—	400	0.65	40			—	—
Ethiopia (*a*)	LN	*			*			—	—
France	BT	745	1250	0.6	178	12.2	44	200	50
	SB	135	1250	2.0	32	0		—	—
	LN	—			—			165	85
Germany	BT	44 000	1500	0.3	23 919		60	186 300	—
	LN	102 000	600	2.0	56 150	100		—	
Greece	LN	5 312			3 000			—	—
Greenland (*a,b*)	SB	—	560		183			200	150
Haiti	LN	13			—			27	—
Honduras	SB	21			—			—	—

Rank of fuel — BT = Bituminous including anthracite SB = Sub-bituminous LN = Lignite
— Unknown or zero N less than 0.1 * see notes

...ted ...nal ...t in ...e	Estimated Additional Reserves Recoverable
...es	Mtonnes
	—
	—
	—
	—
	—
	—
	—
	250 000
	—
	183 000
	61
	—
	900
	—
	6 204
	—
	—
	—
	—
	—
	—
	75
	—
	67 300
	48 000
	34 700
	—
	—
	N
	—
	—
	1 460
	1 000
	—
	—
	—
	—
	—
	50
	—
	85
	—
	—
	150
	—
	—

Table 1.4 Resources and Reserves at end 1990 (continued)

	Rank of fuel (see foot-notes)	Proved Amount in Place			Proved Recoverable Reserves			Estimated Additional Amount in Place	Estimated Additional Reserves Recoverable
		Tonnage	Maximum depth of deposits	Minimum seam thickness	Tonnage	By surface mining	Of coking quality		
		Mtonnes	m	m	Mtonnes	%	%	Mtonnes	Mtonnes
Hungary	BT	1 407	900	0.4	596	N	26	702	77
	SB	2 841	600	1	982	N	0	1 952	369
	LN	5 465	140	1	2 883	100	0	3 337	1 124
India	BT	129 154	600	1.2	60 648	60	10	110 177	47 177
	LN	2 100	110	0.5	1 900	100	0	3 932	3 932
Indonesia	BT	—	300	2	962			—	—
	SB	—	300	2	7 054			—	—
	LN	—	100	12	24 047			—	—
Iran	BT	3 754			193			—	—
	LN	2 295			—			—	—
Ireland	BT	19	335	0.3	14	2	0	26	16
Italy	SB	60	500	1.4	27	0	0	280	—
	LN	15	150	3	7	100	0	22	20
Japan	BT	8 319	1200	0.6	827			N	N
	LN	175	300	0.6	17		0	—	—
Korea (DPR)	BT	2 000			300			2 700	—
	SB	300			300			2 200	—
Korea (Republic of)	BT	301	800	0.5	203	0	0	246	101
Madagascar	BT	1 000			—			—	—
	LN	75			—			—	—
Malawi	BT	25			12	0	0	—	—
Malaysia	BT	15	100	0.55	4	—	—	78	—
	SB	82			—			305	26
	LN	44	100	0.3	—	—	—	270	—
Mali	LN	—			—			3	—
Mexico (a)	BT	1 569	500	0.8	1 252	14	96	1 960	1 168
	SB	640	300	0.8	417	23	0	103	434
	LN	92	200	0.7	51	100		110	95
Mongolia (a)	BT	12 000			*			—	—
	LN	12 000			*			—	—
Morocco	BT	134	600	0.5	45			—	—
	LN	44	100	1	—			—	—
Mozambique (a)	BT	—			240	83	40	155	—
Myanmar (Burma)	BT	4.5			2.3			120	—
	LN	—			—			80	—
Netherlands	BT	1 406	1500	0.8	497	0		2 750	1 375
New Caledonia	BT	4			2			8	—
New Zealand	BT	49	400	0.5	27	90	70	267	15
	SB	277	400	1	81	20	—	953	9
	LN	1 556	300	1	9	100	—	5 500	28
Niger	BT	—			70			—	—
Nigeria	BT	—			21			21	—
	SB	338			169	24		1 000	—
Norway	SB	38	450	0.6	13	0	75	100	90
Pakistan	SB	—			524			—	—
Peru	BT	—			960			—	—
	LN	—			100			—	—

Rank of fuel — BT = Bituminous including anthracite SB = Sub-bituminous Lignite
— Unknown or zero N less than 0.1 * see notes

Table 1.4 Resources and Reserves at end 1990 (continued)

	Rank of fuel (see foot-notes)	Proved Amount in Place			Proved Recoverable Reserves			Estimated Additional Amount in Place	Estimated Additional Reserves Recoverable
		Tonnage	Maximum depth of deposits	Minimum seam thickness	Tonnage	By surface mining	Of coking quality		
		Mtonnes	m	m	Mtonnes	%	%	Mtonnes	Mtonnes
Philippines	BT	0.6	300	0.6	0.3	0		N	N
	SB	265	550	0.6	174	64		937	95
	LN	104	75	1	88	100		232	25
Poland (*a-d*)	BT	65 800	1200	0.4	29 600	0	32	108 100	35 000
	LN	12 900	350	3	11 600	99.6		20 400	10 200
Portugal	BT	7.5	900	0.3	3	10	0	—	—
	LN	38	152	0.5	33	100	0	—	—
Romania	BT	0.6	500	1	0.6	0	0	0.6	0.6
	SB	736	1200	1	810	0	30	290	320
	LN	2 463	150	2	2 307	69	0	1 656	1 325
South Africa	BT	121 218	400	1.0	55 333	58.7	4.1	5 000	—
	LN	—			—			100	70
Spain (*a-d*)	BT	1 750	1000	0.5	850	10	5.0	5 500	2 500
	SB	700	800	0.5	400	15	0	1 500	750
	LN	250	250	0.5	200	100.0		100	100
Swaziland	SB	—			999			—	—
Sweden	SB	4	15	0.5	1	100	0	20	—
Taiwan, China (*a*)	BT	175	650	0.45	100	0		—	—
	SB	—			*			—	—
Tanzania (*b*)	BT	304	487	1.0	200			1 500	—
	SB	*			*			*	*
Thailand	SB	243	200	30	170	100		134	67
	LN	1 179	500	36	829	100	0	234	117
Turkey	BT	590		0.6	162		70	—	765
	LN	7 705		0.7	6 986			—	235
United Kingdom (*a-d*)	BT	190 000	1200	0.60	3 300	8	10	186 700	*
	LN	1 000	200		500			—	—
USA (*a-d*)	BT	223 943	671	0.20	112 668	20.3	—	471 885	—
	SB	163 000	305	1.52	95 929	40.0	0	277 679	—
	LN	40 828	61	0.76	31 963	100	0	392 927	—
ex-USSR	BT	130 000	1800	0.5	104 000	20		2 100 000	—
	SB	47 000	600	0.7	37 000	40	0	1 900 000	—
	LN	110 000	300	1	100 000	90	0	1 200 000	—
Venezuela	BT	697			417	65		2 117	918
Vietnam	BT	300			150			700	—
	LN	12			—			—	—
Yugoslavia	BT	80			70			22	—
	SB	1 760			1 500	45		275	—
	LN	16 000			15 000	80		3 500	—
Zaire	BT	600			600			—	—
Zambia	SB	69	250	1.50	55	79	0	18	14
Zimbabwe	BT	1 535			734	36	50	5 820	—
	SB	965			—			—	—

Rank of fuel — BT = Bituminous including anthracite SB = Sub-bituminous Lignite
— Unknown or zero N less than 0.1 * see notes

Table 1.5 Coal

Algeria
Heat value — MJ

Argentina
Heat value — MJ
Sulphur content -
Carbon content -
Volatile material -
Moisture content
Ash — %

Australia (*c*)
Heat value — M.
Sulphur content -
Carbon content -
Volatile material
Moisture content
Ash — %

Austria
Heat value — M.
Sulphur content -
Carbon content -
Moisture content
Ash — %

Belgium
Heat value — M.
Sulphur content -
Carbon content -
Volatile material
Moisture content
Ash — %

Brazil (*a*)
Heat value — M.
Sulphur content
Volatile material
Ash — %

Canada (*b*)
Heat value — M.
Sulphur content
Carbon content -
Volatile material
Moisture conten
Ash — %

Chile
Heat value — M
Sulphur content
Carbon content -
Volatile material
Moisture conten
Ash — %

China
Sulphur content
Carbon content
Volatile material
Ash — %

Colombia (*b*)
Heat value — M
Sulphur content
Carbon content
Volatile material
Moisture conten
Ash — %

Czech & Slovak F
Heat value — N
Sulphur content
Volatile materia
Moisture conter
Ash — %

France
Heat value — N
Sulphur conten
Carbon content
Volatile materia
Moisture conte
Ash — %

Germany
Heat value — I
Sulphur conten
Carbon conten
Volatile materia
Moisture conte
Ash — %

...ted ...nal ...t in ...e ...es	Estimated Additional Reserves Recoverable Mtonnes
I	N
'	95
?	25
)	35 000
)	10 200
-	—
-	—
).6	0.6
)	320
3	1 325
)	—
)	70
)	2 500
)	750
)	100
-	—
0	—
-	—
-	—
0	—
*	*
4	67
4	117
-	765
-	235
0	*
-	—
5	—
9	—
7	—
0	—
0	—
0	—
7	918
0	—
-	—
2	—
5	—
0	—
-	—
8	14
0	—
-	—

Table 1.5 Coal Characteristics

	Bituminous		Sub-bituminous		Lignite	
	average	range	average	range	average	range
Algeria						
Heat value — MJ/kg	31.40					
Argentina						
Heat value — MJ/kg			22.60	20 – 25		
Sulphur content — %			0.8	0.5 – 1.1		
Carbon content — %			54	50 – 58		
Volatile material — %			46	42 – 50		
Moisture content — %			11	10 – 12		
Ash — %			17	16 – 18		
Australia (*c*)						
Heat value — MJ/kg	27.59	23 – 32	18.66	13.5 – 20.7		8.7 – 13.2
Sulphur content — %		0 – 0.5				
Carbon content — %		39 – 84				
Volatile material — %		20 – 45				
Moisture content — %		1 – 19				48 – 66
Ash — %		2.5 – 31				1 – 4
Austria						
Heat value — MJ/kg	28.00				12.20	
Sulphur content — %					1.05	
Carbon content — %					47.85	
Moisture content — %					34.6	
Ash — %					16.5	
Belgium						
Heat value — MJ/kg	31.40					
Sulphur content — %	0.9					
Carbon content — %	84					
Volatile material — %	30.3					
Moisture content — %	9					
Ash — %	13.1					
Brazil (*a*)						
Heat value — MJ/kg			15.00			
Sulphur content — %			2.5			
Volatile material — %			21.7			
Ash — %			48			
Canada (*b*)						
Heat value — MJ/kg		see note	28.00	12 – 29	15.00	12 – 17
Sulphur content — %		see note	0.35	0.2 – 0.6	0.5	0.3 – 0.8
Carbon content — %		see note	49	39 – 52	54	51 – 55
Volatile material — %		see note	49	39 – 52	47	45 – 49
Moisture content — %		see note	20	13 – 26	32	31 – 33
Ash — %		see note	16	9 – 24	16	10 – 26
Chile						
Heat value — MJ/kg	34.30		23.00			
Sulphur content — %	2.0		2	0.3 – 3.7		
Carbon content — %	45		37	35 – 40		
Volatile material — %	48		29	22 – 36		
Moisture content — %			20	15 – 25		
Ash — %	15.6		15	7 – 23		
China						
Sulphur content — %		0.2 – 0.6				
Carbon content — %	76	60 – 95				
Volatile material — %	41	4 – 55				
Ash — %	23	8 – 40				
Colombia (*b*)						
Heat value — MJ/kg						
Sulphur content — %	0.9		1.2			
Carbon content — %	44		22			
Volatile material — %	32		45			
Moisture content — %	7.0		10			
Ash — %	17		23			
Czech & Slovak F.R.						
Heat value — MJ/kg	24.40	11.7 – 28.0			12.30	8.8 – 19.4
Sulphur content — %	0.65	0.6 – 1.5			1.8	0.7 – 6.0
Volatile material — %	28.3	14.7 – 38.7			52.9	45.1 – 58.9
Moisture content — %	10.7	2.5 – 16.3			32.7	21.5 – 44.4
Ash — %	18.0	5.2 – 55.4			30.2	6.6 – 41.1
France						
Heat value — MJ/kg	34.69	33.0 – 36.4	17.56	16.3 – 18.4		
Sulphur content — %	0.9	0.8 – 2.0	5	3 – 7	1.50	1.25 – 2
Carbon content — %	78	70 – 85	72		40	37 – 44
Volatile material — %	35	4.0 – 40	43	42 – 44	58	54 – 62
Moisture content — %	4.5	2 – 9	10	8 – 14	59	58 – 60
Ash — %	8	5 – 35	27	10 – 32	18	17 – 20
Germany						
Heat value — MJ/kg		32 – 35				7.8 – 10
Sulphur content — %	1.0	0.8 – 1.3			0.6	0.3 – 5.0
Carbon content — %		78 – 94			68	68 – 72
Volatile material — %		6 – 40			56	55 – 64
Moisture content — %	3.6	3.4 – 3.9			55	50 – 62
Ash — %		6 – 40			6.5	6 – 25

Table 1.5 Coal Characteristics (continued)

	Bituminous average	Bituminous range	Sub-bituminous average	Sub-bituminous range	Lignite average	Lignite range
Greece						
Heat value — MJ/kg					13.50	
Sulphur content — %					1	
Carbon content — %					39	
Volatile material — %					60	
Moisture content — %					56	
Ash — %					31	
Hungary						
Heat value — MJ/kg	31.40		25.40		24.10	
Sulphur content — %	2.5		3.8		2.9	
Carbon content — %	81.9		68.6		62.4	
Volatile material — %	35.8		52.7		56.4	
Moisture content — %	8.7		21.3		44.3	
Ash — %	44.9		37.4		42.7	
India						
Heat value — MJ/kg	20.41	5.44 – 25.95				4.60 – 10.05
Sulphur content — %	<1	0.4 – 1.00			<1	0.5 – 2.00
Carbon content — %	85	76 – 92			71	70 – 73
Volatile material — %	28	9 – 42			23	19 – 27
Moisture content — %	5	0.5 – 11			51	45 – 55
Ash — %	30	8 – 48			4	2 – 12
Indonesia						
Heat value — MJ/kg		33 – 34	31.40			25 – 27
Sulphur content — %		low	low			0.16 – 0.41
Carbon content — %		75 – 80	49			36 – 44
Volatile material — %		15 – 19	42.5			29 – 32
Moisture content — %		0.5 – 1.7	6			18 – 23
Ash — %		3.6 – 4.4	1.5			4.4 – 8.9
Iran						
Heat value — MJ/kg	30.50					
Ireland (*a*)						
Heat value — MJ/kg		see note				
Sulphur content — %		see note				
Carbon content — %		see note				
Volatile material — %		see note				
Moisture content — %		see note				
Ash — %		see note				
Italy						
Heat value — MJ/kg						6.3 – 9.5
Sulphur content — %					0.7	0.5 – 1.0
Carbon content — %					50	40 – 60
Volatile material — %					50	40 – 60
Moisture content — %					50	45 – 60
Ash — %					32	25 – 40
Japan						
Heat value — MJ/kg	24.50	20.9 – 27.2				
Sulphur content — %	0.76	0.2 – 1.56				
Carbon content — %	36.7	32.1 – 40.0				
Volatile material — %	35.8	28.8 – 41.3				
Moisture content — %	3.2	1.5 – 6.0				
Ash — %	24.2	16.6 – 35.0				
Korea (Republic of)						
Heat value — MJ/kg	18.10	13.0 – 25.6				
Sulphur content — %	0.7	0.2 – 2.9				
Carbon content — %	51.2	37.7 – 73.6				
Volatile material — %	5.1	3.0 – 7.8				
Moisture content — %	2.3	0.4 – 4.6				
Ash — %	43.8	19.2 – 56.7				
Malaysia						
Heat value — MJ/kg	31.19	25.12 – 34.22	27.85	24.87 – 28.89		
Sulphur content — %	0.57	0.51 – 0.63	0.16	0.09 – 0.38		
Carbon content — %	84.9	80.1 – 86.3	70.9	69.8 – 71.7		
Volatile material — %	25.0	11.3 – 29.3	55.2	54.3 – 56.4		
Moisture content — %	6.84	1.2 – 11.3	17.3	11.2 – 22.3		
Ash — %	7.8	3.4 – 15.2	5.8	2.3 – 13.0		
Mexico						
Heat value — MJ/kg	25.00	23 – 27	19.00	18 – 20		
Sulphur content — %	1	0 – 1	0.8	0 – 1		
Carbon content — %	35	30 – 40	47	35 – 50		
Volatile material — %	16	15 – 18	30	17 – 36		
Moisture content — %	6	5 – 7	6	4 – 8		
Ash — %	40	30 – 45	40	30 – 45		
Morocco						
Heat value — MJ/kg	35.00					
Sulphur content — %	2					
Carbon content — %	93					
Volatile material — %	6					
Moisture content — %	6					
Ash — %	8.4					

Table 1.5 Coa

Netherlands
Heat value — M
New Zealand
Heat value — M
Sulphur content
Carbon content
Volatile material
Moisture content
Ash — %
Norway
Heat value — M
Sulphur content
Carbon content
Volatile material
Moisture conten
Ash — %
Philippines (*a*)
Heat value — M
Sulphur content
Carbon content
Volatile material
Moisture conten
Ash — %
Poland (*e*)
Heat value — M
Sulphur content
Carbon content
Volatile material
Moisture conten
Ash — %
Portugal
Heat value — M
Sulphur content
Carbon content
Volatile material
Moisture conten
Ash — %
Romania
Heat value — M
Sulphur content
Carbon content
Volatile material
Moisture conter
Ash — %
South Africa (*a*)
Heat value — M
Sulphur content
Carbon content
Volatile materia
Ash — %
Spain (*e*)
Heat value — M
Sulphur content
Carbon content
Volatile materia
Moisture conter
Ash — %
Sweden
Heat value — M
Sulphur conten
Carbon content
Volatile materia
Moisture conter
Ash — %
Taiwan, China
Heat value — M
Sulphur conten
Carbon content
Volatile materia
Moisture conter
Ash — %
Tanzania (*a*)
Heat value — M
Sulphur conten
Volatile materia
Ash — %

WEC SURVEY

ignite
range

4.60 – 10.05
0.5 – 2.00
70 – 73
19 – 27
45 – 55
2 – 12

25 – 27
0.16 – 0.41
36 – 44
29 – 32
18 – 23
4.4 – 8.9

6.3 – 9.5
0.5 – 1.0
40 – 60
40 – 60
45 – 60
25 – 40

Table 1.5 Coal Characteristics (continued)

	Bituminous		Sub-bituminous		Lignite	
	average	range	average	range	average	range
Netherlands						
Heat value — MJ/kg	29.30					
New Zealand						
Heat value — MJ/kg	29.16	24 – 33	21.76	19 – 26	25.80	13 – 33
Sulphur content — %	1.22	0.2 – 5.0	1.25	0.1 – 4.0	0.36	0.2 – 0.5
Carbon content — %	51.1	42 – 61	36.46	29 – 44	24.58	22 – 26
Volatile material — %	36.25	18 – 45	32.54	29 – 36	31	27 – 37
Moisture content — %	9.67	5 – 18	21.78	16 – 31	40.22	33 – 44
Ash — %	3.01	0.8 – 6	4.67	2 – 11	4.22	2 – 6
Norway						
Heat value — MJ/kg			28.10			
Sulphur content — %			0.97	0.77 – 1.13		
Carbon content — %			53.95	52.71 – 54.21		
Volatile material — %			39.11	38.49 – 39.58		
Moisture content — %				2 – 4		
Ash — %			6.94	5.71 – 8.39		
Philippines (*a*)						
Heat value — MJ/kg			23.50	20 – 27		
Sulphur content — %			1.3	0.8 – 1.8		
Carbon content — %			33	25 – 42		
Volatile material — %			34	32 – 36		
Moisture content — %			14	6 – 23		
Ash — %			14	7 – 20		
Poland (*e*)						
Heat value — MJ/kg	25.50	16.7 – 32.8				6.0 – 9.0
Sulphur content — %	0.95	0.3 – 3.0			0.5	0.4 – 0.8
Carbon content — %	82	76 – 94			65	
Volatile material — %	30	10 – 42				
Moisture content — %	10	7 – 18			50	
Ash — %	14.7	3.0 – 40			15	7.8 – 24.0
Portugal						
Heat value — MJ/kg		19 – 20				
Sulphur content — %	1.25					
Carbon content — %		65 – 75				
Volatile material — %		2.5 – 4.0				
Moisture content — %	9					
Ash — %	40					
Romania						
Heat value — MJ/kg	26.75		16.80			
Sulphur content — %	2		2.5		3	
Carbon content — %	82					
Volatile material — %	4					
Moisture content — %	8		2		42.5	
Ash — %	20		35.1		39.7	
South Africa (*a*)						
Heat value — MJ/kg	32.30	25.3 – 35.7				
Sulphur content — %	0.84	0.16 – 4.32				
Carbon content — %	84.2	75.2 – 92.5				
Volatile material — %	26.5	6.1 – 41.6				
Ash — %	15.4	6.0 – 42.7				
Spain (*e*)						
Heat value — MJ/kg		19 – 23		11.3 – 14.2		7.1 – 9.2
Sulphur content — %		0 – 1		3 – 8		1 – 3
Carbon content — %		80 – 90		60 – 70		50 – 60
Volatile material — %		10 – 25		25 – 28		30 – 35
Moisture content — %		6 – 10		12 – 18		40 – 50
Ash — %		30 – 35		40 – 50		40 – 45
Sweden						
Heat value — MJ/kg			24.00	22 – 25		
Sulphur content — %			0.45	0.3 – 0.5		
Carbon content — %			76			
Volatile material — %			41	40 – 42		
Moisture content — %			14	12 – 17		
Ash — %			39	35 – 40		
Taiwan, China						
Heat value — MJ/kg	35.27	34.24 – 36.49	33.52	32.74 – 34.16		
Sulphur content — %	1.67	0.71 – 4.12	2.82	1.65 – 4.36		
Carbon content — %	61.41	54.97 – 72.03	50.20	43.94 – 54.05		
Volatile material — %	38.60	27.97 – 45.03	49.64	45.95 – 56.06		
Moisture content — %	5.65	3.87 – 7.45	7.25	4.93 – 9.73		
Ash — %	10.23	5.29 – 20.71	16.09	5.91 – 26.73		
Tanzania (*a*)						
Heat value — MJ/kg		24.34 – 25.26				
Sulphur content — %		0.13 – 11.33		0.67 – 0.99		
Volatile material — %				37.2 – 38.9		
Ash — %		9.3 – 92.0		23.7 – 27.8		

Table 1.5 Coal Characteristics (continued)

	Bituminous average	Bituminous range	Sub-bituminous average	Sub-bituminous range	Lignite average	Lignite range
Thailand						
Heat value — MJ/kg		20.06 – 32-19		15.05 – 34.28		6.69 – 16.30
Sulphur content — %				0.71 – 3.5		0.8 – 2.4
Carbon content — %				37.3 – 51.7		13 – 26
Volatile material — %				30 – 39.5		20 – 41.5
Moisture content — %				7.7 – 20.7		30 – 35
Ash — %				1.06 – 8.1		10 – 47
Turkey						
Heat value — MJ/kg	26.58	22.81 – 30.35			24.00	22 – 28
Sulphur content — %					2.8	0.5 – 6.0
Carbon content — %	63	58 – 68			48	37 – 51
Volatile material — %	37	32 – 42			58	49 – 65
Moisture content — %	8	2 – 14			33	10 – 55
Ash — %	12	9 – 15			38	18 – 54
United Kingdom						
Heat value — MJ/kg	31.00	27.5 – 35.5				
Sulphur content — %	1.66	0.4 – 2.9				
Carbon content — %	70	55.0 – 93.0				
Volatile material — %	37	5.0 – 44				
Moisture content — %	12.0	2.0 – 19.0				
Ash — %	16.5	2.0 – 21.5				
USA (*f,g*)						
Heat value — MJ/kg	27.72		20.31		14.95	
Sulphur content — %	1.85		0.43		0.92	
Ash — %	10.55		7.2		14.0	
ex-USSR (*a*)						
Heat value — MJ/kg			19.50	9.3 – 33.1		
Sulphur content — %			1.44	0.1 – 7.3		
Carbon content — %			80.6	62 – 95.7		
Volatile material — %			33.5	2.4 – 62.7		
Moisture content — %			13.2	4.1 – 58		
Ash — %			26.3	10 – 52		
Venezuela						
Heat value — MJ/kg		30.2 – 33.8				
Sulphur content — %	0.66	0.43 – 0.95				
Carbon content — %	56.46	40.80 – 73.53				
Volatile material — %	35.16	24.87 – 44.73				
Moisture content — %	5.72	1.60 – 10.06				
Ash — %	3.31	1.20 – 7.00				
Zambia						
Heat value — MJ/kg			33.62	32.19 – 35.06		
Sulphur content — %			1.59	1.27 – 1.91		
Carbon content — %			77.31	73.49 – 81.14		
Volatile material — %			22.71	26.57 – 18.86		
Moisture content — %			1.15	1.06 – 1.25		
Ash — %			23.41	22.02 – 24.80		

General Co

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6.69 – 16.30
0.8 – 2.4
13 – 26
20 – 41.5
30 – 35
10 – 47

22 – 28
0.5 – 6.0
37 – 51
49 – 65
10 – 55
18 – 54

General Comments on the Data Tables

The Tables cover Bituminous Coal (including anthracite), Sub-Bituminous Coal and Lignite. Data for Peat are given in Section 8. There is no internationally accepted system of demarcation between coals of different rank, but reference is made to the standards used by individual countries where available.

There is an important distinction between "Proved Recoverable Reserves", as used by the WEC, and the IEA term "Accessible Coal in Significant Coalfields".

The WEC definition of Proved Recoverable Reserves includes the words *"...that can be recovered under present and expected local economic conditions with existing available technology"*

The IEA defines Accessible Coal in Significant Coalfields as being the *"amount of coal likely to be considered for extraction from Significant Coalfields within the next twenty years"*, where a Significant Coalfield is a *"coalfield whose collective physical characteristics, render it likely either to make a significant contribution to, or to enter into the detailed commercial mining and market evaluations required in order to achieve world coal supply over the next twenty years"*.

When comparing Proved Reserves and Accessible Coal in Significant Coalfields it is important to recognise that the former takes *economic* conditions and *existing available technology* into account without limitation as to time, whilst the latter concentrates on the *physical characteristics* which render it likely to make a significant contribution to world coal supplies in the next twenty years. For example, to be considered accessable, the coalfield has to be already served by adequate transport infrastructure.

A final comment applies to all the Tables. There are no internationally agreed standards for estimating coal reserves and although the WEC attempts to establish precisely worded definitions it is a matter of judgement for each country to determine the quantities which in its opinion, meet these definitions.

For the reasons given above, care is needed when comparing the reserves of different countries and when comparing Proved Recoverable Reserves with Accessible Coal in Significant Coalfields. In most instances only a fraction of Proved Recoverable Reserves are considered to be Accessible Coal. However, there are instances where the value for Accessible Coal is significantly greater than Proved Recoverable Reserves. Where this occurs it is generally due to the particular criteria applied by the Member Country to its assessment of reserves.

Definitions

Proved Amount in Place is the tonnage that has been both carefully measured and has also been assessed as exploitable under present and expected local economic conditions with existing available technology.

Maximum Depth of Deposits and Minimum Seam Thickness relate to Proved Amount in Place.

Proved Recoverable Reserves are the tonnage of Proved Amount in Place that can be recovered (extracted from the earth in raw form) under present and expected local economic conditions with existing available technology.

Percentage Recoverable by Surface Mining and Percentage Recoverable of Coking Quality relate to Proved Recoverable Reserves.

Estimated Additional Amount in Place is the indicated and inferred tonnage *additional* to the Proved Amount in Place. It includes estimates of amounts which could exist in unexplored extensions of known deposits or in undiscovered deposits in known fuel-bearing areas as well as amounts inferred through knowledge of favourable geological conditions. The estimates are based on the results of geological and exploratory information about an area or on evidence of duplication or parallelism of geological conditions that occur in known deposits. Deposits whose existence is merely speculative are not included.

Estimated Additional Reserves Recoverable is the quantity of the Estimated Additional Amount in Place which might become recoverable within foreseeable economic and technological limits.

Annual Production is the amount produced in 1990. If some other year applies it is recorded in the notes and references.

Annual Internal Consumption is the total amount of solid fossil fuel consumed internally, *including imports*, in 1990. If some other year applies it is recorded in the notes and references.

Characteristics of Production; for these ranges and/or average values are given. The following apply:

Sulphur Content — dry
Heat Value — moist, ash free
Carbon Content — dry, ash free
Volatile Matter — dry, ash free
Moisture Content — moist, as mined
Ash — dry

Notes

Afghanistan

(a) One main coalfield with approx. 10 x 10^6 tonnes of Accessible Coal in Significant Coalfields of bituminous quality plus other minor areas of bituminous and sub-bituminous coal and lignite. Source : Concise Guide to World Coalfields, IEA Coal Research, 1983.

Albania

(a) In addition to lignite there are small deposits of sub-bituminous coal. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

(b) Production and Consumption data classified as Sub-bituminous includes some Lignite Production.

Antarctica

(a) Numerous unexplored deposits of mainly bituminous coal. None are expected to make a significant contribution to coal supplies over the next 20 years. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Argentina

(a) Sub-bituminous coal basically from Rio Turbio Mine.

(b) Lignite in Austral Basin.

Australia

(a) The large increases in bituminous and sub-bituminous resources which were reported in the 1989 Survey are attributable to revised estimates for New South Wales.

(b) The increase in Estimated Additional Resources for lignite reported in the 1989 Survey result from the inclusion of substantial resources in Victoria.

(c) Range figures for coal characteristics, other than Heat Values, cover Bituminous and Sub-bituminous.

Bangladesh

(a) Coal deposits are considered too deep to mine and the country imports about 1.8 x 10^6 tonnes of coal annually. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Botswana

(a) Coal reserves are large but there is only one coal mine currently producing some 300 000 tonnes per year. Further exploitation is planned. Botswana could play a major part in future world coal supply. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Brazil

(a) Coal rank is bituminous (high volatility) to sub-bituminous. Ash contnent of raw coal is high, with mean values between 50% and 65%; sulphur content varies.

(b) All the important coal deposits are in the southern part of the country. Rio Grande do Sul State accounts for 90.96% of the national coal resources, with 8.5% in Santa Caterine, 0.5% in Paranã and 0.04% in São Paulo. Coal is situated within Permian Rio Bonito Formation, with up to 10 coal seams and an accumulated thickness of up to 10 m coal.

Canada

(a) Maximum Depth of Deposits for bituminous coal is 600m as given in the table, except for Sydney Coalfield, Nova Scotia, where the maximum depth is 1 200m.

(b) Characteristics of Production for bituminous coal are subdivided according to the table below into Eastern Canada (Nova Scotia and New Brunswick) and Western Canada (Alberta and British Columbia) due to the different geological origins of the two production regions.

	Heat Value MJ/kg	Sulphur Content %	Carbon Content %	Volatile Matter %	Moisture Content %	Ash %
Eastern Canada						
range	30-34	1-8	77-86	31-40	3-9	3-20
average	33	2	83	38	8	5
Western Canada						
range	27-36	0.2-0.8	77-91	19-37	3-10	7-20
average	34	0.4	87	26	8	10

Chile

(a) Sub-bituminous coal Production and Consumption included with Bituminous coal.

(b) Most of the sub-bituminous coal is located at the extreme south of the country and is very remote from centres of population. There is also a small deposit at Valdivia Osorno which produces about 30 000 tonnes a year for local consumption.

China

(a) The Reserves data presented in this Survey differ considerably from those in the 1989 Survey of Energy Resources. The figures in this Survey are based on a new study.

Colombia

(a) Proved Amount in Place data are "Probable Reserves" and Proved Recoverable reserves are "Measured Reserves".

(b) There are 35 coal areas throughout the country with varieties of coal ranging from sub-bituminous to anthracite. The data in the tables is an average representation.

Ecuador

(a) There is no production of coal.

Egypt

(a) The only developed coal deposit is at Al Maghara in the Sinai. Production was interrupted for many years but mine reconstruction has begun and early indication are favourable. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

(b) Bituminous probable reserves are given as 18.5 x 10^6 tonnes, with a minimum seam thickness of 0.6 m in reference (ii).

(c) Bituminous Consumption includes all hard coal.

Ethiopia

(a) Coal occurrences are found in over 20 sites with intensive exploration since the early 1980's. However, there are no proved amounts of coal in places which could be economically exploited. Recent exploratory work in the South Western part of the country revealed some deposits of coal together with oil shale in the order of a few million tonnes. In another area 155 kms North-east of Addis Abeba, in the Mush Valley, a small reserve of lignite is localized with quality confirmed to be suitable for local consumption (tobacco curing) and with relatively thin overburden consisting of loose quaternary sediments. The reserve is estimated to be over 100 000 tonnes.

Greece

(a) Consumption figure for bituminous includes all hard coal.

Greenland

(a) Sub-bituminous deposits exist at Nugssuaq. Basic investigation gives 340 x 10^6 tonnes total and 183 x 10^6 tonnes mineable. For the total area containing the strata these figures should be doubled. Source: Shekhar, S.C., Frandren, N., Thomsen, E. 1982. Coal on Nugssuaq, West Greenland published Geological Survey of Greenland, Denmark.

(b) No coal has been mined since 1950 because local demand is low and no export market exists. Source: Concise Guide to World Coalfields, IEA Coal Research, 1983.

Ireland

(a) Coal characteristcs are given separately for anthracite and Bituminous coal as follows:

	Heat Value MJ/kg	Sulphur Content %	Carbon Content %	Volatile Matter %	Moisture Content %	Ash %
Anthracite	30.5	2.0	84.0	5.0	4.0	5.0
Bituminous	23	0.5	56.0	15.0	4.0	25.0

Mexico

(a) Sub-bituminous and Lignite data refer to May 1991 and are from the Cuenca Fuentes Río Escondido Coahuila y Colombia-San Ignacio, Nuevo León, coal fields.

Mongolia

(a) Although no data are available for Proved Recoverable Reserves there is production of both Bituminous Coal and Lignite.

Mozambique

(a) Coal resources in the province Tete 1.5 billion tonnes. Source: Aschinjanz, Svedov, Stand und Entwicklungsaussichten der Energiewirtschaft in Mozambique. Archiv fur Energiewirtschaft Juli 1983.

Philippines

(a) Production and Characteristics data are *run of mine*.

Poland

(a) Resources and Reserves data are for year ending 1989.

(b) Proved Amount in Place and Proved Recoverable Reserves data from latest geological investigations.

(c) Percentage of Coking Quality and Estimated Additional Amount in Place are estimated figures.

(d) Minimum Seam Thickness for:
Coking Coal — 0.4-0.7m
Steam Coal — 0.1-0.8m

(e) Coal Characteristics are approximate.

Portugal

(a) The production of anthracite from the "Faixa Carbonífea do Douro" comes mainly from the Pejão Mine — Empresa Carbonífera do Douro, with 233 ktonnes per annum and from the "Couto Mineiro" — S. Pedro da Cova — with 51 ktonnes per annum, explored by surface mining by the "Terriminas Society" — Sociedade Industrial de Carvões, Lda. The production supplies the "Tapada do Outeiro" power station and cement industries.

(b) There is no production of Lignite at present. The indicated reserves refer to the Espadanal Mine (Rio Maior) deposit.

South Africa

(a) Characteristics are averages of all products and not weighted according to production tonnages.

Spain

(a) Proved Recoverable Reserves include those classified as "very probable" and "probable" in reference publication.

(b) Proved Amount in Place corresponds to Proved Recoverable Reserves divided by a recovery factor of 0.5.

(c) Estimated Additional Reserves Recoverable include those classified as "possible" and "hypothetical" in reference publication.

(d) Estimated Additional Amount in Place is obtained by dividing Estimated Additional Reserves Recoverable by a recovery coefficient of 0.5.

(e) Coal Characteristics represent average quality of Spanish coals and not those of the 1990 production.

Sweden

(a) Annual Consumption includes 1.5 Mtonnes of coke.

Taiwan, China

(a) The data given under Bituminous coal include Sub-bituminous coal.

Tanzania

(a) Tanzanian coal ranges from bituminous to sub-bituminous and is non-coking or weakly coking in character. It is generally low in sulphur and phosphorus.

(b) Coal has entered the energy scene very recently, It is now used for power generation for a township (6MW), a cement factory and a pulp and paper mill. These are located a long way from the mine. Wide use of coal is hindered by logistics.

United Kingdom

(a) British Coal does not carefully measure coal in place that cannot be recovered for various technical, environmental or economic reasons. Data strictly on the basis of WEC definition are therefore not available. However, it is estimated that coal in place in seams over 60 cm thick and less than 1 200 m deep total 190 000 x 10^6 tonnes. Favourable local conditions in Lancashire allow mining to about 1 400 m. This is interpreted as Proved Recoverable Reserves plus Additional Resources in Place.

(b) Data for Recoverable Reserves refers to 1987 and to deep mining only: additional surface mineable quantities are relatively small.

(c) The figure of 186 700 x 10^6 tonnes (for Estimated Additional Amount in Place) is the balance of 190 000 x 10^6 tonnes of coal in place defined in the notes above, after deducting Proved Recoverable Reserves.

(d) No detailed assessment has been made by British Coal of sub-bituminous coal or lignite although these might be locally extensive. The information on lignite refers only to the Crumlin deposit in Co. Antrim, N. Ireland. Additional deposits of lignite also occur near Coagh, Co. Tyrone and Ballymoney, Co. Antrim but have not been explored in detail. It is therefore impossible at this stage to provide details of the deposits characteristics. A reasonable estimate for lignite resources which may occur in Northern Ireland is in the order of 1 000 Mtonnes.

USA

(a) Proved Amount in Place excludes certain resource data currently under review: 7 315.1 million short tons of anthracite in five States; 1 406.5 million short tons of sub-bituminos coal in Alaska, and a total of 163.5 million short tons of coal resources in non-coal producing States. Data reported as "proved" represent both measured and indicated tonnage, as of 1 January 1990. These data have been combined prior to depletion adjustments and cannot be recaptured as "measured alone".

(b) Proved Recoverable Reserves excludes the recoveable reserves from resource data currently under review (see note (a)).

(c) Estimated Additional Amount in Place data are current as of end of 1973. These are inferred and include some deeper resources, and are based on different source studies in some areas than Proved Recoverable Reserves. The data have been adjusted to reflect depletion and new source data for Proved Recoverable Reserves only.

(d) Estimated Additional Reserves Recoverable tonnage. 1 677 686 Mtonnes of hypothetical resources have been identified by US geological survey in 1975. The ranks of the coal were not published. Further not all of this coal has "reasonable certainty" of future recovery.

(e) Consumption data for Bituminous includes Sub-bituminous and cannot be separated.

(f) Coal characteristics. The only data available (heat value, sulphur content and ash) are on an "as received" basis; moisture inherent in coal is not known. Thus, sulphur and ash are presented on the "as received" basis (not "dry") and heat value is "as received", (not "moist, ash free").

(g) Data reported give estimated production characteristics based on coal shipped to power plants adjusted using file data.

ex-USSR

(a) All characteristics data are the average for the three types of coal and supplied for the 1986 Survey of Energy Resources.

Venezuela

(a) Production and Consumption figures are for 1989.

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1995

Survey of

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1 Coal (Including Lignite)

Commentary

Proved recoverable reserves of coal are recorded as 1 031 gigatonnes (Gt), made up of bituminous coal reserves (including anthracite) of 520 Gt and sub-bituminous and lignite reserves of 511 Gt. Only a few changes have occurred since the previous analyses on the occasion of the World Energy Council Congress in 1992; in Germany, for example, the proved recoverable reserves of lignite were reduced by almost 13 Gt, while in India, bituminous reserves were increased by 8 Gt.

The major reserves of coal are located in the USA (amounting to 241 Gt, 106 Gt of which is bituminous coal) and in the former USSR (also totalling 241 Gt, 104 Gt of which is bituminous coal). Next are India with 68 Gt of bituminous coal, China with 62 Gt, South Africa with 55 Gt and Australia with 45 Gt. If sub-bituminous coal and lignite are included, almost 80% of proved recoverable reserves are concentrated in these six countries, of which Australia, the USA and South Africa are the major exporting countries. The significance of the former USSR as a coal exporter is decreasing, while China will probably strengthen its position as an exporter. The new exporting countries – Colombia, Indonesia and Venezuela – account for just under 5Gt of bituminous reserves (1% of world reserves) and 31Gt of sub-bituminous and lignite reserves (6% of world reserves).

Compared with oil and natural gas, coal has further strengthened its long-term position as the world's most widely available fossil energy source. Considering the current annual production of bituminous coal totalling 2.8 Gt, and of sub-bituminous coal and lignite totalling 1.0 Gt, there are still sufficient reserves for more than 200 years, even if output should increase. Due to the significant extent of total deposit resources, coal is generally expected to cover a considerable proportion of the world's primary energy demand. The volume requirements of this expected position can be met if production capacity is developed in time. With lead times of three to five years for open-cast operations and drift mines in cases of geologically favourable deposits, investment decisions have to be taken in due time. Although there has been little exploration activity in recent years, considerable potential is available for short-term implementation.

Increasing world coal demand, however, implies that new capacity in more difficult geological conditions will also have to be developed, which will often entail establishing a new infrastructure or considerably extending an existing one. Transportation distances also are generally rising in the producing countries. Although cost forecasts are difficult to establish, experts agree that the cost increases incurred in exploiting new capacities will probably exceed inflation rates. In addition to rising production costs, the relationship between currency values in exporting and importing countries plays a major role in determining prices on the world market. Similarly, bilateral currency ratios between overseas suppliers affect their competitiveness. Since the direction and extent of currency fluctuations are unpredictable, prices cannot be forecast reliably. In recent years, earnings obtained in the world coal market did not always cover the total production cost. Thus, to ensure the development of new capacity in order to meet forthcoming demand, this situation has to change so that additional investment costs are actually repaid by increasing prices. A price increase has already occurred in recent months and, generally, a further increase in world coal market prices can be expected. Such a price increase could be enhanced by effects of the interdependence of energy markets with rising oil prices and thus provide sufficient returns on investments in new or enlarged coal capacity.

Substantial technological progress in mining techniques and upgrading processes is unlikely in the foreseeable future, but the existing scope for introduction of the highest possible technical standards is not yet fully exhausted. New developments with proven commercial feasibility in all sectors of the coal industry are crucial in promoting the acceptance of coal as a primary energy source and thus in generating additional volume requirements. Progress has been made in the Western industrialised countries in introducing state-of-the-art technology, such as environmentally friendly equipment for minimising harmful dust, sulphur-dioxide and nitrogen-oxide emissions from burning coal, but in many other counties there is still a substantial deficiency. Modern coal-combustion technology is also available for alleviating the CO_2 problem by ensuring a high-efficiency use of primary energy sources worldwide. Combined processes, which are the subject of intensive improvements, show the way. Given the global dimension of the climate risks, a global approach seems to be compelling. Considering the various aspects involved, the transfer of efficient coal technology and other supporting measures in favour of countries with insufficient emission standards and low energy efficiency may well turn out to be the most adequate approach to a solution.

In spite of the long-term increase of coal utilisation, producing countries will continue to concentrate on meeting domestic demand first. This is emphasised by the fact that at present almost 90% of world coal production is consumed in the source country, with only a little more than 10% being traded between producing and importing nations. Growing domestic demand and rising import requirements will probably only have a marginal effect on this ratio, to perhaps 85:15.

On the basis of four criteria – availability of coal reserves, profitability of coal deposits, coal types, and export potential – only a few countries, such as Colombia, Venezuela, Indonesia and China, will further increase their importance as exporters, so the world coal market will continue to be satisfied by a relatively small number of exporting nations.

An analysis of utilisation categories shows that power generation is not only the most important consumer, but also offers the best expansion prospects for the future. With coal-fired power generation of 4 800 TWh, the share of the world's electrical power demand met by coal is some 40%, and coal-based power generation is expected to reach 7 400–8 000 TWh in the year 2010. In the iron and steel industry, coal consumption will probably move towards the use of lower quality coking coal (soft and semi-soft) in blends with high-quality coking coal, and in this sector as well, new technologies, such as pulverised coal injection (PCI), will be introduced. The heating market, including all other areas of industry, households and minor consumption, will continue to shrink. This will result in structural changes in favour of oil and natural gas. However, there are still countries, particularly in Eastern Europe, in which coal has a considerable share in the heating market.

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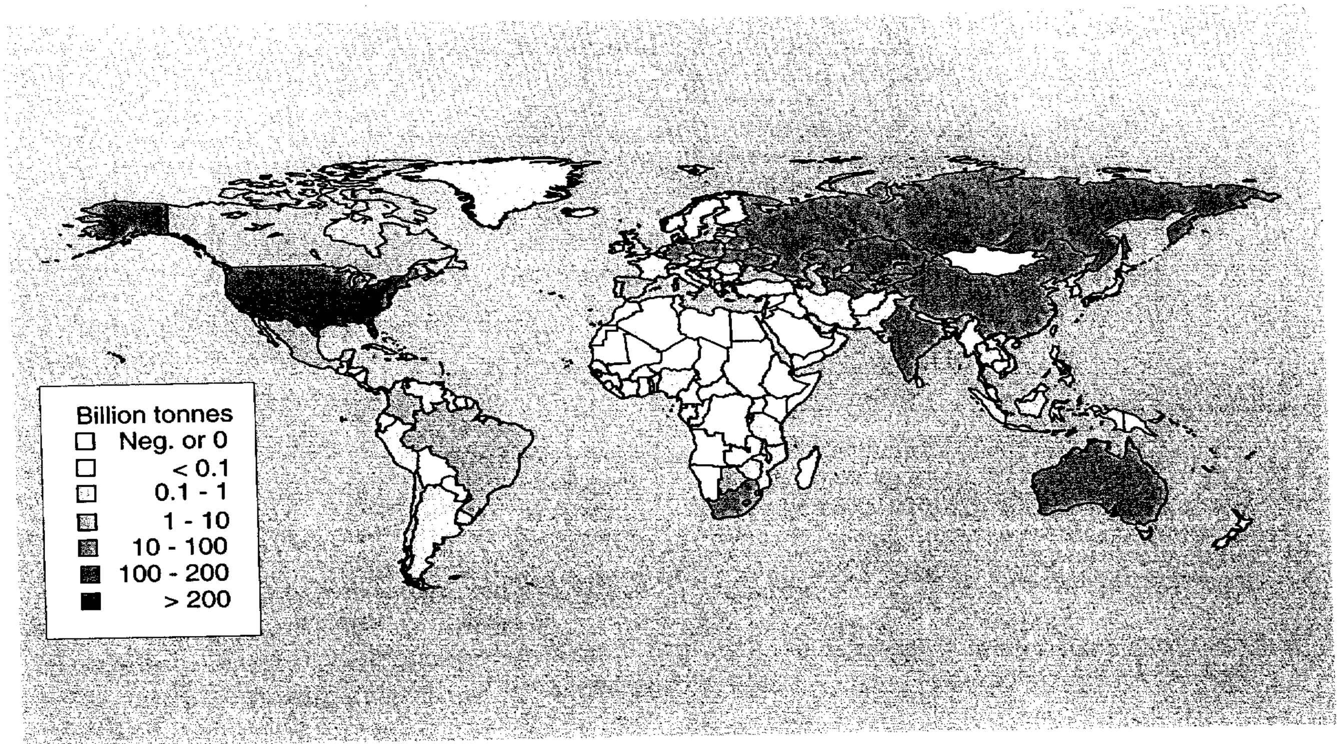
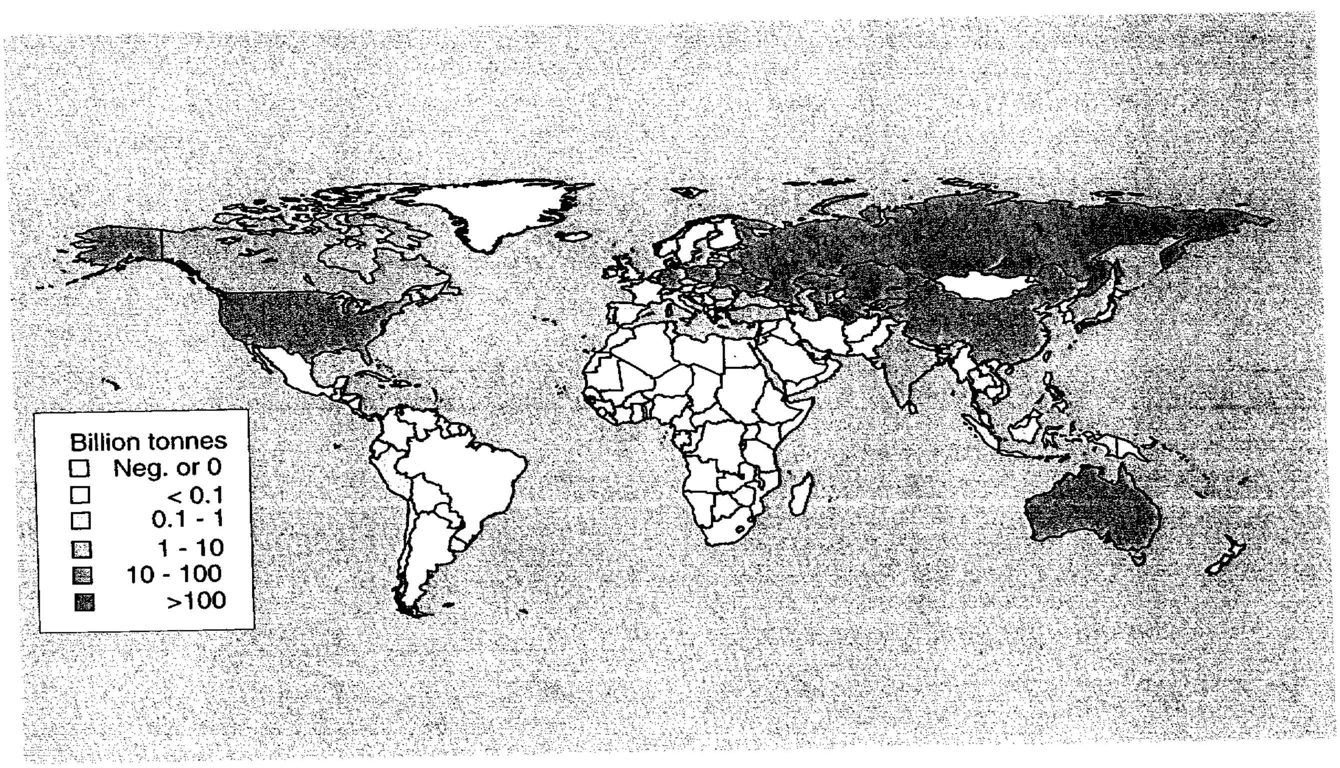
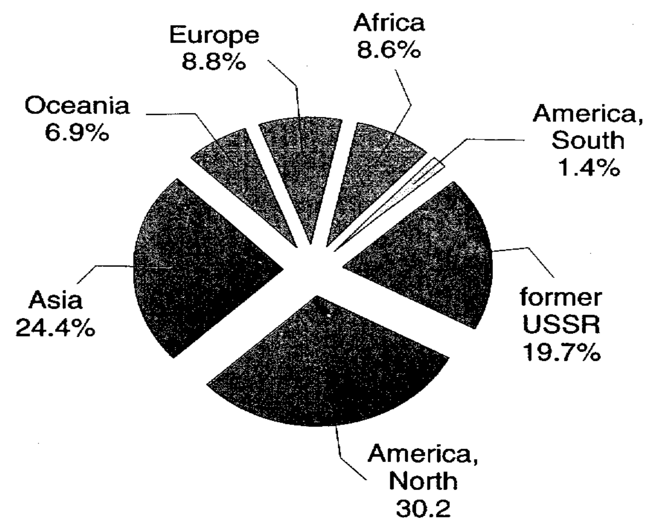
CEO STEAG AG,
Essen, Germany



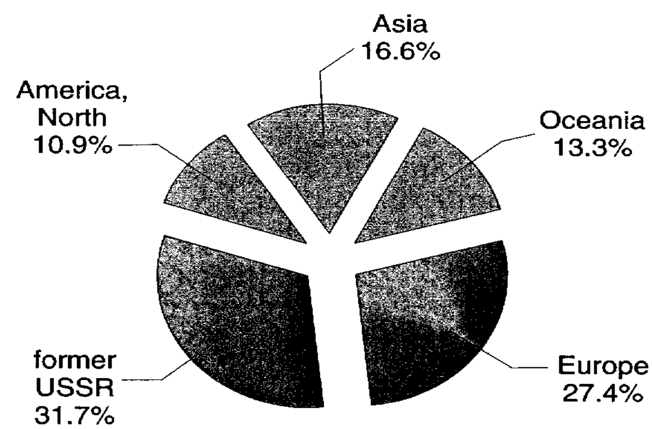
Distribution of proved recoverable reserves of Bituminous and Sub-bituminous coal



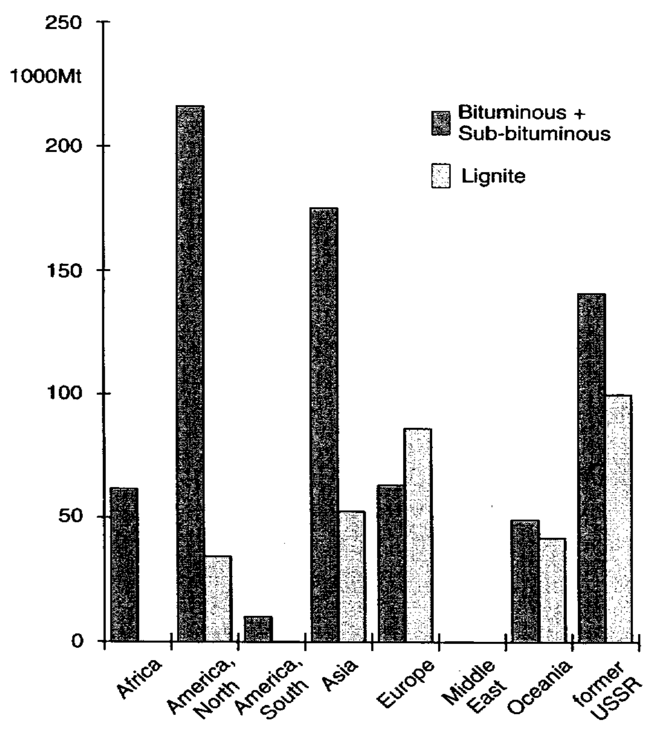
Distribution of proved recoverable reserves of Lignite



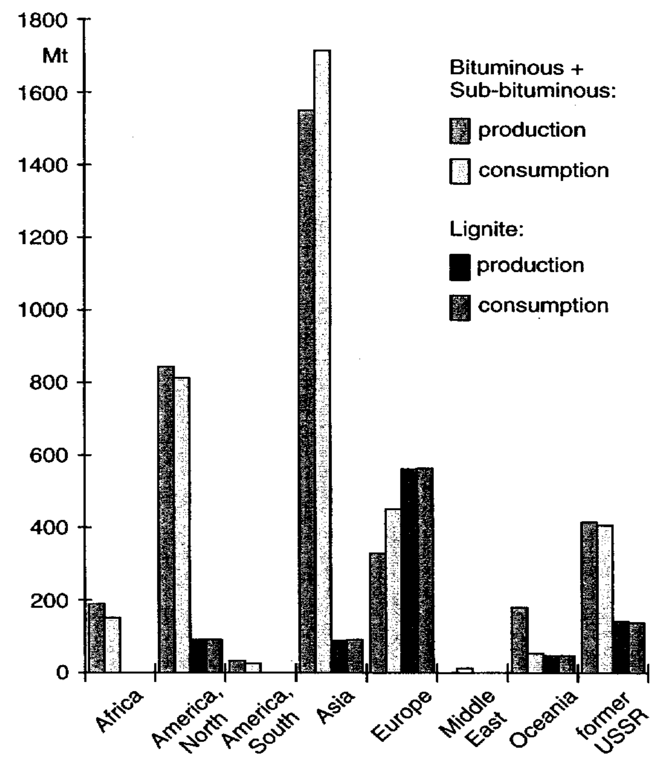
Proved recoverable reserves of Bituminous and Sub-bituminous coal



Proved recoverable reserves of Lignite



Proved recoverable reserves



Production and consumption

Where data for the former USSR are given, the values for Asia and Europe exclude the republics of the former USSR

Country notes

Afghanistan

The country has one main coalfield with approximately 10×10^6 tonnes of "accessible coal in significant coalfields" of bituminous quality, plus other minor areas of bituminous and sub-bituminous coal and lignite.

Albania

In addition to lignite, there are small deposits of sub-bituminous coal.

Antarctica

There are numerous unexplored deposits of mainly bituminous coal. It has been estimated that the Antarctic could contain more than 10% of the world's coal resources.

Argentina

Sub-bituminous coal is mainly from the Rio Turbio Mine and lignite from the Austral Basin.

Australia

Coal is found in all Australian states. Of particular importance are the high-quality coals found in Queensland and New South Wales. These are of value as steam and metallurgical coals and most of the production is for export. The Bowen Basin is located in Queensland, which has total in-situ resources of 33 172 Mt, with proved recoverable reserves of 1 261 Mt. In New South Wales, where the Sydney Basin has 89% of the state's resources, the in-situ resources are 34 248 Mt.

There are economically significant resources of bituminous coal in Western Australia, and sub-bituminous coal and lignite in Victoria and South Australia. Production from these states is geared to local thermal electricity generation.

Bangladesh

Coal deposits are considered too deep to mine and the country imports about 1.8×10^6 tonnes of coal annually.

Belgium

Coal consumption continues to decline. The last Belgian coal-mine in Limbourg closed in 1992.

Botswana

Coal reserves are large, but there is only one coal-mine currently producing some 300 000 tonnes per year. Further exploitation is planned. Botswana could play a major part in future world coal supply.

Brazil

All the important coal deposits are in the southern part of the country. Rio Grande do Sul State accounts for 90.96% of the national coal resources, with 8.5% in Santa Caterine, 0.5% in Paranã and 0.04% in São Paulo. Coal is situated within Permian Rio Bonito Formation, with up to 10 coal seams and an accumulated thickness of up to 10 m coal.

Bulgaria

Although there are reserves of bituminous and sub-bituminous coal, many of the seams are at great depths. Most of the production is of lignite by open-pit mining. By far the largest coalfield is Maritza-East where the lignite is in seams from 1 to 25 m thick. The lignite has a high ash and moisture content. Open-pit mining is fully mechanised.

In underground mines there is less mechanisation, with the use of manual labour prevailing.

The national policy is directed towards utilisation of domestic resources. The transition to a market-oriented economy implies restructuring of coal mining. Inefficient mines and pits will gradually be closed down, the share of manual excavation in the underground mines will be decreased and modern mechanisation to meet the mining and technical conditions will be introduced. Production from the more efficient open-pit mines will be increased.

Work is to be carried out on the ecological problems of utilising coal in powerplants and for briquetting.

Canada

Coal production in Canada, having declined between 1991 and 1992, rebounded in 1993 to record a 4.6% increase to an estimated 69 Mt, with a total value of $1.8 billion. Coal currently is used to generate 17% of Canada's electricity and produces 12% of the nation's primary energy. Over 40% of Canada's coal production is exported, to 23 countries worldwide. Although production for 1994 should increase slightly, the value of total production may actually decline relative to 1993, due to a US$3.85 price per ton decrease for export metallurgical coal.

Chile

Most of the sub-bituminous coal is located in the extreme south of the country and is very remote from centres of population. There is also a small deposit at Valdivia Osorno which produces about 30 000 tonnes a year for local consumption.

China

China is very dependent upon its vast resources of coal. In the past 10 years China's coal demand has increased by 50% and now accounts for approximately three-quarters of the country's primary energy requirements.

Chinese hard coal reserves range from sub-bituminous to anthracite and are concentrated in the north and north-west of the country, with some two-thirds of reserves located in the provinces of Shanxi, Shaanxi and Inner Mongolia. Substantial deposits of lignite are to be found widely distributed across the country, with at least 15 of these having reserves of over 1 000 Mt.

Official Chinese figures from the Ministry of Coal Industry (private communication 1995) give a figure for "known coal reserves" of 976 000 Mt, of which 556 400 Mt are "proven reserves". However, this total must be seen in the context of the definitions applying to the data and the capabilities of existing mining technology. Hence "proved recoverable reserves" – that is, those reserves which can be recovered *under present and expected local economic conditions and with existing available technology* – are likely to be considerably less. The best available estimates are bituminous coal 62 200 Mt, sub-bituminous 33 700 Mt and lignite 18 600 Mt.

In reality, it is likely that China's coal reserves to a depth of 150 m may be relatively small, with the bulk of accessible reserves held at depths of between 150 and 300 m. Resources which are quoted at depths of up to 1 000 m are only likely to be exploited in the long term.

Chinese statistics relating to 1989 indicate that "developed" coal reserves throughout the country totalled 3 800 Mt, of which 2 600 Mt were "prepared" (*China Coal Industry Yearbook 1990*). Given annual Chinese coal production of over 1 000 Mt, this implies that "immediately accessible reserves" are maintained at a level of perhaps two years' output.

The Chinese coal industry is nominally divided into two parts – "state-controlled" mines that are operated by the Ministry of Coal Industry, and "local" mines that are run by other organisations. The latter include mines operated by provincial, prefectural, county and collective organisations, and by individuals. State mines contributed 43.5% of national output in 1989, compared with 56.5% from local mines. In reality, the small scale of many operations renders them subject to only partial state control.

The transportation of coal in China is a major problem, with a significant proportion of production being in the north of the country, but with the most rapidly growing demand being in the southern and eastern parts of the country. At present, 60% of land-based coal movements are by rail, with 20% by inland waterway and 20% by road. In addition, coastal shipping plays an important part with coal being transported by rail from the north and north-west to ports in the east, and then by ship to the south and south-east. The Chinese are actively investigating the transport of coal by pipeline in the form of a slurry. Building large, coal-fired generating plants in the north with high capacity electricity transmission to the south is another option under consideration.

Colombia

There are 35 coal areas throughout the country with varieties of coal ranging from sub-bituminous to anthracite.

By 2000, exports are expected to reach 31 Mt, with domestic consumption of 9.0 Mt.

Croatia (Republic of)

Production of hard coal in Istria totals 100 000 tonnes per annum, and about 10 000 tonnes per annum of lignite is produced in Hrvatsko Zaggrje.

Production of hard coal in Istria is to be suspended until the year 2000, but total annual production for the country of about 50 000 tonnes of lignite is forecast. To meet thermal powerplant needs, about 1 Mt per annum of hard coal will be imported.

Egypt (Arab Republic of)

The only developed coal deposit is at Al Maghara in the Sinai. Production was interrupted for many years but mine reconstruction has begun and early indications are favourable.

Bituminous probable reserves are given as 18.5×10^6 tonnes, with a minimum seam thickness of 0.6 m.

Ethiopia

Coal occurrences are found in over 20 sites with intensive exploration since the early 1980s. However, there are no proved amounts of coal in places which could be economically exploited. Recent exploratory work in the south-western part of the country revealed some deposits of coal together with oil shale in the order of a few million tonnes. In another area, 155 km north-east of Addis Ababa, in the Mush Valley, a small reserve of lignite is localised with quality confirmed to be suitable for local consumption (tobacco curing) and with relatively thin overburden consisting of loose quaternary sediments. The reserve is estimated to be over 100 000 tonnes.

A recent assessment of the coal resource potential and possible use of coal proposes that coal be produced at an annual rate of 100 000 tonnes. As the coal is of low quality with high ash and volatile content, it is proposed that it be processed (pyrolysed and briquetted) for use in domestic cooking applications. The pre-feasibility study also proposes that the coal be used for electric generation via a 25MW plant and for industrial process heat applications.

The energy policy of the transitional government of Ethiopia stipulates that coal should be used for electricity generation and other applications when and where it can economically substitute for other sources of energy

France

Bituminous coal occurs in Lucenay and lignite in Mezos.

Germany

Around 77% of hard coal production is from the Ruhr coalfield where it is mined from seams at depths exceeding 900 m. The coal ranges from anthracite to high-volatile, strongly caking, bituminous coal. The Saar coalfield is also important, with substantial deposits of weakly caking bituminous coal.

The lignite deposit in the Rhine region is the largest single formation in Europe.

In the former East Germany there are major deposits of lignite at Halle Leipzig and Lower Lausitz; these have considerable domestic importance.

Greenland (Denmark)

Sub-bituminous deposits exist at Nugssuaq. Basic investigation gives 340×10^6 tonnes total and 183×10^6 tonnes mineable. For the total area containing the strata, these figures should be doubled. (Source: Shekhar, S.C., Frandren, N., and Thomsen, E., 1982; *Coal* *on Nugssuaq, West Greenland*, published by the Geological Survey of Greenland, Denmark.)

No coal has been mined since 1950 because local demand is low and no export market exists.

India

Coal is the main source of energy and vital for India's economic progress. In view of large endowments of coal it will continue to provide a dependable, economic and sustained source of energy for many years to come.

The Raniganj coalfield, 200 km north of Calcutta, contains about 60% of India's non-coking coal reserves. It supplies 95% of the semi-coking coal requirements as well as a major share of domestic soft coking coal. The Jharia coalfield, north-west of Calcutta, is the only source of prime coking coal in India.

About one-quarter of the country's reserves are amenable to surface mining, which currently accounts for around 55% of the total annual output (222 Mt in 1991). Production from surface mines has increased substantially in recent years despite problems of spontaneous combustion and flooding during the annual monsoons. Fires are estimated to have destroyed nearly 40 Mt of in-situ coal, and Coal India predicts that some of these may not be extinguished until the end of the decade.

Since 1975, most coal production in the country has been the responsibility of the nationalised organisation, Coal India. Through its various subsidiary companies, Coal India accounts for some 88% of Indian coal output. The other principal coal producer is Singareni Collieries Company, owned by the federal government and the government of Andhra Pradesh. Other producers include Tata Iron and Steel Company, Indian Iron and Steel Company and Damodary Valley Corporation.

Government policy is to promote private sector investments and reduce government budgetary support to the public sector coal companies. The development plans have to be financed through international resource generation and multilateral and bilateral funding. The Coal Mines Act 1973 was amended with effect from 9 June 1993 to allow private sector participation in coal mining for power generation, in coal washing, or in other end-uses as notified by the government. Over 40 coal mining blocks have been identified for allocation to private companies for coal mining for captive end-use.

The national policies are aimed at sustainable development of the Indian coal industry on the basis of:

- introducing clean coal technologies;
- meeting the coal demand of the metallurgical sector;
- introducing reforms for improving the operational efficiency and profitability of the public sector coal companies; and
- integrating and internalising environmental safeguards in coal mining.

Almost the entire capacity in the utility sector comprises pulverised coal-fired plants. The government of India has set up a technology mission on clean coal technologies that will improve the productivity of existing thermal powerplants. Various components of the programme comprise gasification, pressurised, fluidised bed combustion and coal beneficiation for slurry formulation and its combustion. The technology mission is to be implemented over 5–6 years via demonstration plants.

Coal bed methane (CBM) is emerging as a promising source of clean energy in India. On a rough estimate, CBM resources in the country are of the order of one trillion cubic metres.

Indonesia

Indonesia has vast resources of high-quality accessible coal. In terms of tonnage, southern Sumatra contains the highest proportion although much of it is lignite. The coal from Kalimantan is variable but includes some deposits of very high quality with low ash and sulphur, and high volatile matter.

In the past 10 years production has risen dramatically, and a major export market has developed. Production is split between the government company, PT Batubara, which operates in Sumatra to supply the domestic market, and various contractors (mainly consortia of Indonesian and overseas interests), that are developing production in Kalimantan, mainly for export.

Exports are expected to continue to grow and to gain substantial market share for high-quality coals to Europe, the Far East and possibly the USA and Western Australia. However, Indonesia is expected to become a net importer of oil early in the 21st century. The national policy is therefore to expand internal use of coal with most future power stations being coal-fired. The target is for 80% of electricity generation to be from coal-fired plants.

Lithuania (Republic of)

Coal contributes less than 5% to the primary energy balance and this is expected to remain the position in the foreseeable future.

Malawi

In 1985, the Malawi Geological Survey Department evaluated "proven reserves" at 15.78 Mt, with 15 Mt in the Ngana deposit. However, the Ngana deposit has a mineable reserve of only 1.6–1.8 Mt. Proved recoverable reserves have therefore been estimated as 2 Mt.

Mozambique

Coal resources in the province of Tete total 1.5 billion tonnes. (Source: Aschinjanz, Svedov, Stand und Entwicklungsaussichten der Energiewirtschaft in Mozambique; Archiv fur Energiewirtschaft Juli 1983.)

Nepal

Deposits of lignite are very small and are mined manually.

New Zealand

A major new underground mine is being developed at Strongman on the west coast of South Island to provide additional capacity for export. A major coal export facility on the west coast is still under investigation.

A development programme for underground coal gasification is progressing at Huntley in North Island.

There are no national policies specific to coal production and use. Coal is covered by the governments overall energy policy statement.

Poland

For the next 20 years the expected level of hard coal output is 130–150 Mt. Since 1993, a very large restructuring programme of coal mining has started to improve ecology and profitability.

For lignite, two basic variants are being studied:

- (decrease) a gradual decrease of production to about 55 Mt in 2010;
- (increase) some increase of production to about 85 Mt in 2010.

The most probable outcome is retaining output at the present level of 68–70 Mt.

One of the main objectives of Polish energy policy is reshaping the energy balance by reducing dependence of coal and increasing the share of gas and oil in energy supply. Even so, coal will remain the major contributor to the Polish energy economy – about 65% in 2000 and 60% in 2010. High priority will be given to:

- further improvement of hard coal quality parameters;
- coal mining restructuring – increasing productivity, reducing costs and creating the conditions for the self-financing of mines; and
- urgent realisation of ecological objectives.

Portugal

The production of anthracite from the Faixa Carbonífea do Douro comes mainly from the Pejão mine (Empresa Carbonífera do Douro), with 233 kt per annum, and from the Couto Mineiro (S. Pedro da Cova), with 51 kt per annum. Production supplies the Tapada do Outeiro power station and cement industries.

Slovakia (Republic of)

There are five main coal-mines – Cígel, Handlevá, Nováky, Dolina and Záherie.

South Africa

The significant coal deposits occur within the Great Karoo basin which extends about 200 km from west to east across the northern Orange Free State and south and east Transvaal, and about 400 km from the southern Transvaal in the north to the centre of Natal in the south.

Recoverable reserves in South African coalfields total some 55 333 Mt out of a total resource estimated at over 121 218 Mt. Of this amount, the Witbank and Highveld coalfields each has recoverable reserves of over 11 000 Mt. Some 96% of mineable reserves occur at depths of less than 200 m. In terms of rank, over 95% of South African coal reserves consist of bituminous coal, with 2% consisting of anthracite and less than 2% comprising metallurgical coal.

The South African coal industry is based on the resources found in 19 coalfields that occur in an arc from the Orange Free State in the west to Natal in the east. All the mines are privately operated, with sales being made to domestic users, such as the electricity generating utility Eskom, or into export markets. In addition, organisations such as the synthetic fuels company, Sasol, and the South African iron and steel firm, Iscor, operate mines to supply their own requirements.

Swaziland

Coal resources are estimated at 1 000 Mt, of which it is estimated that 50% are "proven reserves". However, *proved recoverable reserves* as defined here are estimated to be considerably smaller than this owing to the disturbed geological conditions which exist and the reluctance of prospective exploration companies to construct mines. A value of 116 Mt has therefore been used for bituminous coal, based on a World Bank report (reference [ii] in the section at the end of this chapter).

At present only one mine, situated in the Mpaka coalfield in central Swaziland, is operational and produces anthracite coal. This field has access to the main railway line to Maputo to the north-east and to Richards Bay in the south. The closed Emaswati colliery, to which the 999 Mt of sub-bituminous coal refers, was owned by a private company that mined the coal for export. This mine will be re-opened if a proposed 100 MW thermal powerplant is approved. The continued use of coal in the country remains a debatable issue because of environmental pollution concerns.

Coal production in Swaziland is strictly for export. Local coal demand is satisfied by imports from the Republic of South Africa.

Taiwan, China

The industry has shrunk in recent years due to a shortage of miners. Safety measures have been improved continuously, although less technical development has occurred.

The Taiwan coal policy was issued in 1984, and includes the following items:

- to enforce the mine safety laws strictly;
- to assist the profitable mines continue in operation;
- to assist redundant miners to shift their jobs to other industries and to subsidise their pensions;
- to encourage mining investment from abroad and overseas joint ventures.

Tanzania (United Republic of)

Tanzanian coal ranges from bituminous to sub-bituminous and is non-coking or weakly coking in character. It is generally low in sulphur and phosphorus.

Coal has entered the energy scene very recently. It is now used for power generation for a township (6 MW), a cement factory and a pulp and paper mill. These are located a long way from the mine. Widespread use of coal is hindered by logistics.

Thailand

All coal-mines are operated by open-pit mining methods. The low-grade coal as lignite is supplied to mine-mouth powerplants. The high-grade coal is supplied to cement plants and some industrial boilers.

In the near future, the main coal production should be centred on the specific areas where the government has invested in exploration. The country uses coal as an alternative energy to substitute petroleum for particular purposes because of its lower price and domestic supply.

United Kingdom

In its 1992–93 annual accounts, British Coal estimated that 190 000 Mt of coal resources lie under the UK in seams over 0.6 m thick and less than 1 200 m deep. However, the majority of these coal resources are not within the take of currently operating mines. In its evidence to the House of Commons Trade and Industry Select Committee, British Coal estimated that in 1992 its mines had classified and unclassified reserves of about 2 000 Mt, evenly divided between the two categories. (Classified reserves are those which British Coal considers able to support mining projects at the time of classification, and which it therefore regards as economically recoverable. Unclassified reserves are those which are only partly proven or unable to support mining projects at the time of classification.) These reserves account for about 1% of the 190 000 Mt of resources.

British Coal's view was that, of this 190 000 Mt, 4000–5 000 Mt could be brought to the surface using known technologies. This figure took no account, however, of the cost of extracting the coal or of whether planning could be obtained.

There is inevitably considerable uncertainty about any assessment of the size of economically recoverable reserves. Estimates depend on assumptions about the future level of costs, the prices of fuels, and the prices imports. On current expectations, a programme of investment in new deep mines could not be economically justified. The reserves which can be economically mined are therefore effectively limited to those which can be accessed from deep mines or open-cast sites working at any particular time.

British Coal's mining business was privatised in 1994.

The information on lignite refers only to the Crumlin deposit in County Antrim, Northern Ireland. Additional deposits of lignite also occur near Coagh, County Tyrone and Ballymoney, County Antrim, but these have not been explored in detail. Details of the deposits' characteristics are not available. A reasonable estimate for lignite resources which may occur in Northern Ireland is in the order of 1 000 Mt.

United States of America

Longwall mining accounts for an increasing proportion of underground coal production in the United States. Increases in the capacity of longwall face conveyors have allowed the development of larger longwall panels. Along with other technological improvements such as the increased power of coal shearers, these factors have led to greater productivity in underground mining.

The US Department of Energy's Clean Coal Technology Demonstration Programme is fostering the development of new technologies for producing energy from coal. At the end of 1993, 45 demonstration projects were completed or under way.

Coal is currently the largest single resource used for US electricity generation. Approximately 56% of the nation's generating capacity is based on coal.

Although continued use of coal for electricity generation is economically advantageous, coal-based generation is a major contributor to the nation's carbon emissions and other pollutants. To ensure efficient use of coal and other energy resources, the Department of Energy is interested in developing means to ensure that decisions concerning generation resources are made with knowledge of the full range of long-term impacts and costs associated with a technology. Costs that are external to the price of electricity generated from coal and other resources need to be taken into consideration.

The Department conducts research, demonstration and commercialisation projects to improve the efficiency of coal-based generation and reduce carbon and other emissions. Federal/industry cost-shared funding for "clean coal technologies" is a departmental priority.

Zaire

There are two operational coalfields – Luena and Lukuga – both in the Shaba province. Luena deposits are estimated at 20 Mt, of which about half is considered recoverable. The coal is mainly high-ash and non-coking. The Lukuga basin has reserves of about 700 Mt. However, the seams occur over a wide area and the field is disrupted by folding and large faults that limit exploitation to small areas. As a consequence, mineable coal is estimated at only 78 Mt.

These Country notes have been compiled from various sources including:
- WEC Member Committees;
- *Major Coalfields of the World,* IEA Coal Research, London, January 1993;
- *Concise Guide to World Coalfields,* IEA Coal Research, London, 1983.

Table 1.1 Proved recoverable reserves of coal (Mtonnes)

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
AFRICA				
Algeria	43	—	—	43
Botswana	3 500	—	—	3 500
Cen. African Rep.	—	—	4	4
Egypt (Arab Rep)	13	40	—	53
Malawi	2	—	—	2
Morocco	45	—	—	45
Mozambique (*a*)	240	—	—	240
Niger	70	—	—	70
Nigeria	21	169	—	190
South Africa	55 333	—	—	55 333
Swaziland	116	999	—	1 115
Tanzania	200	*	—	200
Zaire	88	—	—	88
Zambia	—	55	—	55
Zimbabwe	734	—	—	734
Total Africa	**60 405**	**1 263**	**4**	**61 672**
AMERICA, NORTH				
Canada (*a*)	4 509	1 287	2 827	8 623
Greenland	—	183	—	183
Mexico	860	300	51	1 211
USA	106 495	102 515	31 548	240 558
Total America, North	**111 864**	**104 285**	**34 426**	**250 575**
AMERICA, SOUTH				
Argentina	—	130	—	130
Bolivia	1	—	—	1
Brazil (*a*)	—	2 845	—	2 845
Chile (*b*)	31	1 150	—	1 181
Colombia	4 240	299	—	4 539
Ecuador (*a*)	—	—	24	24
Peru	960	—	100	1 060
Venezuela	417	—	—	417
Total America, South	**5 649**	**4 424**	**124**	**10 197**
ANTARCTICA				
Antarctica	N	—	—	N
Total Antarctica	**—**	**—**	**—**	**—**
ASIA				
Afghanistan	66	—	—	66
China (*a*)	62 200	33 700	18 600	114 500
India (*a*)	68 047	—	1 900	69 947
Indonesia	962	7 054	24 047	32 063
Japan	804	—	17	821
Korea (DPR)	300	300	—	600
Korea (Republic of)	183	—	—	183
Malaysia	4	—	—	4
Mongolia (*a*)	*	—	*	—
Myanmar (Burma)	2.3	—	—	2.3

— unknown or zero N less than 0.1 * see notes.

All totals and sub-totals are rounded.

See Country note for an explanation of the proved recoverable reserves data for China.

Table 1.1 Proved recoverable reserves of coal (Mtonnes), contd.

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
Nepal	—	—	N	N
Pakistan (*a*)	—	734	—	734
Philippines	0.3	174	88	263
Taiwan, China	99	—	—	99
Thailand	N	170	829	999
Turkey	162	—	6 986	7 148
Vietnam	150	—	—	150
Total Asia	**132 980**	**42 132**	**52 467**	**227 579**
CIS or former USSR				
(*Former*) USSR	104 000	37 000	100 000	241 000
of which: Kyrgyzstan	—	—	812	812
Total CIS or former USSR	**104 000**	**37 000**	**100 000**	**241 000**
EUROPE				
Albania	—	*	*	—
Austria	—	—	31	31
Bulgaria	13	233	2 465	2 710
(*Former*) Czechoslovakia	1 642	228	3 500	5 370
of which: Slovakia (*a*)	—	228	—	228
France	113	26	—	139
Germany	24 000	—	43 300	67 300
Greece	—	—	3 000	3 000
Hungary	596	982	2 883	4 461
Ireland	14	—	—	14
Italy	—	27	7	34
Netherlands	497	—	—	497
Norway	—	4	—	4
Poland (*a,b*)	29 100	—	13 000	42 100
Portugal	3	—	33	36
Romania	0.6	810	2 307	3 118
Spain (*a*)	850	400	200	1 450
Sweden	—	1	—	1
United Kingdom (*a*)	2 000	—	500	2 500
Yugoslavia (S.F.R.)	70	1 500	15 000	16 570
of which: Croatia	6.3	—	33	39
Slovenia	—	*	*	—
Total Europe	**58 898**	**4 211**	**86 226**	**149 334**
MIDDLE EAST				
Iran	193	—	—	193
Total Middle East	**193**	**—**	**—**	**193**
OCEANIA				
Australia	45 340	3 700	41 900	90 940
New Caledonia	2	—	—	2
New Zealand	27	81	9	117
Total Oceania	**45 369**	**3 781**	**41 909**	**91 059**
WORLD TOTALS	**519 358**	**197 096**	**315 156**	**1 031 610**

– unknown or zero N less than 0.1 * see notes

All totals and sub-totals are rounded.

See Country note for an explanation of the proved recoverable reserves data for the UK.

Table 1.2 Production of coal (Mtonnes)

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
AFRICA				
Algeria	0.02	—	—	0.02
Morocco	0.6	—	—	0.6
Mozambique	0.04	—	—	0.04
Niger (+)	0.17	—	—	0.17
Nigeria (+)	0.1	—	—	0.1
South Africa (*b*)	182.88	—	—	182.88
Swaziland	0.05	—	—	0.05
Zaire	0.09	—	—	0.09
Zambia	—	0.4	—	0.4
Zimbabwe (+)	5.27	—	—	5.27
Total Africa	**189**	**—**	**—**	**190**
AMERICA, NORTH				
Canada	35.31	23.66	10.04	69.01
Mexico	4	5	—	9
USA	527.05	249.39	81.24	857.68
Total America, North	**566**	**278**	**91**	**936**
AMERICA, SOUTH				
Argentina	—	0.17	—	0.17
Brazil	—	4.5	—	4.5
Chile (*a* +)	1.63	1	—	2.63
Colombia	21.71	—	—	21.71
Peru	0.08	—	—	0.08
Venezuela	3.89	—	—	3.89
Total America, South	**27**	**6**	**—**	**33**
ASIA				
China (+)	1 150	—	—	1 150
India (*a*)	246	—	17	263
Indonesia (+)	10.56	8.86	7.64	27.06
Japan	7.2	—	—	7.2
Kazakhstan (+)	111.87	—	4.67	116.54
Korea (DPR) (+)	72	27	—	99
Korea (Republic of)	9.4	—	—	9.4
Kyrgyzstan	0.8	0.6	1.4	2.8
Malaysia (+)	0.26	—	0.03	0.29
Mongolia (*a*)	0.63	—	6.8	7.43
Myanmar (Burma)	0.03	—	0.04	0.07
Nepal	0.1	—	0.01	0.11
Pakistan (*a*)	—	3.3	—	3.3
Philippines (*a*)	—	1.68	N	1.68
Taiwan, China	0.33	—	—	0.33
Tajikistan (+)	0.2	—	—	0.2
Thailand	0.02	4.09	11.5	15.61

– unknown or zero N less than 0.1 * see notes
+ Signifies that sub-bituminous is included with bituminous.

All totals and sub-totals are rounded.

Table 1.2 Production of coal (Mtonnes), contd.

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
Turkey	2.79	0.09	45.29	48.17
Uzbekistan (+)	0.15	—	3.66	3.81
Vietnam	5.9	—	—	5.9
Total Asia	**1 618**	**46**	**98**	**1 762**
EUROPE				
Albania (a)	—	—	0.38	0.38
Austria	—	—	1.69	1.69
Bosnia-Hercegovina (a)	—	—	15	15
Bulgaria	0.28	4.55	25.35	30.18
Croatia	0.1	—	0.01	0.11
Czech Rep. (+)	18.36	—	66.88	85.24
Estonia	—	—	14.92	14.92
France	8.6	1.7	—	10.3
Germany (a)	64.17	—	221.8	285.97
Greece	—	—	54.8	54.8
Hungary	0.95	6.77	6.89	14.61
Ireland	N	—	—	N
Italy	—	N	1	1
Macedonia	—	—	7.3	7.3
Norway	—	0.3	—	0.3
Poland	130.1	—	68.1	198.2
Portugal (a)	0.2	—	—	0.2
Romania	—	1.15	38.6	39.75
Russian Fed.	190.56	—	113.55	304.11
Serbia, Montenegro (+)	0.07	—	37.36	37.43
Slovakia (a)	—	3.81	—	3.81
Slovenia	—	1.2	3.92	5.12
Spain	14	4.7	12.3	31
Sweden	—	N	—	N
Ukraine (+)	111.57	—	4.15	115.72
United Kingdom	67.46	—	—	67.46
Total Europe	**606**	**24**	**694**	**1 325**
MIDDLE EAST				
Iran	1.46	—	—	1.46
Total Middle East	**1**	**—**	**—**	**1**
OCEANIA				
Australia	158.47	18.06	47.65	224.18
New Zealand	1.22	1.7	0.18	3.1
Total Oceania	**160**	**20**	**48**	**227**
WORLD TOTALS	**3 169**	**374**	**931**	**4 474**

– unknown or zero N less than 0.1 * see notes
+ Signifies that sub-bituminous is included with bituminous.

All totals and sub-totals are rounded.

Table 1.3 Consumption of coal (Mtonnes), contd.

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
AFRICA				
Algeria (+)	1.42	—	—	1.42
Egypt (Arab Rep) (+)	1.5	—	—	1.5
Kenya (+)	0.13	—	—	0.13
Madagascar (+)	0.01	—	—	0.01
Malawi (+)	0.02	—	—	0.02
Mauritius (+)	0.06	—	—	0.06
Morocco (+)	1.64	—	—	1.64
Mozambique (+)	0.06	—	—	0.06
Niger (+)	0.17	—	—	0.17
Nigeria (+)	0.06	—	—	0.06
South Africa	140.23	—	—	140.23
Swaziland	0.07	—	—	0.07
Tunisia (+)	0.01	—	—	0.01
Zaire (+)	0.13	—	—	0.13
Zambia	—	0.4	—	0.4
Zimbabwe (+)	5.39	—	—	5.39
Total Africa	**151**	—	—	**151**
AMERICA, NORTH				
Canada	15.85	23.65	10.01	49.51
Cuba (+)	0.15	—	—	0.15
Dominican Rep. (+)	0.12	—	—	0.12
Haiti	0.01	—	—	0.01
Jamaica	0.06	—	—	0.06
Mexico	6	5.4	—	11.4
Panama (+)	0.06	—	—	0.06
Puerto Rico (+)	0.16	—	—	0.16
USA (+)	512.15	249.21	81.44	842.8
Total America, North	**535**	**278**	**91**	**904**
AMERICA, SOUTH				
Argentina	—	1.08	—	1.08
Brazil	—	15.8	—	15.8
Chile (*a* +)	1.98	1	—	2.98
Colombia	5.5	—	—	5.5
Peru (+)	0.23	—	—	0.23
Venezuela (+)	0.29	—	—	0.29
Total America, South	**8**	**18**	—	**26**
ASIA				
Azerbaijan (+)	0.01	—	—	0.01
Bangladesh (+)	0.38	—	—	0.38
Bhutan (+)	0.02	—	—	0.02
China (+)	1 129	—	—	1 129
Cyprus (*a* +)	0.11	—	—	0.11
Georgia (+)	0.16	—	—	0.16
Hong Kong (+)	11.83	—	—	11.83
India (*a*)	256	—	17	273

– unknown or zero N less than 0.1 * see notes
+ Signifies that sub-bituminous is included with bituminous.

All totals and sub-totals are rounded.

Table 1.3 Consumption of coal (Mtonnes), contd.

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
Indonesia (+)	0.49	2.68	5.19	8.36
Japan	118.6	—	—	118.6
Kazakhstan (+)	80.53	—	4.67	85.2
Korea (DPR) (+)	73.95	27	—	100.95
Korea (Republic of)	41.7	—	—	41.7
Kyrgyzstan (+)	1.15	—	0.99	2.14
Malaysia (+)	2.06	—	—	2.06
Mongolia (+)	0.63	—	6.3	6.93
Myanmar (Burma) (+)	0.04	—	0.04	0.08
Nepal	0.1	—	0.01	0.11
Pakistan (*a* +)	4.24	—	—	4.24
Philippines (+)	2.37	—	—	2.37
Taiwan, China	26	—	—	26
Tajikistan (+)	0.18	—	—	0.18
Thailand	0.94	4.09	11.5	16.53
Turkey	8.55	0.1	47.34	55.99
Turkmenistan (+)	0.14	—	—	0.14
Uzbekistan (+)	0.06	—	3.66	3.72
Vietnam	3.97	—	—	3.97
Total Asia	**1 763**	**34**	**97**	**1 894**
EUROPE				
Albania (*a* +)	0.25	—	0.38	0.63
Austria	3.02	—	1.35	4.37
Belarus (+)	1.61	—	—	1.61
Belgium	12.15	0.66	0.23	13.04
Bosnia-Hercegovina (*a*)	—	—	15	15
Bulgaria	3.24	3.42	25.75	32.41
Croatia	0.41	—	0.22	0.63
Czech Rep. (+)	14.6	—	58.09	72.69
Denmark	11.9	—	—	11.9
Estonia (+)	0.13	—	16.47	16.6
Finland (+)	6.8	—	—	6.8
France	21.41	1.73	—	23.14
Germany (*a*)	77.88	—	226.04	303.92
Greece	1.45	—	55.17	56.62
Hungary	1.52	7.96	7.28	16.76
Iceland (*a*)	0.05	N	—	0.05
Ireland	2.89	—	0.04	2.93
Italy	14	N	1	15
Latvia (+)	0.6	—	—	0.6
Lithuania	0.66	—	—	0.66
Luxembourg	0.28	—	—	0.28
Macedonia	—	—	7.45	7.45
Malta (+)	0.3	—	—	0.3
Moldovia (Rep. of) (+)	2.14	—	—	2.14
Netherlands	13.1	—	—	13.1
Norway	—	1.7	—	1.7

– unknown or zero N less than 0.1 * see notes
+ Signifies that sub-bituminous is included with bituminous.

All totals and sub-totals are rounded.

Table 1.3 Consumption of coal (Mtonnes), contd.

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
Poland	110	—	67.2	177.2
Portugal	4.95	—	—	4.95
Romania	2.98	1.15	39.69	43.82
Russian Fed.	203.1	—	112.23	315.33
Serbia, Montenegro (+)	0.13	—	37.36	37.49
Slovakia (*a*)	5.38	3.81	5.21	14.4
Slovenia (*a*)	N	1.34	4.27	5.61
Spain	26.7	4.7	12.3	43.7
Sweden	3.3	—	—	3.3
Switzerland (*a* +)	0.3	—	—	0.3
Ukraine (+)	116.37	—	4.15	120.52
United Kingdom	86.8	—	—	86.8
Total Europe	**750**	**26**	**697**	**1 474**
MIDDLE EAST				
Iran (+)	7.57	—	—	7.57
Israel (+)	5.65	—	—	5.65
Total Middle East	**13**	**—**	**—**	**13**
OCEANIA				
Australia	33.87	18.06	47.65	99.58
Fiji (+)	0.02	—	—	0.02
New Caledonia (+)	0.17	—	—	0.17
New Zealand	0.43	1.7	0.18	2.31
Total Oceania	**34**	**20**	**48**	**102**
WORLD TOTALS	**3 255**	**377**	**933**	**4 564**

– unknown or zero N less than 0.1 * see notes

+ Signifies that sub-bituminous is included with bituminous.

All totals and sub-totals are rounded.

Table 1.4 Resources and reserves of coal

	Rank of fuel (see footnotes)	Proved amount in place			Proved recoverable reserves			Estimated additional amount in place	Estimated additional reserves recoverable
		Tonnage	Maximun depth of deposits	Minimum seam thickness	Tonnage	By surface mining	Of coking quality		
		Mt	m	m	Mt	%	%	Mt	Mt
Afghanistan	BT	112	250	0.8	66			400	—
Albania	SB	—			*			—	—
	LN	15			*			—	—
Algeria	BT	—	600	0.3	43	0	100	—	—
Antarctica	BT	N			N			—	—
Argentina	SB	195	600	1.0	130	30		385	—
	LN	—			—			7 350	—
Australia	BT	66 220	600	1.5	45 340	45	—	500 000	250 000
	SB	4 100	600	1.5	3 700	—	0	—	—
	LN	46 500	500	15	41 900	100	0	204 000	183 000
Austria	LN	347			31	90	0	61	—
Bangladesh	BT	1 054	1 158	0.3	—			—	—
Bolivia	BT	—			1			—	—
Botswana	BT	7 000			3 500			100 000	—
Brazil (*a*)	SB	10 162	870	0.7	2 845	21	7	22 239	6 204
Bulgaria	BT	48	500	0.4	13	N	59	1 202	14
	SB	416	450	0.8	233	5		37	115
	LN	4 375	230	1.0	2 465	96		2 581	1 608
Canada (*a*)	BT	6 435	*	0.6	4 509	88	66	26 045	—
	SB	12 740	300	1.5	1 287	100	0	23 760	—
	LN	1 615	50	1.5	2 827	100	0	8 230	—
Cen. African Rep.	LN	4			4	100		—	—
Chile (*b*)	BT	79	900	0.7	31	0	7	125	75
	SB	4 500	80	2.5	1 150	30	0	5 000	—
China (*a*)	BT	177 600	1 000	0.7	62 200	7	14	363 200	67 300
	SB	71 600	500	0.8	33 700			217 900	48 000
	LN	37 200	400	1.0	18 600	20	0	86 800	34 700
Colombia	BT	5 449	300	0.7	4 240	95	50	13 173	—
	SB	411	200	0.8	299	60	0	3 176	—
Costa Rica	SB	25	350	1.0	—			22	—
	LN	2			—			—	—
(*Former*) Czechoslovakia	BT	5 400	1 800	0.6	1 642		62	3 600	1 460
	SB	447			228			—	—
	LN	565 256	500	1.0	3 500	85	0	1 630	1 000
of which: Slovakia (*a*)	SB	447	525	1.9	228			—	—
Ecuador (*a*)	LN	30	100	200	24			6	—
Egypt (Arab Rep)	BT	25			13			—	—
	SB	—	400	0.7	40			—	—
Ethiopia	SB	14	300	0.3	—			28	—
France (*a*)	BT	594	1 250	1.0	113	12	49	200	50
	SB	129	1 250	2.0	26	0		—	—
	LN	—			—			165	85
Germany	BT	44 000	1 500	0.3	24 000		60	186 300	—
	LN	78 000	600	2.0	43 300	100		—	—
Greece	LN	5 312			3 000			—	—
Greenland	SB	—	560		183			200	100
Haiti	LN	13			—			27	—
Honduras	SB	21			—			—	—
Hungary	BT	1 407	900	0.4	596	N	26	702	77
	SB	2 841	600	1.0	982	N	0	1 952	369
	LN	5 465	140	1.0	2 883	100	0	3 337	1 124

Rank of fuel – BT=Bituminous including anthracite SB=Sub-bituminous LN=Lignite
– unknown or zero N less than 0.1 * see notes

See Country note for an explanation of the proved recoverable reserves data for China.

Table 1.4 Resources and reserves of coal, contd.

	Rank of fuel (see footnotes)	Proved amount in place			Proved recoverable reserves			Estimated additional amount in place	Estimated additional reserves recoverable
		Tonnage	Maximum depth of deposits	Minimum seam thickness	Tonnage	By surface mining	Of coking quality		
		Mt	m	m	Mt	%	%	Mt	Mt
India (*a*)	BT	196 892	1 200	1.2	68 047	88	10	86 088	42 766
	LN	26 000	250	0.5	1 900	100	0	3 932	3 932
Indonesia	BT	—	300	2.0	962	15	0	—	—
	SB	—	300	2.0	7 054	27	0	—	—
	LN	—	100	12	24 047	59	0	—	—
Iran	BT	3 754			193			—	—
	LN	2 295			—			—	—
Ireland	BT	19	335	0.3	14	2	0	26	16
Italy	SB	60	500	1.4	27	0	0	280	—
	LN	15	150	3.0	7	100	0	22	20
Japan	BT	8 296	1 200	0.6	804			—	—
	LN	175	300	0.6	17		0	—	—
Korea (DPR)	BT	2 000			300			2 700	—
	SB	300			300			2 200	—
Korea (Republic of)	BT	276	1 000	0.7	183	0	0	237	98
Madagascar	BT	1 000			—			—	—
	LN	75			—			—	—
Malawi	BT	15			2	0	0	—	—
Malaysia	BT	15	100	0.6	4			78	—
	SB	82			—			305	26
	LN	44	100	0.3	—			270	—
Mali	LN	—			—			3	—
Mexico	BT	1 569	500	0.8	860	14	90	1 960	1 168
	SB	640	300	0.8	300	17	0	103	434
	LN	92	200	0.7	51	60	0	110	95
Mongolia (*a*)	BT	12 000			*			—	—
	LN	12 000			*			—	—
Morocco	BT	134	600	0.5	45			—	—
	LN	44	100	1.0	—			—	—
Mozambique (*a*)	BT	—			240	83	40	155	—
Myanmar (Burma)	BT	4.5			2.3			120	—
	LN	—			—			80	—
Nepal	LN	—		1.5	N	100	0	—	—
Netherlands	BT	1 406	1 500	0.8	497	0		2 750	1 375
New Caledonia	BT	4			2			8	—
New Zealand (*a*)	BT	33	400	0.5	27	90	70	292	15
	SB	207	400	1.0	81	20		1 140	9
	LN	332	300	1.0	9	100		6 641	28
Niger	BT	—			70			—	—
Nigeria	BT	—			21			21	—
	SB	338			169	24		1 000	—
Norway	SB	69	450	0.6	4	0	75	—	—
Pakistan (*a*)	SB	—		0.3	734			—	—
Peru	BT	—			960			—	—
	LN	—			100			—	—
Philippines	BT	0.6	300	0.6	0.3	0		N	N
	SB	265	550	0.6	174	64		937	95
	LN	104	75	1.0	88	100		232	25
Poland (*a-c*)	BT	64 650	1 200	0.7	29 100	0	40	113 300	—
	LN	14 413	350	3.0	13 000	100		30 700	27 000

Rank of fuel – BT=Bituminous including anthracite SB=Sub-bituminous LN=Lignite
– unknown or zero N less than 0.1 * see notes

Table 1.4 Resources and reserves of coal, contd.

	Rank of fuel (see footnotes)	Proved amount in place			Proved recoverable reserves			Estimated additional amount in place	Estimated additional reserves recoverable
		Tonnage	Maximum depth of deposits	Minimum seam thickness	Tonnage	By surface mining	Of coking quality		
		Mt	m	m	Mt	%	%	Mt	Mt
Portugal	BT	7.5	900	0.3	3	10	0	—	—
	LN	38	152	0.5	33	100	0	—	—
Romania	BT	0.6	500	1.0	0.6	0	0	0.6	0.6
	SB	736	1 200	1.0	810	0	30	290	320
	LN	2 463	150	2.0	2 307	69	0	1 656	1 325
South Africa	BT	121 218	400	1.0	55 333	59	4.1	5 000	—
	LN	—			—			100	70
Spain (*a-d*)	BT	1 750	1 000	0.5	850	10	5	5 500	2 500
	SB	700	800	0.5	400	15	0	1 500	750
	LN	250	250	0.5	200	100		100	100
Swaziland	BT	1 000	318	3.0	116			793	50
	SB	—			999			—	—
Sweden	SB	4	15	0.5	1	100	0	20	—
Taiwan, China	BT	174	200	0.5	99	0	0	—	—
Tanzania	BT	304	487	1.0	200			1 500	—
	SB	*			*			*	*
Thailand	BT	—			N	100		—	—
	SB	243	200	30	170	100		134	67
	LN	1 179	500	36	829	100	0	234	117
Turkey	BT	590		0.6	162		70	—	765
	LN	7 705		0.7	6 986			—	235
United Kingdom (*a*)	BT	—	1 200	0.6	2 000	21	10	190 000	—
	LN	1 000	200		500			—	—
USA	BT	226 964	671	0.2	106 495	20		468 864	—
	SB	163 860	305	1.5	102 515	34	0	276 819	—
	LN	40 631	61	0.8	31 548	100	0	393 125	—
(*Former*) USSR	BT	130 000	1 800	0.5	104 000	20		2 100 000	—
	SB	47 000	600	0.7	37 000	40	0	1 900 000	—
	LN	110 000	300	1.0	100 000	90	0	1 200 000	—
of which: Kyrgyzstan	BT	1 080		1.0	—	27	3.7	—	58
	SB	249			—	3.6		—	27
	LN	1 331		1.0	812	30		2 000	85
Venezuela	BT	697			417	65		2 117	918
Vietnam	BT	300			150			700	—
	LN	12			—			—	—
Yugoslavia (S.F.R.)	BT	80			70			22	—
	SB	1 760			1 500	45		275	—
	LN	16 000			15 000	80		3 500	—
of which: Croatia	BT	7.2	300	1.0	6.3			17	14
	LN	38	150	1.5	33	80		12	11
Slovenia	SB	87			*			—	—
	LN	358			*			—	—
Zaire	BT	720			88			—	—
Zambia	SB	69	250	1.5	55	79	0	18	14
Zimbabwe	BT	1 535			734	36	50	5 820	—
	SB	965			—			—	—

Rank of fuel – BT=Bituminous including anthracite SB=Sub-bituminous LN=Lignite
– unknown or zero N less than 0.1 * see notes

See Country note for an explanation of the proved recoverable reserves data for the UK

Table 1.5 Coal characteristics

	Bituminous including anthracite		Sub-bituminous		Lignite	
	average	range	average	range	average	range
Albania						
Heat value — MJ/kg				8.4–18.4		
Sulphur content — %				0.9–4.0		
Moisture content — %				6.0–36.0		
Ash — %				20.0–65.0		
Algeria						
Heat value — MJ/kg	31.4					
Argentina						
Heat value — MJ/kg			25.9			
Carbon content — %			42.5			
Volatile material — %			38.4			
Moisture content — %			7.4			
Ash — %			15.2			
Australia						
Heat value — MJ/kg	28	23–33	19	13.5–20.7	9.8	8.9–13.2
Sulphur content — %		0–0.5				
Carbon content — %		39–84				
Volatile material — %		20–45				
Moisture content — %		1–19				48–66
Ash — %		2.5–31				1–4
Austria						
Heat value — MJ/kg	28				12.2	10.6–11.0
Sulphur content — %					1.05	0.5–0.7
Carbon content — %					47.85	
Moisture content — %					34.6	37–40
Ash — %					16.5	10–18
Brazil (a)						
Heat value — MJ/kg			15			
Sulphur content — %			2.5			
Carbon content — %			30			
Volatile material — %			21.7			
Ash — %			48			
Bulgaria (a)						
Heat value — MJ/kg		see note	11.8	10.3–14.5	6.6	5.6–12.8
Sulphur content — %		see note	1.9	1.5–4.4	4.5	0.7–6.0
Carbon content — %		see note				
Volatile material — %		see note	50	49–61.5	61.5	53.5–67
Moisture content — %		see note	13.9	12.6–25	53.2	24.3–56.1
Ash — %		see note	47.6	29.5–53.9	32.4	28–50.7
Canada (b)						
Heat value — MJ/kg		see note	28	12–29	15	12–17
Sulphur content — %		see note	0.35	0.2–0.6	0.5	0.3–0.8
Carbon content — %		see note	49	39–52	54	51–55
Volatile material — %		see note	49	39–52	47	45–49
Moisture content — %		see note	20	13–26	32	31–33
Ash — %		see note	16	9–24	16	10–26
Chile						
Heat value — MJ/kg	24.14	18–30	23			
Sulphur content — %	1.7	0.2–2.5	2	0.3–3.7		
Carbon content — %	44	42–50	37	35–40		
Volatile material — %	42	40–44	29	22–36		
Moisture content — %	10	4–25	20	15–25		
Ash — %	14	12–18	15	7–23		
China						
Sulphur content — %		0.2–0.6			1.1	
Carbon content — %	76	60–95				
Volatile material — %	41	4–55				
Ash — %	23	8–40				
Colombia (a)						
Heat value — MJ/kg	11.77	11.59–11.95				
Sulphur content — %	0.7	0.55–0.80	1.2			
Carbon content — %	47.7	45.7–49.7	22			
Volatile material — %	33.4	31.8–35.0	45			
Moisture content — %	11.9	10.4–13.4	10			
Ash — %	7	5.6–8.4	23			

Table 1.5 Coal characteristics, contd.

	Bituminous including anthracite		Sub-bituminous		Lignite	
	average	range	average	range	average	range
Croatia						
Heat value — MJ/kg	25				12	
Sulphur content — %	10				1.2	
Carbon content — %	40				15.3	
Volatile material — %	46				64.7	
Moisture content — %	0.8				35	
Ash — %	13				19	
Czech Rep.						
Heat value — MJ/kg						9.3–13.1
Sulphur content — %						1.3–1.8
Moisture content — %						31–44
Ash — %						23.8–28.7
(Former) Czechoslovakia						
Heat value — MJ/kg	24.4	11.7–28.0			12.3	8.8–19.4
Sulphur content — %	0.65	0.6–1.5			1.8	0.7–6.0
Volatile material — %	28.3	14.7–38.7			52.9	45.1–58.9
Moisture content — %	10.7	2.5–16.3			32.7	21.5–44.4
Ash — %	18	5.2–55.4			30.2	6.6–41.1
Ethiopia						
Heat value — MJ/kg				6–28.8		
Sulphur content — %				0.03–2.4		
Carbon content — %				13.9–60.2		
Volatile material — %				11.5–37.9		
Moisture content — %				1.2–6.3		
Ash — %				13.1–68.9		
France						
Heat value — MJ/kg	30	20–35	18.2	16.3–18.5		
Sulphur content — %	0.8	0.5–2.0	5	2–7		
Carbon content — %	78	70–85	72			
Volatile material — %	35	4.0–40	43	42–44		
Moisture content — %	5	3–10	10	8–14		
Ash — %	7	5–35	27	10–32		
Germany						
Heat value — MJ/kg		32–35			8.8	7.8–11.5
Sulphur content — %	1	0.8–1.3			0.6	0.15–3.5
Carbon content — %		78–94			68	68–72
Volatile material — %		6–40			56	55–64
Moisture content — %	9	3–12			55	44–60
Ash — %	10	2–45			6.5	1.5–15
Greece						
Heat value — MJ/kg						4.3–5.4
Sulphur content — %					1	0.6–1.0
Carbon content — %					39	
Volatile material — %					60	
Moisture content — %					56	54–57
Ash — %						33–42
Hungary						
Heat value — MJ/kg	31.4		11.3		6.7	
Sulphur content — %	2.5			1.3–1.6	1.5	
Carbon content — %	81.9		68.6		62.4	
Volatile material — %	35.8		52.7		56.4	
Moisture content — %	8.7			14–25	46	
Ash — %	44.9		30		22	
India (a)						
Heat value — MJ/kg	16.05					4.60–10.05
Sulphur content — %	2				<1	0.5–2.00
Carbon content — %					71	70–73
Volatile material — %					23	19–27
Moisture content — %					51	45–55
Ash — %	35				4	2–12
Indonesia						
Heat value — MJ/kg	29.85	26.2–33.9	23.1	21.7–24.5	20.1	
Sulphur content — %	0.65	0.3–1.0	0.5	0.1–0.9	0.15	
Carbon content — %	62	42–82	41.05	38.9–43.2	34	
Volatile material — %	26.25	10.0–42.5	44.05	38.1–90	36	
Moisture content — %	11.5	5–18	75.7	73.4–78.0	35	
Ash — %	9	3–15	2.5	1–4	2	

Table 1.5 Coal characteristics, contd.

	Bituminous including anthracite		Sub-bituminous		Lignite	
	average	range	average	range	average	range
Iran						
Heat value — MJ/kg	30.5					
Ireland (a)						
Heat value — MJ/kg		see note				
Sulphur content — %		see note				
Carbon content — %		see note				
Volatile material — %		see note				
Moisture content — %		see note				
Ash — %		see note				
Italy						
Heat value — MJ/kg					6.5	5.0–7.0
Sulphur content — %					0.7	0.5–1.0
Carbon content — %					50	40–60
Volatile material — %					50	40–60
Moisture content — %					50	45–60
Ash — %					32	25–40
Japan						
Heat value — MJ/kg	24.5	20.9–27.2				
Sulphur content — %	0.76	0.2–1.56				
Carbon content — %	36.7	32.1–40.0				
Volatile material — %	35.8	28.8–41.3				
Moisture content — %	3.2	1.5–6.0				
Ash — %	24.2	16.6–35.0				
Korea (Republic of)						
Heat value — MJ/kg	18.7	7.8–24.9				
Sulphur content — %	0.6	0.4–1.4				
Carbon content — %	45	20.3–73.0				
Volatile material — %	4.8	2.0–7.2				
Moisture content — %	3.2	0.7–5.5				
Ash — %	40.2	25.5–73.0				
Kyrgyzstan (a)						
Heat value — MJ/kg		see note				
Sulphur content — %		0.5–2.7				
Ash — %		9.21–25.5				
Malaysia						
Heat value — MJ/kg	31.19	25.12–34.22	27.85	24.87–28.89		
Sulphur content — %	0.57	0.51–0.63	0.16	0.09–0.38		
Carbon content — %	84.9	80.1–86.3	70.9	69.8–71.7		
Volatile material — %	25	11.3–29.3	55.2	54.3–56.4		
Moisture content — %	6.84	1.2–11.3	17.3	11.2–22.3		
Ash — %	7.8	3.4–15.2	5.8	2.3–13.0		
Mexico						
Heat value — MJ/kg	19	16–22	23	20–25		
Sulphur content — %	1.2	0.5–1.5	0.8	1.5–1.0		
Carbon content — %	41.5	30–50	43	30–50		
Volatile material — %	18	16–23	33	32–40		
Moisture content — %	1.3	1–6	3.2	3–10		
Ash — %	38	18–46	20	18–25		
Morocco						
Heat value — MJ/kg	35					
Sulphur content — %	2					
Carbon content — %	93					
Volatile material — %	6					
Moisture content — %	6					
Ash — %	8.4					
Netherlands						
Heat value — MJ/kg	29.3					
New Zealand						
Heat value — MJ/kg	29.07	24–33	21.72	18–25	16.37	14–20
Sulphur content — %	1.5	0.2–4.7	1.1	0.1–4.5	0.6	0.3–2.3
Carbon content — %	50.8	42–67	38.6	30–46	27.6	24–37
Volatile material — %	36.1	20–41	33.9	30–38	30.9	28–38
Moisture content — %	9.8	6–18	23.3	17–31	36.1	27–43
Ash — %	3.3	0.7–5.9	4.1	2–10	5.4	3–11

Table 1.5 Coal characteristics, contd.

	Bituminous including anthracite		Sub-bituminous		Lignite	
	average	range	average	range	average	range
Norway						
Heat value — MJ/kg			28.1			
Sulphur content — %			0.97	0.77–1.13		
Carbon content — %			53.95	52.71–54.21		
Volatile material — %			39.11	38.49–39.58		
Moisture content — %				2–4		
Ash — %			6.94	5.71–8.39		
Philippines (a)						
Heat value — MJ/kg			23.5	20–27		
Sulphur content — %			1.3	0.8–1.8		
Carbon content — %			33	25–42		
Volatile material — %			34	32–36		
Moisture content — %			14	6–23		
Ash — %			14	7–20		
Poland (d)						
Heat value — MJ/kg	24.2	18.1–31.5			8.3	6.0–9.0
Sulphur content — %	0.75	0.4–1.7			0.5	0.4–0.8
Ash — %	15.2	6.4–24.0			15	8.0–24.0
Portugal						
Heat value — MJ/kg		19–20				
Sulphur content — %	1.25					
Carbon content — %		65–75				
Volatile material — %		2.5–4.0				
Moisture content — %	9					
Ash — %	40					
Romania						
Heat value — MJ/kg	26.75		16.8		6.8	
Sulphur content — %	2		2.5		3	
Carbon content — %	82					
Volatile material — %	4					
Moisture content — %	8		2		42.5	
Ash — %	20		35.1		39.7	
Slovakia (a)						
Heat value — MJ/kg			13.51	10.52–16.91		9.5–12.9
Sulphur content — %			2.45	1.52–3.13		1.0–2.5
Volatile material — %			N	0.0022–0.07		
Moisture content — %			29.14			11–45
Ash — %			24.42	20.18–44.35 18.44–29.46		27.6–45.7
Slovenia						
Heat value — MJ/kg			12.06	10.1–18.1	10.07	9.8–14.5
South Africa (a)						
Heat value — MJ/kg	32.3	25.3–35.7				
Sulphur content — %	0.84	0.16–4.32				
Carbon content — %	84.2	75.2–92.5				
Volatile material — %	26.5	6.1–41.6				
Ash — %	15.4	6.0–42.7				
Spain						
Heat value — MJ/kg		19–22		14–15	8.3	
Sulphur content — %		0.8–1.0		5–6	2.4	
Carbon content — %		80–90		60–70		50–60
Volatile material — %		13–16		33–36	35.9	
Moisture content — %		9.4–9.8		20–21	43.2	
Ash — %		28–34		33–35	37.9	
Swaziland						
Heat value — MJ/kg	31.4					
Sulphur content — %	0.65					
Carbon content — %	84.45					
Volatile material — %	5.4					
Moisture content — %	1.6					
Ash — %	9.25					

Table 1.5 Coal characteristics, contd.

	Bituminous including anthracite		Sub-bituminous		Lignite	
	average	range	average	range	average	range
Sweden						
Heat value — MJ/kg			24	22–25		
Sulphur content — %			0.45	0.3–0.5		
Carbon content — %			76			
Volatile material — %			41	40–42		
Moisture content — %			14	12–17		
Ash — %			39	35–40		
Taiwan, China						
Heat value — MJ/kg	34.45	33.94–35.04				
Sulphur content — %	0.86	0.74–0.97				
Carbon content — %	57.96	56.74–59.30				
Volatile material — %	42.05	40.70–43.26				
Moisture content — %	2.27	1.98–2.53				
Ash — %	13.92	4.25–18.71				
Tanzania						
Heat value — MJ/kg		24.34–25.26				
Sulphur content — %		0.13–11.33		0.67–0.99		
Volatile material — %				37.2–38.9		
Ash — %		9.3–92.0		23.7–27.8		
Thailand						
Heat value — MJ/kg		20.09–32.23		15.07–34.33		6.7–16.33
Sulphur content — %				0.71–3.5		0.8–2.4
Carbon content — %				37.3–51.7	13.26	
Volatile material — %				30.0–39.5		20–41.5
Moisture content — %				7.7–20.9		30–35
Ash — %				1.06–8.1		10–47
Turkey						
Heat value — MJ/kg	26.58	22.81–30.35			24	22–28
Sulphur content — %					2.8	0.5–6.0
Carbon content — %	63	58–68			48	37–51
Volatile material — %	37	32–42			58	49–65
Moisture content — %	8	2–14			33	10–55
Ash — %	12	9–15			38	18–54
United Kingdom						
Heat value — MJ/kg	31	27.5–35.5				
Sulphur content — %	1.66	0.4–2.9				
Carbon content — %	70	55.0–93.0				
Volatile material — %	37	5.0–44				
Moisture content — %	12	2.0–19.0				
Ash — %	16.5	2.0–21.5				
USA						
Heat value — MJ/kg	28.02	23.33–28.02	20.38	18.87–23.87	14.83	14.09–15.34
Sulphur content — %	1.71	0.55–3.68	0.41	0.20–0.87	0.94	0.57–1.97
Ash — %	10.2	5.67–15.10	7	5.01–23.86	14.4	8.21–25.76
(Former) USSR (a)						
Heat value — MJ/kg			19.5	9.3–33.1		
Sulphur content — %			1.44	0.1–7.3		
Carbon content — %			80.6	62–95.7		
Volatile material — %			33.5	2.4–62.7		
Moisture content — %			13.2	4.1–58		
Ash — %			26.3	10–52		
Venezuela						
Heat value — MJ/kg		30.2–33.8				
Sulphur content — %	0.66	0.43–0.95				
Carbon content — %	56.46	40.80–73.53				
Volatile material — %	35.16	24.87–44.73				
Moisture content — %	5.72	1.60–10.06				
Ash — %	3.31	1.20–7.00				
Zambia						
Heat value — MJ/kg			33.62	32.19–35.06		
Sulphur content — %			1.59	1.27–1.91		
Carbon content — %			77.31	73.49–81.14		
Volatile material — %			22.71	26.57–18.86		
Moisture content — %			1.15	1.06–1.25		
Ash — %			23.41	22.02–24.80		

General comments on the data tables

The tables cover bituminous coal (including anthracite), sub-bituminous coal and lignite. Data for peat are given in Chapter 8. There is no internationally accepted system of demarcation between coals of different rank, but reference is made to the standards used by individual countries where available.

There is an important distinction between "proved recoverable reserves", as used by the WEC, and the IEA term "accessible coal in significant coalfields".

The WEC definition of proved recoverable reserves includes the words "*... that can be recovered under present and expected local economic conditions with existing available technology*".

The IEA defines accessible coal in significant coalfields as being the "*amount of coal likely to be considered for extraction from significant coalfields within the next 20 years*", where a significant coalfield is a "*coalfield whose collective physical characteristics render it likely either to make a significant contribution to, or to enter into the detailed commercial mining and market evaluations required in order to achieve world coal supply over the next 20 years*".

When comparing "proved reserves" and "accessible coal in significant coalfields" it is important to recognise that the former takes *economic conditions* and *existing available technology* into account without limitation as to time, while the latter concentrates on the *physical characteristics* which render it likely to make a significant contribution to world coal supplies in the next 20 years. For example, to be considered accessible, the coalfield has to be already served by adequate transport infrastructure.

A final comment applies to all the tables. There are no internationally agreed standards for estimating coal reserves and, although the WEC attempts to establish precisely worded definitions, it is a matter of judgement for each country to determine the quantities which, in its opinion, meet these definitions.

For the reasons given above, care is needed when comparing the reserves of different countries and when comparing "proved recoverable reserves" with "accessible coal in significant coalfields". In most instances only a fraction of proved recoverable reserves are considered to be accessible coal. However, there are instances where the value for accessible coal is significantly greater than proved recoverable reserves. Where this occurs it is generally due to the particular criteria applied by the member country to its assessment of reserves.

Definitions

Proved amount in place is the tonnage that has been both carefully measured and has also been assessed as exploitable under present and expected local economic conditions with existing available technology.

Maximum depth of deposits and minimum seam thickness relate to proved amount in place.

Proved recoverable reserves are the tonnage of proved amount in place that can be recovered (extracted from the earth in raw form) under present and expected local economic conditions with existing available technology.

Percentage recoverable by surface mining and percentage recoverable of coking quality relate to proved recoverable reserves.

Estimated additional amount in place is the indicated and inferred tonnage *additional* to the proved amount in place. It includes estimates of amounts which could exist in unexplored extensions of known deposits or in undiscovered deposits in known fuel-bearing areas, as well as amounts inferred through knowledge of favourable geological conditions. The estimates are based on the results of geological and exploratory information about an area, or on evidence of duplication or parallelism of geological conditions that occur in known deposits. Deposits, the existence of which is merely speculative, are not included.

Estimated additional reserves recoverable is the quantity of the estimated additional amount in place which might become recoverable within foreseeable economic and technological limits.

Annual production is the amount produced in 1993. If some other year applies it is recorded in the notes and references.

Annual internal consumption is the total amount of solid fossil fuel consumed internally, *including imports*, in 1993. If some other year applies it is recorded in the notes and references.

Characteristics of production for the following ranges and/or average values are given:

- sulphur content – dry;
- heat value – moist, ash-free;
- carbon content – dry, ash-free;
- volatile matter – dry, ash-free;
- moisture content – moist, as mined;
- ash – dry.

Notes to Tables 1.1–1.5

Albania

(a) Production and consumption data classified as lignite includes some sub-bituminous production.

Bosnia-Hercegovina

(a) Data apply to 1992.

Brazil

(a) Coal rank is bituminous (high volatility) to sub-bituminous. The ash content of raw coal is high, with mean values between 50% and 65%; sulphur content varies.

Bulgaria

(a) The coal characteristics for bituminous coal and anthracite are given separately as follows:

	Heat value MJ/kg	Sulphur content %	Carbon content %	Volatile matter %	Moisture content %	Ash %
Bituminous coal						
range	16.3-18.5	2.2-2.6	–	18-22	4-7	39-50
average	17.57	2.4	–	20	4.77	44.5
Anthracite						
range	17.2-20.0	0.9	–	3-4	5-9	28-40
average	18.83	0.9	–	3.5	7.1	34.5

– Calorific value for sub-bituminous coal is the maximum with cleaning.
– Calorific value for bituminous coal and anthracites is without cleaning.

Canada

(a) Maximum depth of deposits for bituminous coal is 600 m as given in the table, except for Sydney coalfield, Nova Scotia, where the maximum depth is 1 200 m.

(b) Characteristics of production for bituminous coal are sub-divided according to the table below into eastern Canada (Nova Scotia and New Brunswick) and western Canada (Alberta and British Columbia) due to the different geological origins of the two production regions.

	Heat value MJ/kg	Sulphur content %	Carbon content %	Volatile matter %	Moisture content %	Ash %
Eastern Canada						
range	30-34	1-8	77-86	31-40	3-9	3-20
average	33	2	83	38	8	5
Western Canada						
range	27-36	0.2-0.8	77-91	19-37	3-10	7-20
average	34	0.4	87	26	8	10

Chile

(a) Production and consumption figures apply to 1992.

China

(a) Please refer to the Country notes for China for important clarification of resources and reserves data.

Colombia

(a) Heat value for bituminous coal is based on Cerrejón Norte which represents 60% of production and 25% of exports.

Cyprus

(a) Data apply to 1990.

Ecuador

(a) There is no production of coal.

France

(a) Additional amount in place and estimated additional amount recoverable for bituminous coal applies to Lucenay and for lignite to Mezos.

Germany

(a) For lignite, the coal equivalent value for production is 62.5 tce and for consumption is 63.5 tce.

Iceland

(a) In 1993, Iceland imported 47 kt of bituminous coal and 6 kt of sub-bituminous.

India

(a) Data refer to 1 April 1993 to 31 March 1994.

Ireland

(a) Coal characteristics are given separately for anthracite and bituminous coal as follows:

	Heat value MJ/kg	Sulphur content %	Carbon content %	Volatile matter %	Moisture content %	Ash %
Anthracite	30.5	2.0	84.0	5.0	4.0	5.0
Bituminous	23	0.5	56.0	15.0	4.0	25.0

Kyrgystan (Republic of)

(a) Heat values are:
– high thermal combustion = 28.9–31.9 MJ/kg;
– lower thermal combustion = 17.12–21.77 MJ/kg.

Mongolia

(a) Although no data are available for proved recoverable reserves, there is production of both bituminous coal and lignite.

Mozambique

(a) Coal resources in the province of Tete total 1 5 000 Mt. Source: Aschinjanz, Svedov, Stand und Entwicklungsaussichten der Energiewirtschaft in Mozambique. Archiv fur Energiewirtschaft, July 1983.

New Zealand

(a) Some resources previously recorded as proved amount in place have been reclassified as estimated additional amount recoverable.

Pakistan

(a) Data refer to July 1992 to June 1993.

Philippines

(a) Production and characteristics data are *run of mine*.

Poland

(a) Resources and reserves data are for the year ending 1992.

(b) Proved amount in place and proved recoverable reserves data are from latest geological investigations.

(c) Percentage of coking quality and estimated additional amount in place are estimated figures.

(d) Coal characteristics are approximate.

Portugal

(a) There is no production of lignite at present. The indicated reserves refer to the Espadanal Mine (Rio Maior) deposit.

Slovakia (Republic of)

(a) Data are based on five coal mines (Cígel, Handlevá, Nováky, Dolina and Záherie) for 1990–93.

Slovenia (Republic of)

(a) Consumption of bituminous coal (classified as having a calorific value greater than 24 MJ/kg) in 1993 was 0.0058 Mt.

South Africa

(a) Characteristics are averages of all products and are not weighted according to production tonnages.

(b) Production and consumption include Botswana, Lesotho and Namibia.

Spain

(a) Proved recoverable reserves include those classified as "very probable" and "probable" in reference publication.

(b) Proved amount in place corresponds to proved recoverable reserves divided by a recovery factor of approximately 0.5.

(c) Estimated additional reserves recoverable include those classified as "possible" and "hypothetical" in reference publication.

(d) Estimated additional amount in place is obtained by dividing estimated additional reserves recoverable by a recovery coefficient of approximately 0.5.

Switzerland

(a) Consumption figure is for all grades of coal.

United Kingdom

(a) British Coal estimates hard coal resources at 190 000 Mt. Of these resources, 4 000–5 000 Mt could be brought to the surface using known technologies. However, only about 2 000 Mt are within the take of currently operating mines. Under present economic conditions, investment in new deep mines is not justified.

***(Former)* USSR**

(a) All characteristics data are the average for the three types of coal and as supplied for the *1986 Survey of Energy Resources*.

Country note and Tables 1.1–1.5 references

Afghanistan
(i) Reserves data from WEC *1980 Survey of Energy Resources*.

Albania
(i) Reserves data from WEC *1980 Survey of Energy Resources*.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.
(iii) Characteristics from STEAG, Germany, private communication.

Algeria
(i) Resources and reserves data provided by WEC Member Committee in 1992.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Antarctica
(i) *Concise Guide to World Coalfields*, IEA Coal Research, 1983.

Argentina
(i) Data provided by WEC Member Committee in 1995.

Australia
(i) All data, including heat values, but excluding other coal characteristics, provided by WEC Member Committee in 1995.
(ii) Other coal characteristics from WEC *1983 Survey of Energy Resources*.

Austria
(i) Data provided by WEC Member Committee in 1995.
(ii) Characteristics provided by STEAG, Germany, private communication.

Azerbaijan
(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Bangladesh
(i) Reserves data from *1983 WEC Survey of Energy Resources*.
(ii) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Belarus (Republic of)
(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Belgium
(i) Consumption data from Member Committee in 1995 and IEA, Paris, 1995.

Bhutan
(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Bolivia
(i) Data provided by WEC Member Committee in 1995.

Bosnia-Hercegovina
(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Botswana
(i) Reserves data from WEC *1980 Survey of Energy Resources*.

Brazil
(i) Data provided by WEC Member Committee in 1995 from Departmento Nacional da Produção Mineral.
(ii) Note provided by WEC Member Committee in 1992.

Bulgaria
(i) Data provided by WEC Member Committee in 1995 from:
– Committee on Geology and Natural Resources;
– Coal Holding AD.

Canada
(i) Data provided by WEC Member Committee in 1995 from:
– *Coal Resources of Canada*, Geological Survey of Canada paper 89-4, C G Smith, (resources and reserves);
– *Coal Mining in Canada*: 1986 CANMET Report 87-3E, Canada Centre for Mineral and Energy Technology; Energy, Mines and Resources, (resources and reserves);
– *Coal and Coke Statistics*, December 1993, ISSN 0380.6847, March 1994, *Statistics Canada*, (production and consumption, except bituminous consumption which is from the IEA Paris, 1995, private communication) .

Central African Republic
(i) Reserves data from WEC *1980 Survey of Energy Resources*.

Chile
(i) Data provided by WEC Member Committee in 1995.
(ii) Characteristics for sub-bituminous from WEC Member Committee in 1986.
(iii) Information from *Concise Guide to World Coalfields*, IEA Coal Research, and WEC Member Committee in 1986.

China
(i) Data provided by WEC Member Committee from China National Coal Corporation, 1992.
(ii) Coal characteristics provided by WEC Member Committee in 1989.
(iii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.
(iv) Data contained in Country note form WEC Member Committee in 1995.

Colombia
(i) Data provided by WEC Member Committee in 1995 from Ecocarbon.

Costa Rica
(i) Data provided by WEC Member Committee in 1989 from:
– Divisi6n de Recursos Carboníferos;
– Cerencia de Producci6n Primaria;
– Refinadora Costarricense de Petr6leo.

Croatia (Republic of)
(i) Data provided by WEC Member Committee in 1995 from Ministry of Economy.

Cuba
(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Cyprus
(i) Consumption data from *1990 Energy Statistics Yearbook*, United Nations, 1992.

Czech Republic
(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.
(ii) Characteristics from STEAG, Germany, private communication.

(*Former*) Czechoslovakia
(i) Data provided by WEC Member Committee in 1989.

Denmark
(i) Consumption data from IEA, Paris, 1995, private communication.

Dominican Republic
(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Ecuador
(i) Data provided by WEC Member Committee, 1992 from INE, Plan Maestro de Energía.

Egypt (Arab Republic of)
(i) Bituminous reserves data from WEC *1980 Survey of Energy Resources*.
(ii) Sub-bituminous reserves data from *Country Paper Egypt*, United Nations Symposium on World Coal Prospects 15–23 October 1979, Katowice, Poland. Paper TCD/NRET/AC.12/CP/9.
(iii) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Estonia
(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Ethiopia
(i) Data provided by WEC Member Committee in 1995 from:
– Ethiopian Energy Authority, *Coal Pre-feasibility Assessment*, 1994;
– Ethiopian Energy Authority, *Energy Policy of the Transitional Government of Ethiopia*, 1994.

Fiji

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Finland

(i) Consumption data provided by WEC Member Committee in 1995 from *Statistics Finland*, estimate of the Ministry of Trade and Industry.

France

(i) Data provided by WEC Member Committee in 1995 from:
- national reserves document;
- statistical surveys of various operating units;
- except as follows:

(ii) Lignite characteristics data provided by WEC Member Committee for WEC *1983 Survey of Energy Resources*.

(iii) Consumption data from IEA, Paris, 1995, private communication.

Georgia (Republic of)

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Germany

(i) Data provided by WEC Member Committee in 1995 from:
- Statistik der Kohlenwirtschaft e.V., Essen and Cologne;
- Deutscher Braunkohlen-Industrie-Verein e.V.;
- except:

(ii) Characteristics, which are from WEC Member Committee in 1992.

(iii) Production and consumption data from IEA, Paris, 1995, private communication.

Greece

(i) Data from WEC *1986 Survey of Energy Resources*.

(ii) Production and consumption data from IEA, Paris, 1995, private communication.

(iii) Characteristics from STEAG, Germany, private communication.

Greenland (Denmark)

(i) Data provided by WEC Member Committee for Denmark in 1995 from Shekhar, S.C., Frandsen, N. and Thomsen, E., *Coal on Nugssuaq, West Greenland*, Geological Survey of Greenland, 1982.

Haiti

(i) Reserves data from WEC *1980 Survey of Energy Resources*.

(ii) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Honduras

(i) Reserves data from WEC *1980 Survey of Energy Resources*.

Hong Kong

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Hungary

(i) Data provided by WEC Member Committee in 1995.

(ii) Characteristics data provided by STEAG, Germany, private communication.

Iceland

(i) Data provided by WEC Member Committee in 1995.

India

(i) Data provided by WEC Member Committee in 1995 from:
- 8th Five-Year Plan (1992–97);
- Economic Survey, 1993–94;
- Ministry of Coal, 1993–94;
- Sachdev, R.K., *Coal as a Sustainable Source of Energy in India: Concerns and Issues*, Ministry of Coal.

(ii) Characteristics data (except for bituminous coal average values) provided by WEC Member Committee in 1989 from:
- Sub Group II on Coal Exploration, Mine Planning and Development;
- Sub Group on Lignite Report – January 1988.

Indonesia

(i) Proved recoverable reserves, production and consumption data provided by WEC Member Committee in 1995.

(ii) Other data provided by WEC Member Committee from:
- A one day seminar on Indonesia Coal Quality, Perum Tambang Baturbara, Jakarta, 23 July 1985.
- *General Policy on Energy*, National Energy Co-ordinating Agency, April 1984.
- *Asian Coal Development Project Interim Report, Volume I*, Monenco Limited, 31 May 1984.

Iran (Islamic Republic of)

(i) Resources and reserves data provided by WEC Member Committee in 1995.

(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

(iii) Characteristics data provided by the WEC Member Committee in 1992.

Ireland

(i) Data provided by WEC Member Committee from Department of Energy, 1992.

(ii) Consumption data from IEA, Paris, 1995 private communication.

Israel

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Italy

(i) Data provided by WEC Member Committee in 1995 from ENEL.

Jamaica

(i) Data provided by WEC Member Committee in 1995 from Ministry of Public Utilities, Mining and Energy.

Japan

(i) Data provided by WEC Member Committee from Japan Coal Association, 1995.

Kazakhstan (Republic of)

(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Kenya

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Korea (Democratic People's Republic of)

(i) Reserves and characteristics data from WEC *1980 Survey of Energy Resources*.

(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Korea (Republic of)

(i) Resources and reserves data provided by WEC Member Committee in 1995 from Coal Mine 1st Div., Korea Mining Promotion Corp.

(ii) Production and consumption data supplied by WEC Member Committee in 1995 from *Yearbook of Energy Statistics*.

(iii) Characteristics data supplied by WEC Member Committee in 1995 from *Yearbook of Coal Quality Statistics*.

Kyrgystan (Republic of)

(i) Data provided by WEC Member Committee in 1995 from *The Balance of the Coal Resources of the Kyrgyzstan on 1 January 1994*.

(ii) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Latvia (Republic of)

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Lithuania (Republic of)

(i) Data provided by WEC Member Committee in 1995 from *Fuel and Energy Balance for Lithuania for 1993*, Vilnius, 1994.

Luxembourg

(i) Consumption data from IEA, Paris, 1995 private communication.

Macedonia (former Yugoslav Republic of)

(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Madagascar

(i) Reserves data from WEC *1980 Survey of Energy Resources*.

(ii) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Malawi

(i) Data from R.K. Dutkiewicz, Energy Research Institute, University of Cape Town, South Africa, private communication, 1995.
(ii) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Malaysia

(i) Data provided by WEC Member Committee in 1992 from *Geological Survey of Malaysia*.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Mali

(i) Reserves data from WEC *1980 Survey of Energy Resources*.

Malta

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Mauritius

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Mexico

(i) Data provided by WEC Member Committee in 1995 from:
- *Unam "Dynamis" Energy Bulletin*, year 4, numbers 1–6, December 1992;
- *Coal and Electricity Generation in Mexico*, Comision Federal de Electricidad, 1992;
- *Unam "Dynamis" Energy Bulletin*, year 2, number 5, September–October, 1990.

Moldovia (Republic of)

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Mongolia

(i) Reserves data from WEC *1980 Survey of Energy Resources*.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Morocco

(i) Resource data from WEC *1983 Survey of Energy Resources*.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Mozambique

(i) Reserves data from WEC *1980 Survey of Energy Resources*.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Myanmar (formerly Burma)

(i) Reserves data from WEC *1980 Survey of Energy Resources*.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Nepal

(i) Data provided by WEC Member Committee in 1995 from Department of Mines and Geology, HMG, Nepal.
(ii) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Netherlands

(i) Data provided by WEC Member Committee in 1995 from:
- Private communication: Krans Th. F., Eindrapport project inventarisatie-onderzoek Nederlandse kolenvoorkomens, Geologisch Bureau, Heerlen;
- Private communication: Bergh, G.J. van der, Faculty of Mining and Petroleum Engineering DUT, 1988;
- CBS, Brandstoffen balans 1993.

New Caledonia

(i) Reserves data from WEC *1980 Survey of Energy Resources*.
(ii) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

New Zealand

(i) Data provided by WEC Member Committee in 1993 from:
- *Coal Resources of New Zealand*, Resource Information Report 16, Ministry of Commerce, 1994;
- *Energy Data File*, Ministry of Commerce;
- *Analysis of New Zealand Industrial Coals and Analysis Update 1994*, Coal Research Association of New Zealand.

Niger

(i) Proved recoverable reserves from Glüuckauf 121 (1985) Nr. 16.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Nigeria

(i) Proved recoverable reserves from *World Coal Letter*, No. 26, 1982.
(ii) Other resources data from WEC *1980 Survey of Energy Resources*.
(iii) Estimated production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Norway

(i) Data provided by WEC Member Committee in 1995 from Central Bureau of Statistics of Norway.
(ii) Characteristics data (except heat value) from WEC *1989 Survey of Energy Resources*.

Pakistan

(i) Data provided by WEC Member Committee in 1995 from *Pakistan Energy Yearbook 1993*.
(ii) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Panama

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Peru

(i) Reserves data from *ICT*, vol. 46, No. 8, August 1977.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Philippines

(i) Data provided by WEC Member Committee in 1992 from Office of Energy Affairs.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Poland

(i) Data provided by WEC Member Committee in 1995 from:
- *Balance of Minerals and Underground Waters in Poland*, State Geological Institute, Warsaw, 1993;
- *Fuel and Energy Economy – Statistical Report 1990*, Main Statistical Office and Energy Information Centre;
- Information from Polish Academy of Science, Mineral and Energy Economy Research Centre, Krakow.

Portugal

(i) Data provided by WEC Member Committee in 1992 from:
- Direccão-Geral de Geologia e Minas, Ministério da Indústria e Energia;
- Empresa Carbonifera do Douro, SA;
- Empresa de Desenvolvimento Mineiro, E.P.

(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Puerto Rico

(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Romania

(i) Data provided by WEC Member Committee in 1992 from Mines Department, Ministry of Energy.
(ii) Production and consumption data estimated from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Russian Federation

(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Serbia, Montenegro

(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Slovakia (Republic of)

(i) Data provided by WEC Member Committee in 1995.
(ii) Consumption data estimated from *1993 Energy Statistics Yearbook*, United Nations, 1995.
(iii) Characteristics from STEAG, Germany, private communication.

Slovenia (Republic of)
(i) Data provided by WEC Member Committee in 1995.

South Africa
(i) Data provided by WEC Member Committee in 1992 from:
– reserves – Smuts W.J., Department of Mineral and Energy Affairs;
– characteristics – *CSIR Energy Technology Bulletin*, No. 105, "Analysis of Coal Samples During 1990";
– Lignite – Smuts W.J., *Preliminary Report on West Coast Lignite Deposits*, SAGEO Report 1990-0017, 1990.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Spain
(i) Data provided by WEC Member Committee in 1995 from Revision of Inventario de Recursos Nacionales de Carbon, 1988 a per *Bulletin Geológico y Minero*, volume 100, number 1, January–February 1989.

Swaziland
(i) Data provided by WEC Member Committee in 1995 from Geology Department, Ministry of Natural Resources and Energy.
(ii) Proved recoverable reserves from *Swaziland: Issues and Options in the Energy Sector*, World Bank Energy Sector Assessment Programme Report 6262-2W, 1987.

Sweden
(i) Resources and reserves data, and production and consumption data provided by WEC Member Committee in 1995.
(ii) Characteristics data from WEC *1980 Survey of Energy Resources*.

Switzerland
(i) Data provided by WEC Member Committee in 1995 from *Swiss Energy Statistics 1993*.

Taiwan, China
(i) Data provided by WEC Member Committee in 1995 from:
– Taiwan Provincial Bureau of Mines;
– Department of Mines, Department of Economic Affairs.

Tajikistan (Republic of)
(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Tanzania (United Republic of)
(i) Data provided by WEC Member Committee in 1992 from Ministry of Water, Energy and Minerals.

Thailand
(i) Data provided by WEC Member Committee in 1995 from *Coal Exploration and Assessment Project*, Department of Mineral Resources.

Tunisia (Republic of)
(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Turkey
(i) Main data provided by WEC Member Committee in 1992 from Ministry of Energy and Natural Resources.
(ii) Production and consumption data from IEA, Paris, 1995, private communication.
(iii) Characteristics data for bituminous from WEC *1989 Survey of Energy Resources*.

Turkmenistan (Republic of)
(i) Consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Ukraine (Republic of)
(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

United Kingdom
(i) Data provided by WEC Member Committee in 1995 from:
– British Coal;
– Department of Trade and Industry Energy Report.
(ii) Production data from IEA, Paris, 1995, private communication.
(iii) Characteristics data from WEC *1992 Survey of Energy Resources*.

United States of America
(i) Data provided by WEC Member Committee in 1995 from:
– US Department of Energy, Energy Information Administration, *Coal Industry Annual*, DOE/EIA-0118;
– US Department of Energy, Energy Information Administration, *US Coal Reserves*, DOE/EIA-0529.
(ii) Consumption data for bituminous and sub-bituminous coal from IEA, Paris, 1995, private communication.

***(Former)* USSR**
(i) All data provided by WEC Member Committee in 1989 from VNIIKTEP Research Institute.

Uzbekistan (Republic of)
(i) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Venezuela
(i) Data provided by WEC Member Committee in 1992 from:
– Ministerio de Energía y Minas, Dir. General Sectorial de Energía.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Vietnam
(i) Reserves data from WEC *1980 Survey of Energy Resources*.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Yugoslavia (Socialist Federal Republic)
(i) Reserves data from WEC *1980 Survey of Energy Resources*.

Zaire
(i) Resources and reserves data from various sources summarised in Bisengo, K., *Energy in Central Africa: With Special Reference to Zaire*, MSc University of Cape Town, South Africa, 1993.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Zambia
(i) Data provided by WEC Member Committee in 1989 from:
– British Mining Consultants;
– Geological Survey of Zambia;
– Sfremines (a French Consultancy Company).
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

Zimbabwe
(i) Reserves data from WEC *1980 Survey of Energy Resources*.
(ii) Production and consumption data from *1993 Energy Statistics Yearbook*, United Nations, 1995.

World Energy Council

CONSEIL MONDIAL DE L'ENERGIE

1998

Survey of Energy Resources

18th Edition

The objective of the World Energy Council is to promote the sustainable supply and use of energy for the greatest benefit of all.

1 Coal (including Lignite)

COMMENTARY

The new analysis of proved recoverable reserves of coal demonstrates that out of a total of 984 billion tonnes, bituminous coal reserves (including anthracite) constitute 509 billion tonnes and sub-bituminous and lignite 475 billion tonnes. As compared to the 1995 Survey the aggregate is down by 47 billion tonnes, of which bituminous coal reserves account for 10 billion tonnes.

One of the most noticeable reassessments of reserves has been made in Poland, a reduction of 28 billion tonnes, the downgrade being attributable to a re-evaluation of reserves following market-oriented criteria. Further noticeable features of the analysis are the devaluation of lignite reserves in Turkey (down by some 6 billion tonnes), whereas Pakistan shows an increase of 2.2 billion tonnes of sub-bituminous reserves reflecting the inclusion of the recently discovered Thar coal field. In the case of Brazil, a complete reassessment of coal resources/reserves has resulted in an upward adjustment of proved reserves.

Six countries hold over 75% of proved recoverable reserves: the USA possesses 25%, the Russian Federation takes second place with 16% and China, Australia, India and Germany have 12%, 9%, 8% and 7% respectively.

With regard to trade, three of the resource-rich countries—Australia, the USA and South Africa—are the world's leading exporters, accounting for some 60% of international coal trade.

The importance of the FSU as a coal exporter appears to be shrinking. A similar observation can be applied to Poland, on the assumption that the new government will strictly realize the official restructuring program. China accounts for approximately 6% of world trade but its future growth is rather uncertain: coal imports required by the Chinese coastal regions will tend to curb the rate of increase in net exports.

Compared with oil and natural gas, coal has maintained its long-term position as the world's most widely available fossil energy source. Current annual production of bituminous coal totals some 3.3 billion tonnes, and of sub-bituminous coal and lignite 1.4 billion tonnes, in 72 countries around the world.

In 1996 coal supplied some 27% of global primary energy demand. The countries in which coal had the largest market share were South Africa, China and Poland: in all three cases, coal supplied between 70% and 80% of total energy demand. The next three countries in ranked order were India, the Czech Republic and Kazakhstan, all with about 56%.

Coal is generally expected to continue supplying a considerable proportion of the world's primary energy demand. In view of the enormous tonnage of proved reserves, the present rate of coal production could continue for over 200 years, while coal demand is likely to increase both on the national and international sides of the market.

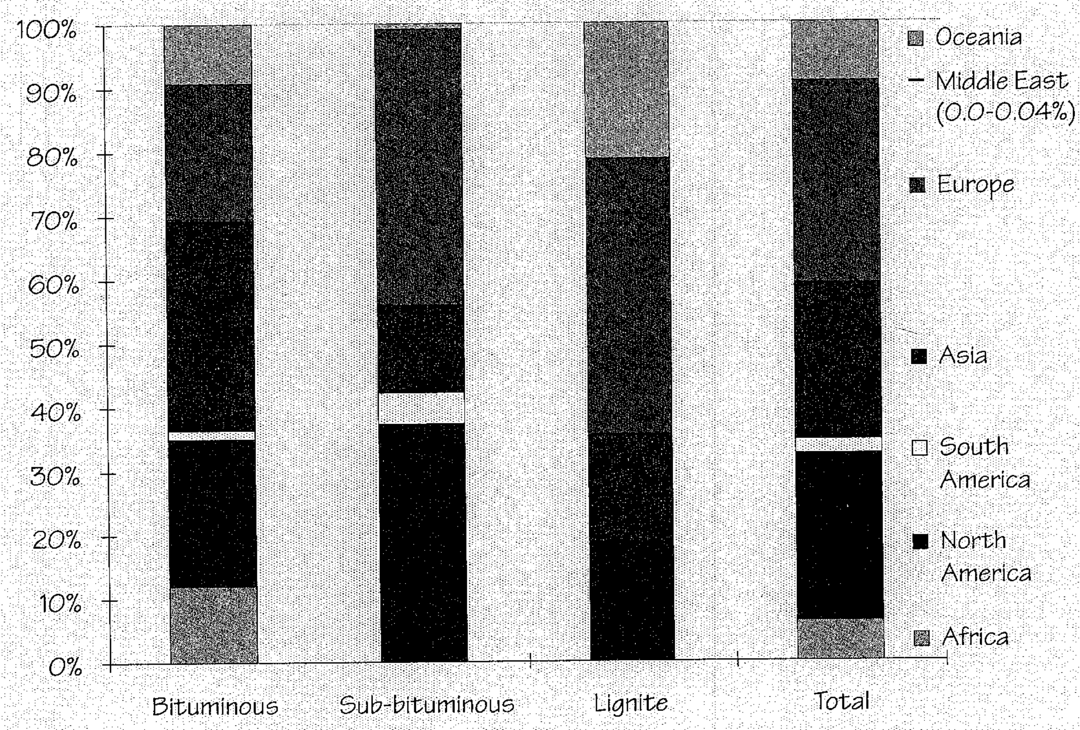


Figure 1.1
Proved coal reserves at end-1996: regional distribution

The size of the resource base is thus not the restraining factor; it is rather a question of the development of production facilities and infrastructure. However, the necessary investment decisions must be made in due time, given lead times of up to 5 years for open-cast operations and drift mines where geologically less favorable deposits prevail. Nevertheless, there is considerable potential for a significant increase in coal production capacity in the short term.

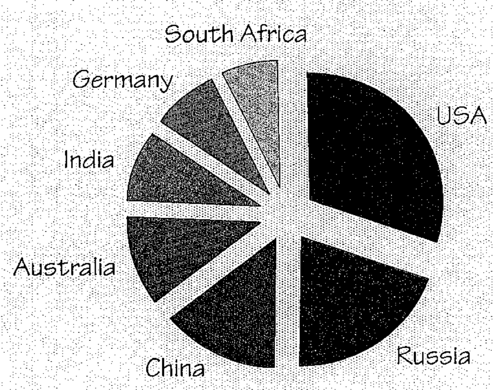


Figure 1.2
Proved coal reserves at end-1996: the leading countries

A recent study made by WEFA Energy on the international steam coal market reveals that the demand in this sector may treble by 2020, attaining nearly 0.7 billion tonnes per year. The total international coal market, including a fairly static demand for coking coal, could reach approximately 0.9 billion tonnes per year. The authors do not see any fundamental problem in coal exporters' capability to supply the world market with the expected volume of coal. While Colombia and Venezuela are expected to have an aggregate capacity of 40–50 million tonnes per year by 2020, the traditional exporters (e.g., Australia and South Africa) could easily fill the gap caused by any inability of the newcomers to supply the quantities required. The study indicates that there are huge, nearly untouched deposits of steam coal in Alaska that could help supply the Pacific Rim markets.

Moreover, it is envisaged that coal exporters will be able to provide an increasing supply at decreasing prices in real terms: deregulation, liberalization and privatization of the coal and the coal-related markets will provide the benefits of competition. Productivity benefits will come from progress in technology and larger-scale production in new coal mines, resulting in lower costs.

Obviously the relationship between currency values in exporting and importing countries plays a major role in determining prices on the world market and subsequently the investment in new coal. Furthermore, coal prices cannot be forecast reliably because of the interdependence of energy markets. Rising oil and gas prices would certainly invite coal exporters to follow the price leaders. Similarly, declining oil and gas prices would put pressure on the price claims of coal exporters. Equally, possible international agreements on carbon emission limits or taxes to punish coal exporters with high emissions may have negative impacts on future coal pricing and forthcoming demand.

Summing up on the basis of four criteria—availability of coal reserves; profitability of coal deposits; coal types; and export potential—the international coal market will probably obtain a required supply through the joint efforts of traditional and "new" coal exporting countries. This is on the assumption that the "new" coal exporters will not have their exports restrained by their domestic requirements.

Allowing producing countries to satisfy their own domestic demand first, at present almost 90% of world coal production is consumed in the source country. Growing domestic demand and rising import requirements will probably have only a marginal effect on the ratio, to perhaps 85:15.

Analysis of the sectors in which coal is utilized reveals the important role of power generation. Power generators are by far the most important consumers and moreover offer the best prospects for expansion in the future. With coal-based power generation of 4 800 TWh, the share of the world's electrical power demand which is met by coal is some 40%. By 2010 coal-based electricity generation is expected to reach 7 400–8 000 TWh. In the iron and steel industry, coal consumption is moving toward the use of lower-quality coking coal (soft and semi-soft) in blends with high-quality coking coal. Technologies, such as pulverized coal injection (PCI), are advancing. The heating market, including all other areas of industry, households and miscellaneous consumption, will continue to contract. This will result in structural changes in favor of oil and natural gas. However, there are still countries, particularly in Eastern Europe, in which coal has a considerable presence in the heating market.

The future of both the production and the utilization of coal depends to a large degree upon the technical progress achieved. Mining techniques and upgrading processes are to be pushed forward. The scope for the introduction of the highest possible standards is not yet

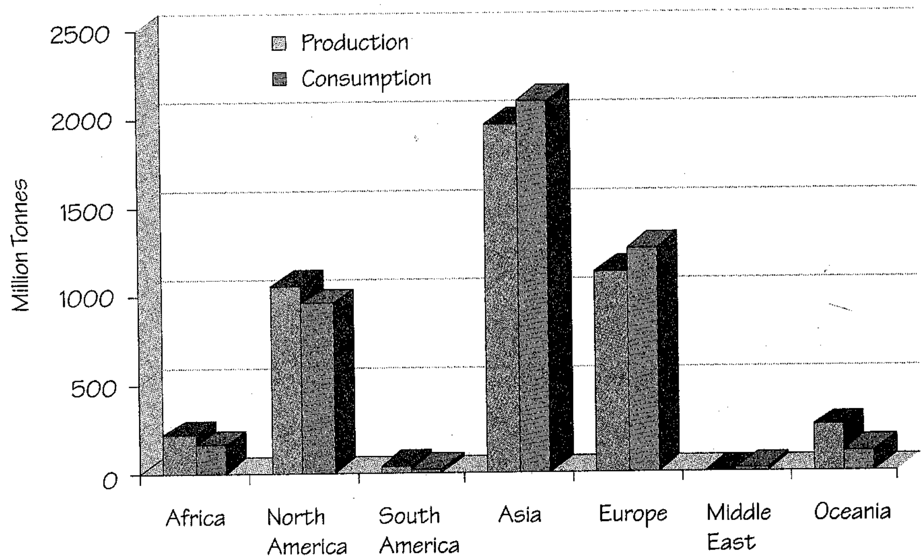


Figure 1.3
Coal production and consumption, 1996: regional distribution

fully exhausted. New developments with proven commercial feasibility in all sectors of the coal industry are crucial in promoting the acceptance of coal as a primary energy source and thus in generating additional volume demand.

Progress has been made in the Western industrialized countries in the introduction of state-of-the-art clean-coal technology, such as environmentally friendly equipment for minimizing harmful particulates, sulfur dioxide and nitrogen oxide emissions from burning coal, but in many other countries there is still a substantial deficiency. Modern coal-combustion technology is also available for alleviating the CO_2 problem by contributing to a

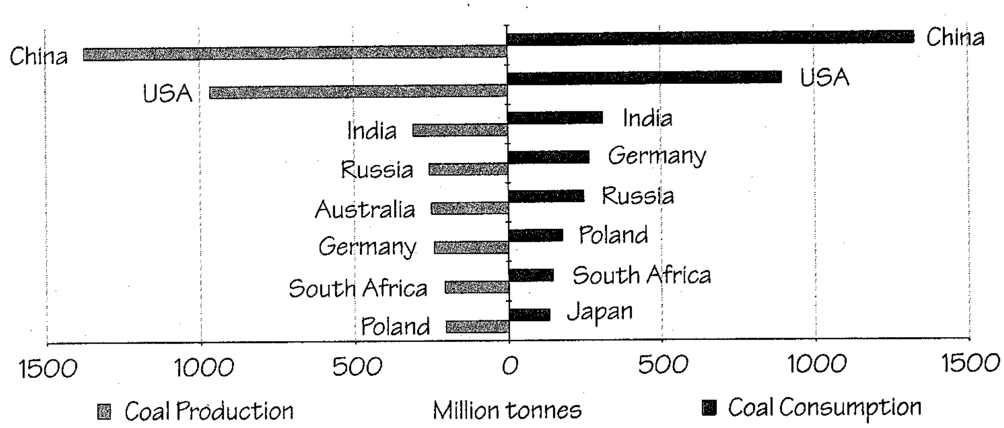


Figure 1.4
Coal production and consumption, 1996: the leading countries

high-efficiency utilization of primary energy sources worldwide. Combined processes, which are the subject of intensive improvements, are showing the way to efficiency gains and subsequently CO_2 reduction.

Given the global dimension of the climate change risks, a global approach seems to be compelling. Considering the various aspects involved, the transfer of efficient coal technology and other supporting measures to countries with insufficient emission standards and low energy efficiency may well turn out to be the most adequate approach to a solution.

The required increase in energy provision worldwide must not be effected at the expense of environmental damage which threatens sustainable development. Therefore, worldwide solutions for a resource-preserving and environmentally friendly utilization of energies are imperative. The dissemination of efficient technologies is particularly important in the developing and threshold countries, where energy demand is likely to increase most rapidly in the coming decades.

Friedrich H. Esser
President of Wirtschaftsvereinigung Bergbau c.V., Bonn, Germany

DEFINITIONS

Proved amount in place is the tonnage that has been both carefully measured and assessed as exploitable under present and expected local economic conditions with existing available technology.

Maximum depth of deposits and **minimum seam thickness** relate to proved amount in place.

Proved recoverable reserves are the tonnage within the proved amount in place that can be recovered (extracted from the earth in raw form) under present and expected local economic conditions with existing available technology.

Estimated additional amount in place is the indicated and inferred tonnage *additional* to the proved amount in place. It includes estimates of amounts which could exist in unexplored extensions of known deposits or in undiscovered deposits in known coal-bearing areas, as well as amounts inferred through knowledge of favorable geological conditions. The estimates are based on the results of geological and exploratory information about an area, or on evidence of duplication or parallelism of geological conditions that occur in known deposits. Deposits whose existence is merely speculative are not included.

Estimated additional reserves recoverable is the tonnage within the estimated additional amount in place which geological and engineering information indicates with reasonable certainty might be recovered in the future.

TABLE NOTES

The tables cover bituminous coal (including anthracite), sub-bituminous coal and lignite. Data for peat are given in Chapter 8. There is no universally accepted system of demarcation between coals of different rank and what is regarded as sub-bituminous coal tends to vary from one country to another. Moreover, if it is not isolated as such, sub-bituminous is sometimes included with bituminous and sometimes with lignite.

There is an important distinction between "proved recoverable reserves," as used by the WEC, and the IEA term "accessible coal in significant coalfields."

The WEC definition of proved recoverable reserves includes the words "*. . . that can be recovered under present and expected local economic conditions with existing available technology.*"

The IEA defines accessible coal in significant coalfields as being the "*amount of coal likely to be considered for extraction from significant coalfields within the next 20 years,*" where a significant coalfield is a "*coalfield whose collective physical characteristics render it likely either to make a significant contribution to, or to enter into the detailed commercial mining and market evaluations required in order to achieve world coal supply over the next 20 years.*"

When comparing "proved reserves" and "accessible coal in significant coalfields," it is important to recognize that the former takes *economic conditions* and *existing available technology* into account without limitation as to time, while the latter concentrates on the *physical characteristics* which render it likely to make a significant contribution to world coal supplies in the next 20 years. For example, to be considered accessible, the coalfield has to be already served by adequate transport infrastructure.

There are no internationally agreed-on standards for estimating coal reserves and, although the WEC attempts to establish precisely worded definitions, it is a matter of judgment for each country to determine the quantities which, in its opinion, meet these definitions.

TABLE 1.1 Coal: Proved Recoverable Reserves at End-1996

	Million tonnes				Percentage share					
					By surface mining			Of coking quality		
	Bituminous including anthracite	Sub-bituminous	Lignite	Total	BT	SB	LN	BT	SB	LN
Algeria	40	—	—	40	—	—	—	100	—	—
Botswana	4 313	—	—	4 313	—	—	—	—	—	—
Central African Republic	—	—	4	4	—	—	100	—	—	—
Congo (Democratic Rep.)	88	—	—	88	—	—	—	—	—	—
Egypt (Arab Rep.)	—	22	—	22	—	—	—	—	15	—
Malawi	2	—	—	2	—	—	—	—	—	—
Morocco	5	—	—	5	—	—	—	—	—	—
Mozambique	240	—	—	240	83	—	—	40	—	—
Niger	70	—	—	70	—	—	—	—	—	—
Nigeria	21	169	—	190	—	24	—	—	—	—
South Africa	55 333	—	—	55 333	59	—	50	41	—	—
Swaziland	116	—	—	116	—	—	—	—	—	—
Tanzania	200	—	—	200	—	—	—	—	—	—
Zambia	—	55	—	55	—	79	—	—	—	—
Zimbabwe	734	—	—	734	36	—	—	50	—	—
Total Africa	**61 162**	**246**	**4**	**61 412**	**—**	**—**	**—**	**—**	**—**	**—**
Canada	4 509	1 287	2 827	8 623	88	100	100	66	—	—
Greenland	—	183	—	183	—	—	—	—	—	—
Mexico	860	300	51	1 211	14	17	60	90	—	—
United States of America	111 338	101 978	33 327	246 643	28	45	100	—	—	—
Total North America	**116 707**	**103 748**	**36 205**	**256 660**	**—**	**—**	**—**	**—**	**—**	**—**
Argentina	—	130	—	130	—	30	—	—	—	—
Bolivia	1	—	—	1	—	—	—	—	—	—
Brazil	—	11 950	—	11 950	—	21	—	—	7	—
Chile	31	1 150	—	1 181	—	30	—	7	—	—
Colombia	6 368	381	—	6 749	—	—	—	—	—	—
Ecuador	—	—	24	24	—	—	—	—	—	—
Peru	960	—	100	1 060	—	—	—	—	—	—
Venezuela	479	—	—	479	—	—	—	—	—	—
Total South America	**7 839**	**13 611**	**124**	**21 574**	**—**	**—**	**—**	**—**	**—**	**—**
Afghanistan	66	—	—	66	—	—	—	—	—	—
China	62 200	33 700	18 600	114 500	7	—	20	14	—	—
India	72 733	—	2 000	74 733	—	—	100	22	—	—
Indonesia	770	1 390	3 060	5 220	—	—	—	—	—	—
Japan	785	—	—	785	—	—	—	—	—	—
Kazakhstan	31 000	—	3 000	34 000	—	—	—	—	—	—
Korea (Democratic People's Rep.)	300	300	—	600	—	—	—	—	—	—
Korea (Republic)	82	—	—	82	—	—	—	—	—	—
Kyrgyzstan	—	—	812	812	—	—	30	—	—	—
Malaysia	4	—	—	4	—	—	—	—	—	—
Myanmar (Burma)	2	—	—	2	—	—	—	—	—	—
Nepal	2	—	N	2	—	—	—	—	—	—
Pakistan	—	2 928	—	2 928	—	—	—	—	—	—
Philippines	24	187	88	299	—	63	100	5	—	—
Taiwan, China	1	—	—	1	—	—	—	—	—	—

TABLE 1.1 Coal: Proved Recoverable Reserves (Cont.)

	Million tonnes				Percentage share					
					By surface mining			Of coking quality		
	Bituminous including anthracite	Sub-bituminous	Lignite	Total	BT	SB	LN	BT	SB	LN
Thailand	—	—	2 000	2 000	—	—	100	—	—	—
Turkey	449	—	626	1 075	—	—	70	80	—	—
Uzbekistan	1 000	—	3 000	4 000	—	—	—	—	—	—
Vietnam	150	—	—	150	—	—	—	—	—	—
Total Asia	**169 568**	**38 505**	**33 186**	**241 259**	—	—	—	—	—	—
Albania	—	—	—	—	—	—	—	—	—	—
Austria	—	—	25	25	—	—	90	—	—	—
Bulgaria	13	233	2 465	2 711	N	5	96	59	—	—
Croatia	6	—	33	39	—	—	80	—	—	—
Czech Republic	2 613	3 418	146	6 177	—	—	—	67	—	—
France	95	21	—	116	6	—	—	45	—	—
Germany	24 000	—	43 000	67 000	—	—	100	60	—	—
Greece	—	—	2 874	2 874	—	—	—	—	—	—
Hungary	596	982	2 883	4 461	N	N	100	26	—	—
Ireland	14	—	—	14	2	—	—	—	—	—
Italy	—	27	7	34	—	—	100	—	—	—
Netherlands	497	—	—	497	—	—	—	—	—	—
Norway	—	6	—	6	—	—	—	—	75	—
Poland	12 113	—	2 196	14 309	—	—	100	20	—	—
Portugal	3	—	33	36	10	—	100	—	—	—
Romania	1	810	2 800	3 611	—	—	74	—	30	—
Russian Federation	49 088	97 472	10 450	157 010	23	74	100	55	—	—
Serbia, Montenegro	64	1 448	14 960	16 472	—	—	—	—	—	—
Slovakia	—	—	172	172	—	—	—	—	—	—
Slovenia	—	52	7	59	—	4	—	—	—	—
Spain	200	400	60	660	10	80	100	5	—	—
Sweden	—	1	—	1	—	100	—	—	—	—
Ukraine	16 388	16 027	1 941	34 356	—	—	35	56	30	—
United Kingdom	1 000	—	500	1 500	—	—	—	—	—	
Total Europe	**106 691**	**120 897**	**84 552**	**312 140**	—	—	—	—	—	—
Iran (Islamic Rep.)	193	—	—	193	—	—	—	—	—	—
Total Middle East	**193**	—	—	**193**	—	—	—	—	—	—
Australia	47 300	1 900	41 200	90 400	50	82	100	—	—	—
New Caledonia	2	—	—	2	—	—	—	—	—	—
New Zealand	29	114	428	571	—	—	—	—	—	—
Total Oceania	**47 331**	**2 014**	**41 628**	**90 973**	—	—	—	—	—	—
TOTAL WORLD	**509 491**	**279 021**	**195 699**	**984 211**	—	—	—	—	—	—

Notes:

The proportion of proved recoverable reserves which can be mined by opencast or surface mining and the proportion considered to be of coking quality are shown as percentages, where they have been reported by WEC Member Committees.

A quantification of proved recoverable reserves for Albania is not available.

The data shown against Serbia, Montenegro, include reserves in Bosnia-Herzogovina and the former Yugoslav Republic of Macedonia.

Sources: WEC Member Committees, 1997; *1995 Survey of Energy Resources;* National and international published sources, including *Memorias al Congreso Nacional 1996–1997,* Ministerio de Minas y Energía, Colombia; and *Annual Report, 1996–97,* Ministry of Coal, India.

TABLE 1.2i Bituminous Coal (including Anthracite): Resources at End-1996

	Proved amount in place			Estimated additional	
	Tonnage	Maximum depth of deposits	Minimum seam thickness	Amount in place	Reserves recoverable
	Million tonnes	Meters	Meters	Million tonnes	Million tonnes
Africa					
Algeria	40	—	—	—	—
Botswana	7 189	250	0.3	205 253	—
Morocco	16	750	0.6	—	—
South Africa	121 218	400	1.0	5 000	—
North America					
Canada	6 435	1 200	0.6	26 045	—
United States of America	239 675	671	0.2	456 153	—
South America					
Bolivia	—	—	—	1	N
Venezuela	1 328	—	—	4 528	2 427
Asia					
Japan	8 277	1 200	0.6	—	—
Korea (Republic)	138	1 000	1.8	272	73
Nepal	5	300	1.0	—	—
Philippines	40	380	0.3	8	5
Taiwan, China	100	800	0.4	—	—
Turkey	—	860	1.0	249	—
Europe					
Austria	1	—	—	3	—
Czech Republic	6 401	1 600	0.6	—	4 928
France	593	1 250	1.0	200	50
Germany	44 000	1 500	0.3	186 000	—
Hungary	1 407	900	0.4	702	77
Netherlands	1 406	1 500	0.8	2 750	1 375
Poland	60 185	1 200	0.7	—	—
Romania	—	—	—	1	1
Russian Federation	75 753	1 200	0.6	1 582 479	1 025 448
Spain	1 700	1 200	0.5	3 000	1 500
Ukraine	21 850	1 800	0.6	5 406	3 784
Oceania					
Australia	65 900	600	1.5	125 000	75 000
New Zealand	136	—	—	642	404

Notes:

The data on resources are those reported by WEC Member Committees in 1997. They thus constitute a sample, reflecting the information available in particular countries: they should not be considered as complete, or necessarily representative of the situation in each region. For this reason, regional and global aggregates have not been computed.

Sources: WEC Member Committees, 1997.

TABLE 1.2ii Sub-bituminous Coal: Resources at End-1996

	Proved amount in place			Estimated additional	
	Tonnage	Maximum depth of deposits	Minimum seam thickness	Amount in place	Reserves recoverable
	Million tonnes	Meters	Meters	Million tonnes	Million tonnes
Africa					
Egypt (Arab Rep.)	27	420	1.1	52	—
North America					
Canada	12 740	300	1.5	23 760	—
Greenland	183	550	—	200	100
United States of America	168 319	305	1.5	272 360	—
South America					
Brazil	17 072	870	0.5	15 319	7 660
Asia					
Philippines	239	200	0.3	34	20
Europe					
Czech Republic	1 956	500	2.0	—	5 003
France	124	1 350	2.0	—	—
Hungary	2 841	600	1.0	1 952	369
Italy	60	500	1.4	280	—
Norway	64	450	0.6	—	—
Romania	—	—	—	320	290
Russian Federation	113 340	600	1.0	2 205 079	1 896 360
Slovenia	59	190	10.0	32	4
Spain	800	1 100	0.8	1 200	600
Sweden	4	15	0.5	20	—
Ukraine	21 370	1 800	0.6	5 500	3 850
Oceania					
Australia	2 200	500	1.5	27 000	16 000
New Zealand	544	—	—	2 569	1 615

Notes:

The data on resources are those reported by WEC Member Committees in 1997. They thus constitute a sample, reflecting the information available in particular countries: they should not be considered as complete, or necessarily representative of the situation in each region. For this reason, regional and global aggregates have not been computed.

Sources: WEC Member Committees, 1997.

TABLE 1.2iii Lignite: Resources at End-1996

	Proved amount in place			Estimated additional	
	Tonnage	Maximum depth of deposits	Minimum seam thickness	Amount in place	Reserves recoverable
	Million tonnes	Meters	Meters	Million tonnes	Million tonnes
Africa					
Morocco	42	80	—	2	—
South Africa	30	60	0.5	—	—
North America					
Canada	1 615	50	1.5	8 230	—
USA	40 229	61	0.8	393 527	—
Asia					
Philippines	104	104	0.3	3	2
Thailand	2 315	300	0.3	3 000	3 000
Turkey	7 339	700	0.5	110	—
Europe					
Albania	712	400	0.4	—	300
Austria	343	—	—	61	—
Croatia	33	—	—	—	—
Czech Republic	591	130	1.5	—	281
France	—	—	—	165	85
Germany	78 000	600	2.0	—	—
Hungary	5 465	140	1.0	3 337	1 124
Italy	15	150	3.0	22	20
Poland	14 184	—	—	—	—
Romania	—	—	—	1 656	1 325
Russian Federation	11 483	300	1.5	153 006	139 242
Slovakia	347	370	1.5	—	—
Slovenia	355	547	8.0	—	—
Spain	60	250	0.5	60	60
Ukraine	2 588	400	2.7	319	224
Oceania					
Australia	45 800	600	3.0	188 000	169 000
New Zealand	2 039	—	—	9 632	6 055

Notes:

The data on resources are those reported by WEC Member Committees in 1997. They thus constitute a sample, reflecting the information available in particular countries: they should not be considered as complete, or necessarily representative of the situation in each region. For this reason, regional and global aggregates have not been computed.

Sources: WEC Member Committees, 1997.

TABLE 1.3 Coal: 1996 Production

	Bituminous	Sub-bituminous	Lignite	Total
	Thousand tonnes			
Algeria	20	—	—	20
Botswana	728	—	—	728
Congo (Democratic Rep.)	90	—	—	90
Egypt	—	100	—	100
Morocco	505	—	—	505
Mozambique	40	—	—	40
Niger	170	—	—	170
Nigeria	20	—	—	20
South Africa	206 400	—	—	206 400
Swaziland	129	—	—	129
Tanzania	30	—	—	30
Zambia	50	—	—	50
Zimbabwe	5 250	—	—	5 250
Total Africa	**213 432**	**100**	**—**	**213 532**
Canada	39 970	24 990	10 850	75 810
Mexico	1 500	7 000	—	8 500
United States of America	576 520	308 710	79 880	965 110
Total North America	**617 990**	**340 700**	**90 730**	**1 049 420**
Argentina	—	330	—	330
Brazil	—	4 805	—	4 805
Chile	1 377	—	—	1 377
Colombia	30 065	—	—	30 065
Peru	130	—	—	130
Venezuela	4 200	—	—	4 200
Total South America	**35 772**	**5 135**	**—**	**40 907**
Afghanistan	5	—	—	5
China	1 319 561	—	54 525	1 374 086
Georgia	40	—	—	40
India	283 000	—	25 000	308 000
Indonesia	30 785	20 184	185	51 154
Japan	6 500	—	—	6 500
Kazakhstan	73 200	—	3 400	76 600
Korea (Democratic People's Rep.)	25 000	—	8 000	33 000
Korea (Republic)	4 951	—	—	4 951
Kyrgyzstan	100	—	300	400
Malaysia	70	—	—	70
Mongolia	660	—	7 200	7 860
Myanmar (Burma)	33	—	40	73
Nepal	4	—	—	4
Pakistan	—	3 600	—	3 600
Philippines	—	1 100	—	1 100
Taiwan, China	150	—	—	150
Tajikistan	N	—	N	N
Thailand	3	—	21 474	21 477
Turkey	2 440	—	53 890	56 330
Uzbekistan	100	—	2 700	2 800
Vietnam	7 800	—	—	7 800
Total Asia	**1 754 402**	**24 884**	**176 714**	**1 956 000**

TABLE 1.3 Coal: 1996 Production (Cont.)

	Bituminous	Sub-bituminous	Lignite	Total
	Thousand tonnes			
Albania	—	—	89	89
Austria	—	—	1 105	1 105
Bosnia-Herzogovina	—	—	2 500	2 500
Bulgaria	200	—	31 300	31 500
Croatia	64	—	2	66
Czech Republic	16 532	56 454	902	73 888
Former Yugoslav Rep. of Macedonia	—	—	6 700	6 700
France	6 200	800	—	7 000
Germany	53 000	—	187 200	240 200
Greece	—	—	57 216	57 216
Hungary	2 370	5 200	7 550	15 120
Ireland	N	—	—	N
Italy	—	N	324	324
Norway	—	300	—	300
Poland	138 100	—	63 850	201 950
Portugal	100	—	—	100
Romania	N	5 139	36 530	41 669
Russian Federation	130 000	116 000	10 000	256 000
Serbia, Montenegro	63	—	38 367	38 430
Slovakia	—	—	3 840	3 840
Slovenia	—	841	3 950	4 791
Spain	13 700	4 100	9 600	27 400
Sweden	—	N	—	N
Ukraine	54 100	15 900	1 600	71 600
United Kingdom	50 197	—	—	50 197
Total Europe	**464 626**	**204 734**	**462 625**	**1 131 985**
Iran (Islamic Rep.)	1 700	—	—	1 700
Total Middle East	**1 700**	—	—	**1 700**
Australia	174 200	20 800	53 600	248 600
New Zealand	1 730	1 560	320	3 610
Total Oceania	**175 930**	**22 360**	**53 920**	**252 210**
TOTAL WORLD	**3 263 852**	**597 913**	**783 989**	**4 645 754**

Notes:

It is often difficult to draw the distinction between bituminous and sub-bituminous grades and between sub-bituminous and lignite.

Sources: WEC Member Committees, 1997; *BP Statistical Review of World Energy 1997,* The British Petroleum Company p.l.c.; *Energy—Monthly statistics,* Eurostat; National sources.

TABLE 1.4 Coal: 1996 Consumption

	Bituminous	Sub-bituminous	Lignite	Total
	Thousand tonnes			
Algeria	600	—	—	600
Botswana	728	—	—	728
Congo (Democratic Rep.)	140	—	—	140
Egypt (Arab Rep.)	1 400	—	—	1 400
Ghana	3	—	—	3
Kenya	145	—	—	145
Libya/GSPLAJ	5	—	—	5
Madagascar	14	—	—	14
Malawi	17	—	—	17
Mauritania	6	—	—	6
Mauritius	70	—	—	70
Morocco	3 385	—	—	3 385
Mozambique	55	—	—	55
Niger	170	—	—	170
Nigeria	20	—	—	20
South Africa	146 300	—	—	146 300
Swaziland	100	—	—	100
Tanzania	30	—	—	30
Tunisia	5	—	—	5
Zambia	45	—	—	45
Zimbabwe	5 350	—	—	5 350
Total Africa	**158 588**	**—**	**—**	**158 588**
Canada	16 160	25 410	11 470	53 040
Cuba	160	—	—	160
Dominican Republic	115	—	—	115
Haiti	10	—	—	10
Jamaica	N	—	—	N
Mexico	2 500	7 000	N	9 500
Panama	55	—	—	55
Puerto Rico	175	—	—	175
United States of America	502 100	309 440	80 070	891 610
US Virgin Islands	255	—	—	255
Total North America	**521 530**	**341 850**	**91 540**	**954 920**
Argentina	1 450	300	—	1 750
Brazil	12 447	4 913	—	17 360
Chile	3 500	—	—	3 500
Colombia	6 500	—	—	6 500
Peru	450	—	—	450
Venezuela	350	—	—	350
Total South America	**24 697**	**5 213**	**—**	**29 910**
Afghanistan	5	—	—	5
Armenia	10	—	—	10
Azerbaijan	5	—	—	5
Bangladesh	50	—	—	50
Bhutan	24	—	—	24
China	1 275 000	—	50 000	1 325 000
Cyprus	159	—	—	159
Georgia	200	—	—	200
Hong Kong, China	6 770	—	—	6 770

TABLE 1.4 Coal: 1996 Consumption (Cont.)

	Bituminous	Sub-bituminous	Lignite	Total
	Thousand tonnes			
India	285 000	—	25 000	310 000
Indonesia	2 403	8 850	99	11 352
Japan	132 600	—	—	132 600
Kazakhstan	65 000	—	3 400	68 400
Korea (Democratic People's Rep.)	27 000	—	8 000	35 000
Korea (Republic)	44 908	5 369	—	50 277
Kyrgyzstan	1 000	—	300	1 300
Malaysia	2 400	—	—	2 400
Mongolia	800	—	7 000	7 800
Myanmar (Burma)	37	—	40	77
Nepal	1 200	—	—	1 200
Pakistan	1 100	3 600	—	4 700
Philippines	—	4 350	—	4 350
Sri Lanka	1	—	—	1
Taiwan, China	31 000	—	—	31 000
Tajikistan	N	—	—	N
Thailand	3 755	—	20 983	24 738
Turkey	8 140	—	58 800	66 940
Turkmenistan	100	—	—	100
Uzbekistan	500	—	2 700	3 200
Vietnam	4 500	—	—	4 500
Total Asia	**1 893 667**	**22 169**	**176 322**	**2 092 158**
Albania	—	—	88	88
Austria	3 400	—	1 110	4 510
Belarus	1 300	—	—	1 300
Belgium	13 000	—	—	13 000
Bosnia-Herzogovina	—	—	2 500	2 500
Bulgaria	3 200	—	31 000	34 200
Croatia	117	—	150	267
Czech Republic	13 858	50 577	902	65 337
Denmark	14 500	—	—	14 500
Estonia	85	—	—	85
Finland	6 400	—	—	6 400
Former Yugoslav Rep. of Macedonia	100	—	6 700	6 800
France	15 975	850	—	16 825
Germany	75 000	—	190 200	265 200
Greece	2 085	—	57 000	59 085
Hungary	2 800	5 200	7 550	15 550
Iceland	100	—	—	100
Ireland	3 129	—	40	3 169
Italy	16 300	N	300	16 600
Latvia	294	N	N	294
Lithuania	300	—	—	300
Luxembourg	311	—	10	321
Moldova	1 500	—	—	1 500
Netherlands	15 000	—	—	15 000
Norway	—	1 900	—	1 900
Poland	110 400	—	63 870	174 270
Portugal	5 683	—	—	5 683
Romania	N	12 037	36 530	48 567

TABLE 1.4 Coal: 1996 Consumption (Cont.)

	Bituminous	Sub-bituminous	Lignite	Total
	Thousand tonnes			
Russian Federation	125 000	112 000	10 000	247 000
Serbia, Montenegro	120	—	38 000	38 120
Slovakia	—	—	7 220	7 220
Slovenia	26	1 153	3 807	4 986
Spain	22 500	3 400	9 700	35 600
Sweden	3 600	—	—	3 600
Switzerland	180	—	—	180
Ukraine	58 200	20 700	1 600	80 500
United Kingdom	71 403	—	—	71 403
Total Europe	**585 866**	**207 817**	**468 277**	**1 261 960**
Iran (Islamic Rep.)	2 000	—	—	2 000
Israel	7 700	—	—	7 700
Lebanon	200	—	—	200
Total Middle East	**9 900**	**—**	**—**	**9 900**
Australia	35 100	20 800	53 600	109 500
Fiji	20	—	—	20
New Caledonia	165	—	—	165
New Zealand	140	1 560	320	2 020
Papua New Guinea	1	—	—	1
Total Oceania	**35 426**	**22 360**	**53 920**	**111 706**
TOTAL WORLD	**3 229 674**	**599 409**	**790 059**	**4 619 142**

Notes:

It is often difficult to draw the distinction between bituminous and sub-bituminous grades and between sub-bituminous and lignite.

Sources: WEC Member Committees, 1997; National sources; Estimates by the editors.

COUNTRY NOTES

The following Country Notes on coal have been compiled by the editors, drawing upon a wide variety of material, including information received from WEC Member Committees, national and international publications.

The principal published sources consulted were:

- *Energy Balances of OECD Countries 1994–1995,* 1997, International Energy Agency
- *Energy Overview* series, Office of Fossil Energy, US Department of Energy
- *Energy Statistics and Balances of Non-OECD Countries 1994–1995,* 1997, International Energy Agency
- *Energy Statistics of OECD Countries 1994–1995,* 1997, International Energy Agency
- *Major coalfields of the world,* January 1993, IEA Coal Research

Average values and/or ranges are given (when reported by WEC Member Committees) for the following characteristics of indigenous coal production:

Heat value	:	moist, ash-free
Sulfur content	:	dry
Carbon content	:	dry, ash-free
Volatile matter	:	dry, ash-free
Moisture content	:	moist, as mined
Ash	:	dry

AUSTRALIA

Proved amount in place (total coal, million tonnes) 113 900

Proved recoverable reserves (total coal, million tonnes) 90 400

Production (total coal, million tonnes, 1996) 248.6

Coal Characteristics

	Bituminous including anthracite		Sub-bituminous		Lignite	
	Average	Range	Average	Range	Average	Range
Heat value (MJ/kg)	28	23–33	19.0	13.5–20.7	9.8	8.9–13.2
Sulfur content (%)	—	0.3–0.8	—	0.2–0.5	—	0.3–0.6
Carbon content (%)	—	39–84	—	35–49	—	45–49
Volatile matter (%)	—	20–45	—	21–27	—	47–52
Moisture content (%)	—	1–19	—	15–26	—	48–66
Ash (%)	—	2.5–31	—	6–19	—	1–4

Coal-bearing sediments extend across vast areas in eastern Australia; substantial coal resources occur in all Australian states but not in the Northern Territory. Although there are large reserves of both metallurgical and thermal coal, the emphasis of production varies by state: more than 70% of the black (hard) coal produced is destined for export markets and is currently sourced from deposits of metallurgical and steam coals found in New South Wales and Queensland; the lower grade deposits of sub-bituminous coal and lignite found in Victoria, South Australia and Western Australia are utilized in the generation of electricity.

The industry, whose operations are entirely within the private sector, has many producers with numerous mines, rail, road and port facilities offering customers alternative supply sources. The mines are efficient and modern and many have on-site preparation plants.

Australia is the world's largest exporter of black coal, currently supplying 33 countries. The growth in the country's export trade first occurred in the late 1960s when demand from Japanese steel makers was increasing. The 1979 oil price rise led to an increased demand as customers sought to reduce their dependence on oil.

The Australian coal industry has the capacity to expand to help meet increasing world demand. New mines, covering a range of thermal and metallurgical coals, are currently under development. Several additional projects in New South Wales and Queensland are at the stage where development decisions can be made quickly if market conditions warrant.

Sources: WEC Member Committee; Australian Department of Primary Industries & Energy; IEA Coal Research.

BOTSWANA

Proved amount in place (total coal, million tonnes) 7 189

Proved recoverable reserves (total coal, million tonnes) 4 313

Production (total coal, million tonnes, 1996) 0.7

Coal Characteristics

	Bituminous including anthracite	
	Average	Range
Heat value (MJ/kg)	25.54	24.20–27.73
Sulfur content (%)	0.98	0.8–1.16
Carbon content (%)	51.3	48–54.2
Volatile matter (%)	25.5	24.5–26.5
Moisture content (%)	6.25	5.66–7.39
Ash (%)	20.25	18.7–21.8

Coal deposits have been located in ten areas of Botswana and although vast reserves have been discovered in the east of the country, socio-economic factors will probably limit their development in the short-medium term. The main coalfields are located in the greater Morupule and Mmamabula areas. At the present time the Morupule Colliery (a subsidiary of Anglo-American Corporation), near Palapye, is the country's only coal mine in operation. It provides coal for power generation and copper/nickel smelting: the Morupule power station, adjacent to the mine, generates approximately 80% of the country's power requirements.

Proven in-situ resources in the Morupule and Mmamabula coalfields are 7 189 million tonnes, with a maximum depth of 200–250 meters and a minimum seam thickness of 0.25 meters. The recoverable portion of these resources is quoted as in the range of 50%–70% of the proved amount in place. A mean recovery factor of 60% would give proved recoverable reserves of 4 313 million tonnes.

Over and above the proven amount in place, there is an estimated additional amount in place of 205 253 million tonnes, representing 28 722 million tonnes of indicated resources and 176 531 million tonnes of inferred resources, covering all the coalfields that have been explored in Botswana. It is not at present possible to provide an estimate of the recoverable portion of the indicated and inferred resources.

Sources: WEC Member Committee; Botswana Power Corporation; Ministry of Finance and Development Planning; UNDP/World Bank.

BRAZIL

Proved amount in place (total coal, million tonnes) 17 072

Proved recoverable reserves (total coal, million tonnes) 11 950

Production (total coal, million tonnes, 1996) 4.8

Coal Characteristics

	Sub-bituminous	
	Average	**Range**
Heat value (MJ/kg)	16.5	12–26
Sulfur content (%)	2.3	0.5–6.5
Carbon content (%)	31.6	19–55
Volatile matter (%)	23.3	18–33
Ash (%)	45.4	20–57

Brazil has considerable reserves of sub-bituminous coal, mostly located in the southern states of Rio Grande do Sul, Santa Catarina and Paraná.

For the present Survey, the WEC Brazilian Member Committee has reported revised assessments of coal resources, with a proved amount in place (defined as covering measured, indicated and inferred reserves) of just over 17 billion tonnes, of which 70% is categorized as proved recoverable reserves. There is estimated to be some 15.3 billion tonnes of additional coal in place, of which about 50% is considered to be recoverable.

Almost all output is classified as steam coal, of which three-quarters is used as power-station fuel and the remainder in industrial plants. Virtually all of Brazil's metallurgical coal is imported.

Sources: WEC Member Committee; Ministry of Mines and Energy.

BULGARIA

Proved amount in place (total coal, million tonnes) .... —

Proved recoverable reserves (total coal, million tonnes) 2 711

Production (total coal, million tonnes, 1996) 31.5

There are fairly large deposits of low-quality lignite and brown coal in Bulgaria, as well as minor amounts of anthracite and bituminous coal. The Maritsa coal field in the south of the country produces low-quality coal (with high ash and sulfur content) which is used to fuel local power plants. Nationally, coal-fired electricity generating capacity accounts for over 40% of the total; the country is highly dependent on imports of coal.

The government, in its 1995 *Basic Direction for Development of the Energy Sector until 2020* called for the construction of 1 500 MW of additional coal-fired generating capacity.

Source: Office of Fossil Energy, US Department of Energy.

CANADA

Proved amount in place (total coal, million tonnes) 20 790

Proved recoverable reserves (total coal, million tonnes) 8 623

Production (total coal, million tonnes, 1996) 75.8

Coal Characteristics

	Sub-bituminous		Lignite	
	Average	Range	Average	Range
Heat value (MJ/kg)	28	12–29	15	12–17
Sulfur content (%)	0.35	0.2–0.6	0.5	0.3–0.8
Carbon content (%)	49	39–52	54	51–55
Volatile matter (%)	49	39–52	47	45–49
Moisture content (%)	20	13–26	32	31–33
Ash (%)	16	9–24	16	10–26

Bituminous coal characteristics differ dramatically between eastern Canada and western Canada. The characteristics quoted below reflect the different geological origins of the two production regions.

	Eastern Canada		Western Canada	
	Average	Range	Average	Range
Heat value (MJ/kg)	33	30–34	34	27–36
Sulfur content (%)	2	1–8	0.4	0.2–0.8
Carbon content (%)	83	77–86	87	77–91
Volatile matter (%)	38	31–40	26	19–37
Moisture content (%)	8	3–9	8	3–10
Ash (%)	5	3–20	10	7–20

Canada possesses large reserves of coal which are mainly located in the mid to western provinces of Saskatchewan, Alberta and British Columbia, with smaller deposits in the eastern provinces of Nova Scotia and New Brunswick. The first four named provinces are responsible for more than 99% of Canadian coal production. Bituminous deposits are found in the two eastern provinces together with Alberta and British Columbia; Alberta also possesses sub-bituminous grades while lignite deposits are found only in Saskatchewan.

Alberta is both the largest coal-producing and coal-consuming province; as in the other producing provinces, coal is mainly used for electricity generation. In total, more than 88% of Canadian coal production is used for electricity generation, about 8% for steel production and 4% for other industries, mainly cement.

Ontario, as the second largest coal consumer, conforms to the national pattern of usage. Consumption has declined in Ontario as nuclear power stations have come on line. However, it may rise after 2010 as some older nuclear installations are retired and the demand for electricity rises.

British Columbia produces mostly metallurgical coal which is almost entirely exported.

The Canadian coal industry is very largely in private ownership; output is currently mostly from large surface mines. Virtually all underground operations have now closed.

Sources: WEC Member Committee; IEA Coal Research; Natural Resources Canada.

CHILE

Proved amount in place (total coal, million tonnes) .... —

Proved recoverable reserves (total coal, million tonnes) 1 181

Production (total coal, million tonnes, 1996) 1.4

Chile possesses modest amounts of bituminous coal and substantially greater resources of sub-bituminous grades. Coal production together with imported coal is consumed in power stations and industrial plants, with very small tonnages used in agriculture and by households.

Production from the Mina Pecket deposit, 50 km from the city of Punta Arenas in the far-south region of Magallanes, is being converted from a surface-mining basis (output capacity circa 1 million tonnes per annum) to an underground mining operation.

Sources: Compañía de Carbones de Chile, COCAR S.A.; International Energy Agency; SER 1995.

CHINA

Proved amount in place (total coal, million tonnes) . . . . —

Proved recoverable reserves (total coal, million tonnes) 114 500

Production (total coal, million tonnes, 1996) 1 374.1

China possesses enormous coal resources which are widely distributed throughout the country, except in the south-west. However, its major coal deposits lie in a belt some 3 000 km long and 1 000 km wide in the east of the country.

The whole range of coal ranks is found, with bituminous being the most plentiful. The country is the world's largest coal producer and consumer: its output (in terms of calorific content) is equivalent to 30% of the world total.

Domestic consumption of coal in China is on the same massive scale as its production: the principal consuming sectors are industrial users (especially the iron and steel industry, cement and chemicals), which account for approximately 45% of total consumption (excluding the coal industry's own use/loss). Power stations, including CHP plants, account for some 36% of coal use, residential consumers for about 12% and other consumers (commercial/public administration, agriculture and railways) for the remaining 7%.

China imports relatively small tonnages of coal, principally from Vietnam and Australia. Exports, however, are on a totally different scale: currently the country is the 6th largest coal exporter in the world.

Control and operation of mines is divided into two segments:

- The Ministry of Coal Industry's key mines are large "backbone" coal mines with advanced technology and equipment, which supply the main coal consumers.
- Local coal mines are operated either by the state through local governments at the provincial, county or prefecture level, or as collectively/individually owned township and village enterprises. The local state-owned mines consist mainly of medium-sized and small coal mines, with a certain degree of mechanization. Township and village mines are mostly small and primitive but are so numerous that their total output accounts for about 45% of China's production.

Coal transportation within China is a major problem, as a significant proportion of coal production takes place in the north of the country and the bulk of demand is in the eastern and southern provinces. Approximately 60% of coal movements are by rail, 20% by road and 20% by inland waterways.

Sources: *BP Statistical Review of World Energy*; IEA Coal Research; International Energy Agency; Ministry of Energy; State Planning Commission; SER 1995.

COLOMBIA

Proved amount in place (total coal, million tonnes) . . . . —

Proved recoverable reserves (total coal, million tonnes) 6 749

Production (total coal, million tonnes, 1996) 30.1

Colombia's vast coal resources are located in the north and west of the country. Published data on measured reserves (sourced from the state coal entity Ecocarbón, March 1997) indicate a total of 6 749 million tonnes, of which Cerrejón North and Central Zones account for 54% and Cesar for 29%.

Virtually all Colombia's coal resources fall into the bituminous category: the reserves in the San Jorge field in Córdoba, with an average calorific value in the sub-bituminous/lignite bracket, are shown under sub-bituminous in Table 1.1.

Development of Colombian coal for export has centered on the Cerrejón deposits, which are located in the Guajira Peninsula in the far north, about 100 km inland from the Caribbean coast. The coal is found in the northern portion of a basin formed by the Cesar and Rancheria rivers; the deposit has been divided into the North, Central and South Zones by the government. Late in 1975 the government opened international bidding for the development of El Cerrejón-North Zone reserves, and two years later Carbocol (100% owned by the Colombian State) and Intercor (an Exxon affiliate) entered into an Association Contract for the development and mining of the North Zone. The contract has three phases and covers a 33 year period with the production phase scheduled to end early in 2009. The Cerrejón North Zone surface mine produces high quality steam coal; production stood at 14.4 million tonnes in 1996, close to the design capacity of 15 million tonnes/year. In addition, the Central and South Zones produced 3.3 million tonnes in 1996.

The other main coal producing province of Colombia is Cesar, which produced nearly 6.5 million tonnes in 1996; the remaining provinces produced 5.9 million tonnes giving a total national output of 30.1 million tonnes in 1996.

Coal exports from the Cerrejón North Zone were 14.5 million tonnes in 1996 out of a national total of 24.9 million tonnes. Cerrejón has confirmed its position of being the largest export mine in the world.

Sources: Carbocol; Ministerio de Minas y Energía.

CZECH REPUBLIC

Proved amount in place (total coal, million tonnes) 8 948

Proved recoverable reserves (total coal, million tonnes) 6 177

Production (total coal, million tonnes, 1996) 73.9

Coal Characteristics

	Bituminous including anthracite		Sub-bituminous		Lignite
	Average	Range	Average	Range	Average
Heat value (MJ/kg)	27.03	15–31	13.96	9–17	9.4
Sulfur content (%)	0.51	0.4–0.7	1.18	0.3–1.2	1.88
Carbon content (%)	—	—	—	68–73	—
Volatile matter (%)	—	36–38	—	52–60	—
Moisture content (%)	9.51	4–20	29.82	28–41	47.2
Ash (%)	12.40	5–40	26.13	10–42	20.2

The Upper Silesia Basin straddles the border between Poland, the Czech Republic and Slovakia: about 80% of the coalfield lies within Poland. Although the Czech Republic has large reserves of coal, most are not suited for development for economic or environmental reasons. The majority of the high-quality hard coal reserves are located in Moravia, with most of the output coming from the Ostrava-Karviná district. The higher-quality lignite deposits are to be found further west in North Bohemia.

The mining industry has been privatized into six joint-stock companies—three hard coal and three lignite mining companies which between them own and operate a range of underground mines, surface mines, washing plants, coking plants and a lignite gasification plant.

In recent years the Republic has exported coal primarily to Slovakia, Germany and Austria while importing marginal amounts. However, it is anticipated that by 2005 domestic demand for coal and lignite will decline, with exports declining to an even greater extent.

The Czech Republic has an Association Agreement with the European Union and full membership is expected some time after 2000. With this in mind, energy policy will focus on harmonizing the energy sector standards with those of the EU. Thus, dependence on solid fuels as a primary energy source will be lowered.

Sources: WEC Member Committee; IEA Coal Research; Office of Fossil Energy, US Department of Energy.

GERMANY

Proved amount in place (total coal, million tonnes) 122 000

Proved recoverable reserves (total coal, million tonnes) 67 000

Production (total coal, million tonnes, 1996) 240.2

Coal Characteristics

	Bituminous including anthracite		Lignite	
	Average	**Range**	**Average**	**Range**
Heat value (MJ/kg)	35	34–36.5	8.9	8.6–11.4
Sulfur content (%)	1	0.7–1.3	—	0.15–3.0
Carbon content (%)	86	78–94	—	60–68
Volatile matter (%)	29	6–40	—	53–60
Moisture content (%)	5	2–8	—	46–60
Ash (%)	7	2–12	—	1.5–13.0

The Ruhr coalfield produces about 79% of German hard coal. The coal qualities range from anthracite to high-volatile, strongly caking bituminous coal. The Saar is the second largest coalfield with substantial deposits of weakly caking bituminous coal.

All German hard coal is deep-mined from seams at depths exceeding 900 meters.

The lignite deposit in the Rhine region is the largest such formation in Europe.

In the former East Germany there are major deposits of lignite at Halle Leipzig and Lower Lausitz; these have considerable domestic importance.

Source: WEC Member Committee.

GREECE

Proved amount in place (total coal, million tonnes) . . . . —

Proved recoverable reserves (total coal, million tonnes) 2 874

Production (total coal, million tonnes, 1996) 57.2

Coal resources are all in the form of lignite. Apart from a very small amount of private mining, all production is carried out by the mining division of the Public Power Corporation (DEI). There are two lignite centers, Ptolemais-Amynteo (LCPA) in the northern region of West Macedonia, and Megalopolis (LCM) in the southern region of Peloponnese. These two centers control the operations of seven open-cast mines; LCPA mines account for about 75% of DEI's output of lignite.

In the lignite-mining areas there are six dedicated power stations (total generating capacity: 4 900 MW), which together produce more than two-thirds of Greece's electricity supply. In 1996, DEI mines produced 56.9 million tonnes of lignite, which was used to generate 25 854 GWh of electricity.

Greece is the second largest producer of lignite in the European Union and amongst the largest in the world. DEI is developing new mines at three locations. Remaining reserves at the two existing lignite centers, together with two new fields, are quoted as 2 874 million tonnes; DEI also quotes "known exploitable" lignite resources as 4 billion tonnes: 70 years supply at the present rate of production.

Source: Public Power Corporation (Dimosia Epichirisi Ilectrismou, DEI).

INDIA

Proved amount in place (total coal, million tonnes) .... (see below)

Proved recoverable reserves (total coal, million tonnes) 74 733

Production (total coal, million tonnes, 1996) 308.0

Coal is the most abundant fossil fuel resource in India and places the country in the top rank of nations with coal reserves. The most significant deposits are contained in the Raniganj and Jharia basins of north-east India. The coalfields are mainly located in the eastern half of the country, ranging from Andhra Pradesh, bordering the Indian Ocean to Arunachal Pradesh in the extreme north-east: the States of Bihar, Orissa, Madhya Pradesh and West Bengal together account for about 85% of reserves. There are also isolated deposits in the far west and south. In addition to the 72 733 million tonnes of proved reserves (as of January 1, 1997) the Geological Survey of India states that there are some 89 836 million tonnes of indicated reserves and 42 084 million tonnes of inferred reserves.

Lignite deposits mostly occur in the State of Tamil Nadu. India's geological resources of lignite are estimated to be about 27.5 billion tonnes, of which about 2 billion tonnes in the Neyveli area are regarded as "mineable under the presently adopted mining parameters," and taken as proved recoverable reserves in the present Survey.

Although reserves cover a range of coal types from lignite to bituminous, they generally have a high ash content and a low calorific value. The low quality prevents India from being anything but a small exporter of coal (traditionally to the neighboring countries of Bangladesh, Nepal and Bhutan) and conversely, is responsible for the sizeable import of coal (mostly of coking grade) from Australia, China, Indonesia and South Africa.

The Ministry of Coal has the overall responsibility for determining policies and strategies in respect of exploration and development of coal and lignite reserves. Under the administrative control of the Ministry, key functions are exercized through the public sector undertakings, namely Coal India and its subsidiaries, the Neyveli Lignite Corporation (essentially entrusted with the task of lignite production and associated power generation) and the Singareni Collieries Company (a joint sector undertaking of the Government of India and the Government of Andhra Pradesh).

Coal is the most important source of energy for electricity generation in India. Some two-thirds of electricity is generated by coal-fired power stations. In addition, the steel, cement, fertilizer, chemical, paper and many other medium and small-scale industries are also dependent on coal. In the course of phasing out steam traction the direct demand for coal for rail transport has decreased. However, the replacement electric locomotives are still dependent on an availability of electric power from coal.

It is expected that coal will continue to play an important role in India's energy supply and there are long-term plans to increase efficiency in the industry. Areas to be covered include increases in the capacities of washing plants, mechanization in mining and transport systems and the introduction of mining technology suitable for Indian conditions.

Sources: IEA Coal Research; Ministry of Coal.

INDONESIA

Proved amount in place (total coal, million tonnes) 17 731

Proved recoverable reserves (total coal, million tonnes) 5 220

Production (total coal, million tonnes, 1996) 51.2

Coal Characteristics

	Bituminous including anthracite		Sub-bituminous		Lignite
	Average	Range	Average	Range	Average
Heat value (MJ/kg)	29.85	26.2–33.5	23.1	21.7–24.5	20.1
Sulfur content (%)	0.65	0.3–1	0.5	0.1–0.9	0.15
Carbon content (%)	62	42–82	41.05	38.9–43.2	34
Volatile matter (%)	26.25	10–42.5	44.05	38.1–50.0	36
Moisture content (%)	11.5	5–18	25.70	23.4–28.0	35
Ash (%)	9.0	3–15	2.5	1–4	2

Despite differing assessments of Indonesian coal reserves, there is general agreement that the country possesses large resources of bituminous and sub-bituminous coal and even larger tonnages of lignite.

The proved amount in place shown above consists of the sum of "measured" and "indicated" coal resources, as quoted in "Indonesian Coal Mining Development & Company Profiles, 1997", published by the Indonesian Coal Mining Association; measured resources are taken to correspond with proved recoverable reserves. No official breakdown of these numbers by rank is available. Table 1.1 includes a provisional split, estimated by the editors.

About two-thirds of Indonesian coal reserves are located in Sumatra and nearly one-third in Kalimantan. The first commercial coal mine was inaugurated in 1849 at Pengaron, East Kalimantan. Subsequently a number of coalfields were discovered, the main ones being the Ombilin field in west Sumatra (1868) and the Bukit Asam lignite field in south Sumatra (1919). Although southern Sumatra contains the higher proportion of reserves, Kalimantan's resources are more important in terms of quality.

The deposits are characterized by thick seams that lie close to the surface. Although the quality varies from mine to mine, and generally the moisture content is high, the higher-quality coals often have low ash and sulfur contents and high volatile matter.

After reaching a high output in the 1930s, coal production slumped to only about 200 000 tonnes/year in the early 1970s. Following the first oil crisis in 1973/1974, plans were laid to increase coal production and these came to fruition in the next decade. By 1985, output had increased and it has continued on a steeply rising trend.

The industry has moved from a position of being a producer wholly for the domestic market to one of possessing great export potential. Substantial resources are located near tidal waterways or the coast so that the relative dearth of railways in the archipelago has not retarded a growth in exports. Where there is no railway available, trucks, barges or direct, overland conveyors are used to transport the coal to deep-water loading jetties at the main coal terminals. The greater part of Indonesian coal production is exported to Asia/Pacific countries (in 1995, exports represented approximately 75% of production). The main domestic markets for coal are power stations and cement works.

Although state-owned mines, which used to produce almost all Indonesia's coal, have greatly increased their output, a major factor behind the rapid growth of total production since 1990 has been the participation of foreign companies in coal cooperation contracts with the government.

Sources: WEC Member Committee; IEA Coal Research; Indonesian Coal Mining Association.

MEXICO

Proved amount in place (total coal, million tonnes) . . . . —

Proved recoverable reserves (total coal, million tonnes) 1 211

Production (total coal, million tonnes, 1996) 8.5

Mexico possesses moderate resources of coal, mostly located in the north-eastern state of Coahila.

Mexico's current production (after cleaning) comprises both coking coal and other grades. Apart from minimal amounts which are exported, indigenous coking coal is consumed by the Mexican iron and steel industry, in which it is supplemented by imports from the USA, Canada and Colombia. All the non-coking coal is used as power-station fuel. In general, Mexican coal is of low quality, having a high ash content.

Sources: Energy Information Administration, US Department of Energy; International Energy Agency; Secretaría de Energía.

PAKISTAN

Proved amount in place (total coal, million tonnes) .... (see below)

Proved recoverable reserves (total coal, million tonnes) 2 928

Production (total coal, million tonnes, 1996) 3.6

The republic's coal resources appear to be substantial: The Geological Survey of Pakistan gives measured resources as 2 928 million tonnes, with indicated resources of a further 8 208 million tonnes, inferred resources of 68 350 and hypothetical resources as 105 169 million tonnes, as at 30 June 1997.

The discovery of the Thar coal field in the Thar Desert of eastern Sindh province transformed the country's coal resources and now contributes 80% of the measured reserves. Under the auspices of an USAID program which began in 1985, the field was located in the late 1980s; in the early 1990s a drilling program largely confirmed the extent of the field.

Notwithstanding this massive potential, coal production in recent years has been only about 3–3.5 million tonnes per annum. About half is currently produced in the western province of Balochistan; no Thar coal is produced at present.

Small tonnages of indigenous coal are used for electricity generation and by households, but by far the largest portion is used to fire brick-kilns. Just over 1 million tonnes of Australian coking coal are imported each year for use in the iron and steel industry.

Sources: Ministry of Petroleum and Natural Resources; U.S. Geological Survey.

PERU

Proved amount in place (total coal, million tonnes) .... —

Proved recoverable reserves (total coal, million tonnes) 1 060

Production (total coal, million tonnes, 1996) 0.1

Peru has some moderately sized reserves of coal, but with current output of bituminous coal at a very low level an enormous R/P ratio is implied. Indigenous coal, together with approximately 500 000 tonnes of imported coal, is all used by industrial plants.

Sources: International Energy Agency; SER 1995.

POLAND

Proved amount in place (total coal, million tonnes) 74 369

Proved recoverable reserves (total coal, million tonnes) 14 309

Production (total coal, million tonnes, 1996) 202.0

Coal Characteristics

	Bituminous including anthracite		Lignite	
	Average	Range	Average	Range
Heat value (MJ/kg)	23.95	23.88–24.02	8.47	8.3–8.5
Sulfur content (%)	1.3	1–2	—	—
Moisture content (%)	3.8	—	50	—
Ash (%)	13	10–20	11	—

Most of Poland's extensive coal resources are in the form of hard coal: 85% of the proved recoverable reserves are of hard coal, one-fifth of which is considered to be of coking quality.

Approximately 97 % of Poland's hard coal production comes from the Upper Silesia Basin in southern Poland, one of Europe's most important coal basins. Other coal-producing areas are in Lower Silesia and Lublin; Poland's three largest coal mines are located at Ziemonwist, Crenott and Piost.

At the present time the hard coal industry is undergoing a deep restructuring. The trend is to eliminate the non-profitable mines and to reduce hard coal production. This process is time-consuming and difficult: the quality of the coal is rising but production is reducing slowly.

The current level of lignite output is being maintained, but will be carefully controlled because of environmental restrictions. Up to 2020 lignite production will probably remain constant.

Sources: WEC Member Committee; Office of Fossil Energy, US Department of Energy.

RUSSIAN FEDERATION

Proved amount in place (total coal, million tonnes) 200 576

Proved recoverable reserves (total coal, million tonnes) 157 010

Production (total coal, million tonnes, 1996) 256.0

Russian coal reserves are widely dispersed and held in a number of major basins. They range from the Moscow basin in the far west; the eastern end of the Donetsk basin (most of which is within Ukraine) in the south and the Pechora basin in the far northeast of European Russia. The Irkutsk, Kuznetsk, Kansk-Achinsk, Lena, South Yakutia and Tunguska basins stretch across Siberia to the Far East.

Much the greater part of Russia's coal resources are located east of the Ural Mountains—thousands of kilometers from the major industrial and population centers of European Russia. However, in addition to the costly mine-to-market transportation problems involved, the quality of many of these remote coal reserves is poor because of undesirable levels of ash, water and sulfur.

The principal economic hard coal deposits of Russia are to be found in the Pechora and Kuznetsk basins. The former, which covers an area of some 90 000 km^2, has been extensively developed, despite the severe climate and the fact that 85% of the basin is under permafrost. The deposits are in relatively close proximity to the markets and the coal is of a high-quality bituminous coking variety. The Kuznetsk basin, an area of some 26 700 km^2, lies to the east of the city of Novosibirsk and contains a wide range of coals; the ash content is variable and the sulfur is generally low. The coal is produced from both surface and underground mines.

The Moscow and Kansk-Achinsk basins contain lignite and brown coal, respectively, and even though the reserves are high in moisture, sulfur and ash content they have been successfully exploited: in the case of the former, because of its closeness to centers of consumption, and in the case of the latter, because of the coal's shallow overburdens that make it easily strip-mineable.

East of the Kuznetsk and astride the trans-Siberia railway, the Kansk-Achinsk basin contains huge, high-moisture, low-thermal-energy content lignite reserves which are suitable for surface mining. The vast Siberian coal-bearing areas of the Lena and Tunguska basins represent unexplored reserves, the commercial significance of which will probably be difficult to achieve.

The transportation of coal from mining to consuming areas is problematical in a country of Russia's proportions. As the reserves in the western areas have been increasingly depleted, the focus of production has moved further east and the burden on the rail system has increased, exacerbated by a large amount of crosshauling. Nevertheless, the vast majority of coal movements are by rail.

Between 1950 and 1975 total USSR coal output increased by about 4% per annum; in the following years there was a levelling off and after the disintegration of the USSR, total coal production declined dramatically. Russian production now stands at about 250–260 million tonnes. Coal consumption has followed a similar pattern of gradual growth followed by a more pronounced decline. In 1995 about 56% of Russian consumption was accounted for by power stations and district heating plants. Since 1990 Russia has fluctuated between being a net importer and a net exporter of coal.

Sources: IEA Coal Research; International Energy Agency; US Central Intelligence Agency.

SOUTH AFRICA

Proved amount in place (total coal, million tonnes) 121 248

Proved recoverable reserves (total coal, million tonnes) 55 333

Production (total coal, million tonnes, 1996) 206.4

Coal Characteristics

	Bituminous including anthracite	Lignite	
	Range	Average	Range
Heat value (MJ/kg)	16.8–31.9	13	13–14
Sulfur content (%)	0.23–1.84	3.3	2–6
Carbon content (%)	36.3–92.5	16.8	13–19
Volatile matter (%)	5.8–46.0	24.7	24–25
Moisture content (%)	0.7–5.7	9.2	9–10
Ash (%)	7–38	49.1	45–53

From the first discovery of coal in South Africa in 1699 the country has grown to become one of the leading coal nations of the world. Coal's prominence in the national energy scene is largely attributable to a very large reserve base and historically a ready supply of low-cost labour. In the past South Africa's political isolation led the country to restrict its dependence on oil imports to a greater degree than any other non-centrally planned economy, and to emphasize the development of its coal resources.

Coal occurs principally in three regions within the Great Karoo basin:

- The shaly Volksrust Formation which covers most of the central and northern Transvaal. The coal is found in isolated basins and troughs, which results in the fields being disconnected and widely separated;
- The sandy Vryheid Formation of the northern part of the main Karoo basin (northern Orange Free State, northern Natal and southern Transvaal): this generally continuous area is probably the most important economically;
- The Molteno Formation is confined to the north-eastern Cape. It is of minor economic importance compared to other coalfields in South Africa.

Some lignite deposits are known to be present along the Natal and Cape coasts, but are considered of no economic importance.

Coal occurrences have been divided into 18 separate coalfields. These cover an area of some 600 km from north to south by 500 km from east to west. The Molteno field lies some 300 km south of the main coal-bearing region.

Eskom, the South African electric utility, accounts for well over half of coal consumption. A further large slice is consumed by the Sasol plants in making synthetic fuels and chemicals from coal. The third main user is the industrial sector, including the iron and steel industry. Coal use in residential and commercial premises is relatively small, while demand by the railways has virtually disappeared.

Coal exports are equivalent to about 30% of South African output and are mainly destined for Europe and Asia/Pacific. The main route for exports is via the Richards Bay coal terminal. Although there are other harbours which can handle coal exports, Richards Bay is by far the busiest, ranking among the largest coal export terminals in the world. Coal can be transported directly by rail from many mines and stored by grade at the terminal prior to export.

Sources: WEC Member Committee; Department of Mineral and Energy Affairs; IEA Coal Research; International Energy Agency.

THAILAND

Proved amount in place (total coal, million tonnes) 2 315

Proved recoverable reserves (total coal, million tonnes) 2 000

Production (total coal, million tonnes, 1996) 21.5

Coal Characteristics

	Bituminous including anthracite	Lignite
	Range	Range
Heat value (MJ/kg)	20.1–32.2	4.2–34.6
Sulfur content (%)	—	0.0–23.93
Carbon content (%)	—	2.02–83.6
Volatile matter (%)	—	2.6–56.13
Moisture content (%)	—	0.9–42.1
Ash (%)	—	1.1–84.95

Thailand has substantial resources of lignite, notably at Mae Moh (with 1.3 billion tonnes of proven reserves). Production of coal (almost entirely lignite and largely from the Mae Moh mine) has increased substantially during the 1990s.

All Thai production is obtained by surface mining.

The main outlet for indigenous coal is electricity generation, the balance being consumed by various industrial users. Imports of coking coal are for use by the iron and steel industry; the principal suppliers are Indonesia and China.

Sources: WEC Member Committee; Ministry of Science, Technology and Environment; Ministry of Finance, Customs Department.

UNITED KINGDOM

Proved amount in place (total coal, million tonnes) . . . . (see below)

Proved recoverable reserves (total coal, million tonnes) 1 500

Production (total coal, million tonnes, 1996) 50.2

Coal deposits are widely distributed and for many years the UK was one of the world's largest coal producers, and by far its largest exporter. Production rose to a peak of nearly 300 million tonnes/year during World War I and thereafter did not fall below 200 million tonnes/year until 1960. Output began a long-term decline in the mid-1960s, falling to less than 100 million tonnes/year by 1990. Reflecting continued competition from natural gas and imported coal, UK coal production sank to 50 million tonnes in 1996.

The UK coal industry was privatized at the end of 1994, with the principal purchaser being RJB Mining, which acquired 16 deep mines from British Coal. At end-1996, a total of 27 deep mines and 91 surface-mining sites were in operation. Deep-mined coal output in 1996 was 32.2 million tonnes and open-cast sites produced 16.3 million tonnes; production from slurry, etc., amounted to 1.7 million tonnes.

The decline of the British coal industry makes it exceptionally difficult to quantify resources and reserves in compliance with the definitions specified for this Survey. In British Coal's annual report for 1991/1992, coal in place (in seams over 0.6 meters thick and less than 1 200 meters deep) was estimated as 190 billion tonnes, of which some 45 billion tonnes could be extracted with current technology. The report qualified these estimates by stating that "the working of these resources will depend on economic circumstances, together with any other strategic considerations."

For the purpose of the present Survey, the problem lies in quantifying the proportion of the coal in place which should be regarded as "exploitable under present and expected local economic conditions" (see Definitions), and the proportion of the technologically recoverable reserves which would satisfy the same economic criterion.

The greater part of the 190 billion tonnes of coal in place quoted above is not within the take of currently operating mines. The UK Department of Trade and Industry's 1997 *Energy Report* states that "there were estimated to be approximately 1 billion tonnes of economically viable coal reserves at existing mines at the end of 1994." Parker (1997) estimated proven UK coal reserves accessible to existing deep mines and identified opencast sites as "of the order of 800 million tonnes." In this Survey, UK proved recoverable reserves of bituminous coal are quoted at the 1997 *Energy Report* level of 1 billion tonnes, the British Coal estimate of 190 billion tonnes of coal in place could be regarded as "additional amount in place"; no quantification can be given for the "proved amount in place" or "additional reserves recoverable" on account of the difficulty of applying economic criteria to these concepts in the UK's particular circumstances.

Estimates of lignite reserves and resources relate only to the Crumlin deposit in County Antrim, Northern Ireland.

Sources: UK Department of Trade and Industry; *UK Coal Reserves in Perspective,* M. J. Parker, Energy Exploration & Exploitation, vol 15, no 1, 1997.

UNITED STATES OF AMERICA

Proved amount in place (total coal, million tonnes) 448 223

Proved recoverable reserves (total coal, million tonnes) 246 643

Production (total coal, million tonnes, 1996) 965.1

Coal Characteristics

	Bituminous including anthracite		Sub-bituminous		Lignite	
	Average	Range	Average	Range	Average	Range
Heat value (MJ/kg)	28.43	27.54–34.92	20.28	20.28–27.44	15.12	14.34–17.48
Sulfur content (%)	1.64	0.41–4.29	0.39	0.21–0.80	1.41	0.50–1.00
Ash (%)	10.34	5.31–39.26	6.60	3.40–24.11	13.60	7.10–26.56

The US coal resource base is the largest in the world. Proved recoverable reserves of some 247 billion tonnes are equivalent to about 25% of the global total. The demonstrated reserve base (DRB), corresponding to the WEC category of "proved amount in place," is 448 billion tonnes (494 billion short tons), of which bituminous coal (including anthracite) represents about 53%, sub-bituminous 38% and lignite 9%.

Coal deposits are widely distributed, being found in 38 states and underlying about 13% of the total land area. The Western Region (notably Montana and Wyoming) accounts for about 49% of the DRB, the Interior Region (in particular, Illinois and Kentucky) for 29% and the Appalachian Region (chiefly West Virginia, Pennsylvania and Ohio) for 22%. Bituminous coal reserves are recorded for 27 states, whereas only 8 states have sub-bituminous reserves, of which 90% are located in Montana and Wyoming.

The US Energy Information Administration's "estimated recoverable reserves" diverge somewhat from the pattern of the DRB data owing to regional differences in resource accessibility, geology and recovery rates. Overall, about 55% of the DRB is deemed to be recoverable. The Western Region has a somewhat higher share (56%) of the recoverable reserves than it does of the DRB; more than half of its coal is classified as low-sulfur.

US coal output is the second highest in the world, after China, and accounted for over 20% of global production in 1996. Coal is the USA's largest single source of indigenous primary energy; nearly 90% of domestic coal consumption is for electricity generation. Coal exports amounted to 82 million tonnes in 1996, confirming the USA as one of the world's leading suppliers of coking coal and other bituminous grades.

Sources: WEC Member Committee; US Department of Energy, Energy Information Administration.

COAL (INCLUDING LIGNITE)

In writing the commentary to accompany the latest analysis of proved recoverable reserves of coal, there is the opportunity to provide a narrative that deals with the results on two very distinct levels. On one level, a review in terms of reserves, their location, notable reassessments from past surveys and the relationship between reserves and production/consumption, regional balance and trade flows.

But there is also a broader debate … what do ‘proved recoverable reserves of coal’ mean in terms of energy resources for today and tomorrow, in terms of energy availability and coal use?

We have seen some very significant changes within the coal industry since the last WEC Survey published in September 1998. Many of these changes reflect broader global issues, including trade competitiveness, global concentration, and market restructuring (particularly at country level, with continuing shifts from command to market economies for some major players).

The point was made in the 1998 Survey that the size of the resource base is not the restraining factor for coal to be able to continue supplying a considerable portion of world primary energy demand. At that time the restraining factor on coal’s participation in the supply of the world’s primary energy demand was identified as a question of the development of production facilities and infrastructure.

Looking now both with hindsight and from an assessment of the contemporary policy setting, the issues currently facing coal are much more in the context of international, regional and national environmental policy conditions relating to the use of coal.

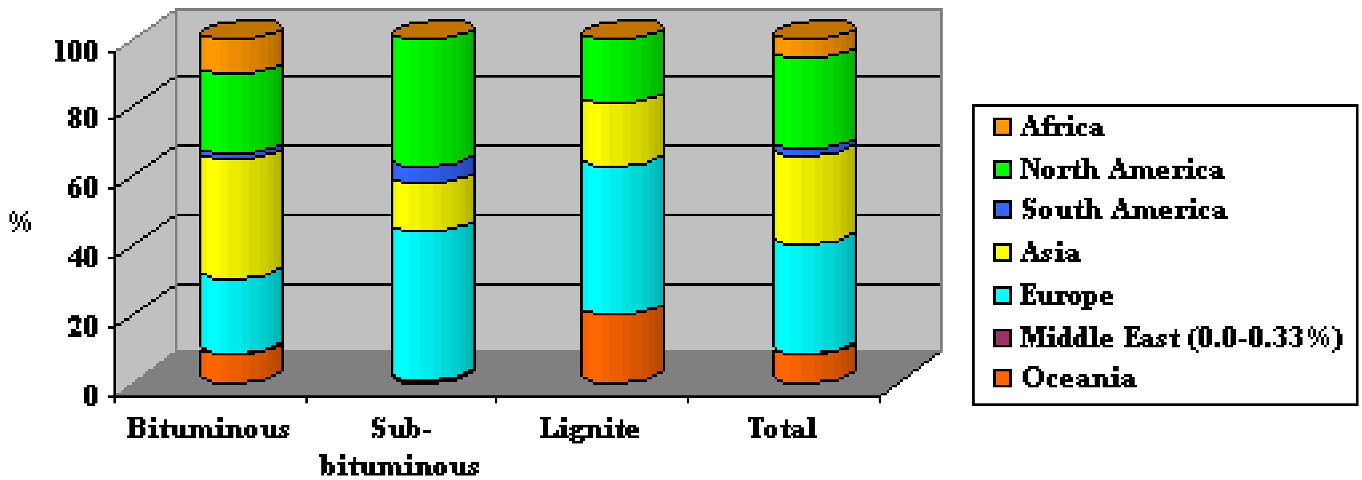
In dealing with the specific reserves of coal, there is little change in the total world figures, just a slight overall increase on the previous Survey. This is a predictable outcome, given the maturity of the industry and the large amount of reserves relative to current rates of exploitation. The rough and ready explanation of a production level showing that exploitation can continue at current levels in excess of 200 years is correct in arithmetic terms, but of little consequence or value given the size of this number. The world is not going to run out of physically-available supplies of coal.

Any limit on coal use will not be imposed by a limit on the availability of physical resources of coal – but coal use could face limits and restrictions in the future which would affect the availability and price of energy. These changes in the relative market value of coal compared with other energy sources will impact on recoverable reserves when the economic impact is taken into account by individual countries when assessing their coal reserves.

Within the total world reserves, there was a slight adjustment between the three primary categories with the bituminous increasing by 2%, while sub-bituminous declined by 1% and lignite reserves by around 3% below the previous recorded levels.

The top ten countries accounted for 95% of the reserves of bituminous coal – which was equal to 53% of total coal reserves. These same ten countries also held over 85% of the sub-bituminous and lignite reserves. In total, these top ten countries on a reserves basis held just over 90% of the total reported coal reserves at the end of 1999.

Figure 1.1: Proved coal reserves at end-1999 - regional distribution



On a geographic basis, South America is the one continent with little in the way of coal reserves – only 2.2% of total reserves and only 1.5% of the bituminous reserves. Africa has less than 6% of total reserves with these reserves concentrated in the bituminous category and dominated by South Africa with about 90% of the total. Botswana and Zimbabwe have the only significant reserves outside South Africa.

Both North America and Asia have over 25% each of total reserves. While the reserves in North America are almost equally split between bituminous coal and sub-bituminous/lignite, Asia has a significantly higher proportion of reserves in the bituminous classification, accounting for around 35% of total bituminous reserves worldwide.

Total coal reserves held by Europe were slightly over 30% of the world total, while the individual categories show a higher share of world sub-bituminous and lignite reserves and a lower proportion of bituminous (22%).

European reserves are dominated by two countries: Germany (21%) and the Russian Federation (50%). In respect of bituminous reserves, Germany, Poland, Russian Federation and the Ukraine account for over 95% of the European total.

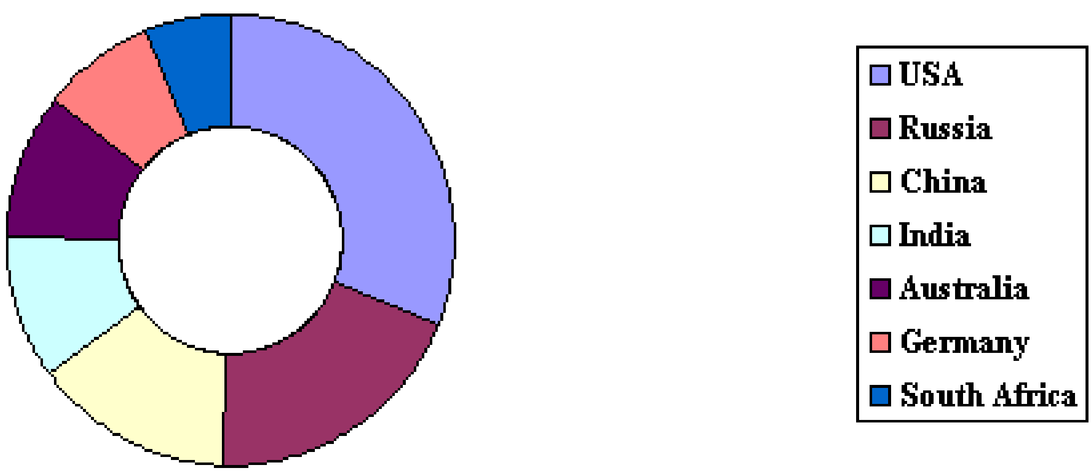
Significant changes between these results and those of the previous Survey are recorded by nine countries: Australia, Canada, Hungary, India, Poland, Romania, South Africa, Turkey, and the USA.

Poland recorded the largest increase in bituminous reserves over the previous Survey (68%), followed by India (13%), while US bituminous reserves increased by 4%.

South Africa's and Australia's bituminous reserves have both been reduced by 10%, whilst Canada's considerably smaller proved reserves have fallen 23%.

Hungary's reported reserves have been seriously downgraded to almost non-existent under the bituminous and sub-bituminous categories – and halved under the lignite category. In global terms, this adjustment by Hungary is not significant (previously accounting for less than 0.5% of total proved recoverable reserves of coal); however, at the national level, Hungary has now no reported bituminous reserves, with only small sub-bituminous reserves (80 million tonnes) and just over a billion tonnes of lignite.

Figure 1.2: Proved coal reserves at end-1999 - leading countries



Romania has also reported a very significant downgrading of its coal reserves which were concentrated in the sub-bituminous and lignite categories. This revision removes almost all reported reserves of sub-bituminous coal (from 810 Mt down to 35 Mt) and a halving of lignite reserves (2 800 Mt down to 1 421 Mt).

Turkey's reported proved recoverable reserves – mostly in the form of sub-bituminous coal and lignite – are now well over three times the level advised for the 1998 Survey.

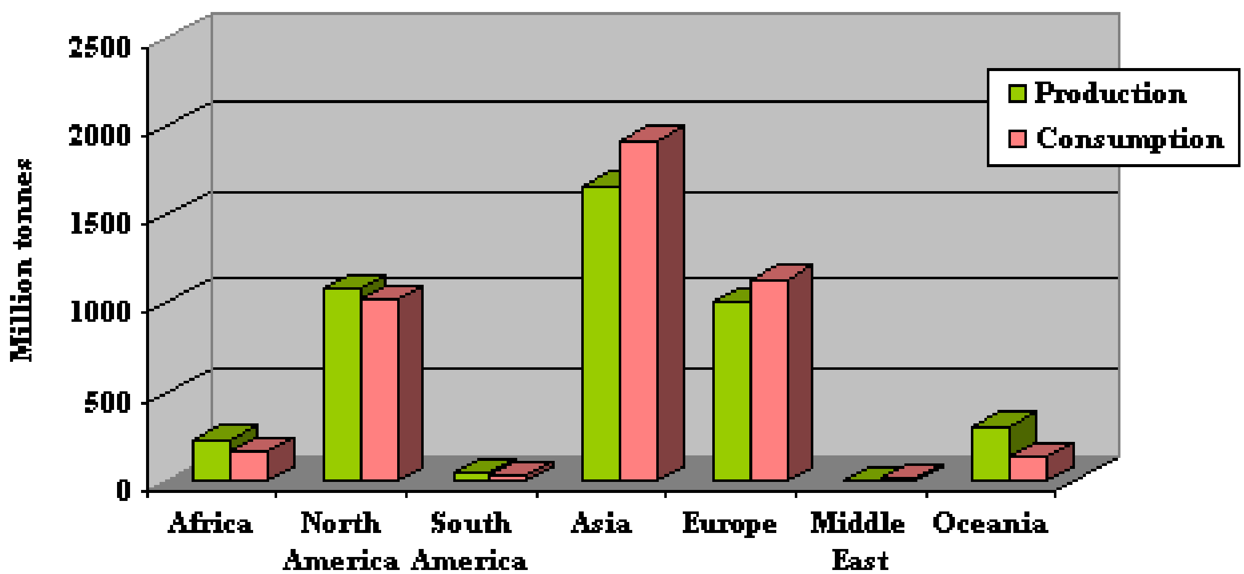
Looking beyond the issue of coal reserves, a number of the key indicators within the coal industry have shown significant change over the past three years.

Ownership of coal-producing enterprises has changed significantly. On one level, the trend which had just commenced in the second half of the last decade – the withdrawal of the oil majors from the strategic coal production investments undertaken in the wake of the oil shocks of the 1970's – turned into a flood of disposals. Very limited coal-producing assets remained in the hands of oil companies by the end of 2000. Of those assets remaining, most have been on the market, with the special circumstances of the individual assets being the primary reason for the failure to conclude this chapter in the history of coal in the hands of oil companies.

In addition to the departure of the oil majors from coal production, industry concentration has been pursued by a number of the major coal-producing companies. A number of global mining houses and global coal specialists increased their coal portfolio, taking advantage of the lower asset values reflecting the poor market returns for coal over the last decade, and encouraging many smaller operations to exit from the sector. Further industry concentration is expected to continue within the industry.

In the period since the 18th Survey, the most significant production adjustment has occurred in China. In 1997 Chinese hard coal production was 1 268 Mt; however, the 1999 Chinese output of hard coal was less than a billion tonnes. This reduction in production reflects the very significant restructuring being undertaken within the Chinese coal industry. This has resulted in a large number of small local pits being closed (estimated to be in excess of 40 000 over the last two years) – but at the same time, China has developed new high-volume open-cast coal operations to underpin both domestic and export supplies for the future.

Figure 1.3: Coal production and consumption, 1999 - regional distribution



The USA continues to expand production – now over 975 Mt per annum – but with less tonnage being made available to the export market. While tonnage traded bilaterally between USA and Canada remains a function of logistical advantage, USA seaborne coal exports have halved between 1996 and 2000, down to a new level of around 36 Mt. This is a reminder that the1 USA remains a ‘swing’ supplier with the export tonnage made available when favourable global market conditions prevail. In the later part of 2000, demand for energy in the USA domestic market had strengthened to such a level that coal spot prices were significantly above long-term contract price trends. This situation now raises questions over the future USA market conditions for coal, given the USA capacity to expand production if contract prices stimulate such a response.

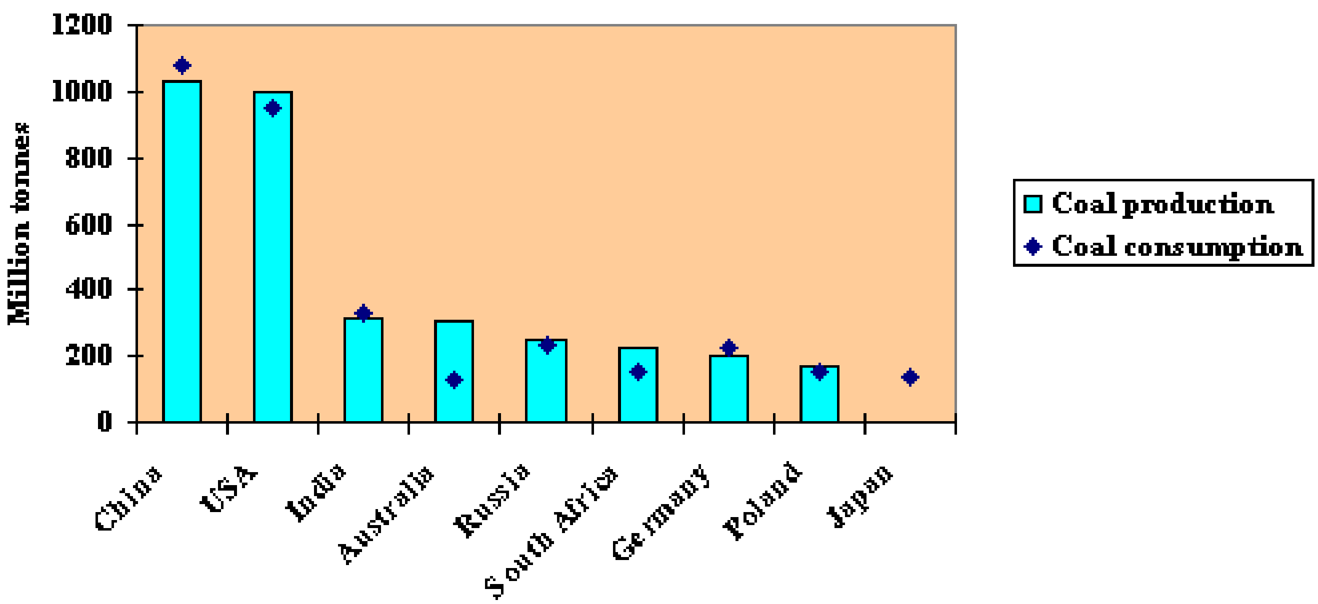
Traded coal on a global level continues to expand. While the long-term importers remain in the trade – and continue to increase demand – other countries have emerged as significant markets as their domestic coal industry is further exposed to a competitive coal market. Germany and the UK are notable in this group, along with Spain. But will this be a short- or long-term market opportunity with the environmental policies being sponsored by a number of the EU Member States?

Imports into the USA market are also growing, reflecting the availability of coal from Colombia to access some of the USA coastal regions.

This is a powerful reminder of the role of transport in the cost-competitive delivery of coal into most global markets and as a key factor in determining the export source of the coal.

The second half of the 1990's has seen the consolidation of China and Indonesia as two of the top five exporters, with around 10% of the global export market each.

Figure 1.4: Coal production and consumption, 1999 - leading countries



Specific attributes of some coals have also aided the development of coal production and heightened interest in reserves located in countries such as Indonesia. Low sulphur levels make many of the Indonesian coals commercially attractive to a global customer base required to meet ever-tightening SO_x emission levels.

This highlights the importance of a qualitative assessment of reserves that takes into account environmental issues which are still evolving on a global level. Different standards across different countries (from low to high) suggest reported reserves would also reflect these differences, to the degree that externalities have been and will be incorporated into the reserves assessment.

Allied to this is the work of the US Geological Survey (USGS) to create a reliable worldwide coal-quality and related information database. The goal for the World Coal Quality Inventory (WoCQI) is to generate reliable, internally consistent coal quality analyses for all major coal-producing countries.

Accurate information on coal, particularly information on coal properties and characteristics, is required to make informed decisions regarding the best use of indigenous resources, international import needs and export opportunities, domestic and foreign policy objectives, technology transfer opportunities, foreign investment prospects, environmental and health assessments, and by-product use and disposal issues. Further information is available at: http://pubs.usgs.gov/factsheet/fs155-00/

The two major uses for coal – steel production and electricity generation – continue to be at the heart of development for most countries seeking economic growth. Coal supplies around 23% of the total global primary energy demand, around 38% of total world electricity production and is an essential input for steel production via the BOF process, which accounts for almost 70% of total world steel production.

But will this remain … what are the risks and constraints facing coal in continuing a ‘business-as-usual’ outlook?

The year 2000 took energy – and the users of this resource – on the next phase of the combined political and economic roller coaster. At the mid-point of 2000, North Sea Brent crude oil was quoted at US$ 30.18 (27 June), an 80% increase over the price one year earlier.

Coal prices, particularly in the spot and short-term market, have moved strongly upwards as the oil price has remained in the US$ mid-twenties band, encouraging fuel switching away from oil and gas where the energy market has the capacity to substitute fuel inputs or energy sources. The skyrocketing of natural gas prices stimulated demand for coal in a market with considerable coal-burning capacity.

The good news is that coal has been available to respond to the market situation …flexibility still remains in the "system" to switch fuels in many countries. Coal-fired generating capacity was available to enable fuel substitution to occur to alleviate the market pressure. However, this option is being slowly closed off in a number of important European markets as coal-fired electricity capacity is taken out of service.

Will the coal option continue to be available to respond in the future under similar circumstances?

For the coal production side of the debate, the answer is simple: medium- and long-term availability of coal for the international market is assured, with a diverse range of sources and suppliers.

But the delivery and use of coal will rely on other elements of the overall electricity production chain – and, importantly, the policy conditions under which markets will be required to operate at the regional and national levels.

What are the factors – political, economic, environmental and social – that will affect coal's future involvement in the energy market?

Deregulation of markets and the establishment of new, higher hurdles of environmental performance have been found to be fun and rewarding in the playground of energy surplus, which is the circumstance of most developed countries. It is not a luxury available to, or shared by, many countries seeking to enhance living conditions and standards to a basic level for all citizens.

Where deregulation of the electricity markets has been undertaken or commenced in developed countries, the market has always featured adequate or excess generating capacity (including reserve capacity). This makes life simple in the short- and medium-term and creates unrealistic expectations for the future. Future capacity investments are not certain and will rely on major firms being created out of market concentration to be able to absorb/cover the financial/commercial risks of such developments, guaranteeing oligopolistic behaviour at best within the 'deregulated' market in the future.

Can governments 'pick and choose' the energy mix they want based on their goal for achieving certain environmental outcomes? The political issue of climate change and the desire of some governments to reduce greenhouse gas (GHG) emissions is an area of great potential change for energy, and for coal in particular.

The coal industry – production and consumption – will change because of the emerging political circumstances and new market conditions. Coal will need to reduce its *environmental footprint*.

Some countries have introduced (or indicated their intention to introduce in the near future) support policies for alternative energy sources and mandated energy market shares for coal's competitors.

Coal is the most carbon-intensive of the fossil fuels at the point of combustion. Improved coal technology and efficiency are consistent with the GHG objectives of the United Nations Framework Convention on Climate Change (UNFCCC) (and the Kyoto Protocol) and can provide significant benefits, in both developed and developing countries. Deployment of these technologies will support the continuation of coal in the global energy mix.

Technology can deliver solutions to the GHG emissions for coal – significant research is now focussed on the challenges of tomorrow. Advanced technologies are being pursued for the conversion of coal into energy - and to enhance the capture and sequestering of carbon by-products.

The US Department of Energy (DOE) has a major research programme to develop new carbon sequestration technologies, which capture and store gases that enhance the natural "greenhouse effect." The DOE programme objective is to reduce the expense of carbon sequestration to US$ 10 or less per ton by 2015, equivalent to about one US cent per kilowatt hour on the average electricity bill.

Technology advances will ensure coal remains a critical part of the energy equation. Other policy and market responses will underwrite low-cost measures to address the environmental issues of climate change and GHG emissions to the atmosphere.

Coal will remain part of the energy resource endowment, possibly with a greater role in energy delivery as a key element of the ‘energy bridge’ to the future under the conditions of sustainable development. The World Energy Assessment* recently highlighted the global energy challenge to provide greater access to clean and affordable fuels and electricity to the two billion people still dependent on traditional fuels with serious health consequences. Coal can assist in meeting this challenge – with cleaner technologies ensuring both that energy needs can be satisfied and improved environmental outcomes attained.

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DEFINITIONS

Proved amount in place is the tonnage that has been carefully measured and assessed as exploitable under present and expected local economic conditions with existing available technology.

Maximum depth of deposits and **minimum seam thickness** relate to proved amount in place.

Proved recoverable reserves are the tonnage within the proved amount in place that can be recovered (extracted from the earth in raw form) under present and expected local economic conditions with existing available technology.

Estimated additional amount in place is the indicated and inferred tonnage *additional* to the proved amount in place. It includes estimates of amounts which could exist in unexplored extensions of known deposits or in undiscovered deposits in known coal-bearing areas, as well as amounts inferred through knowledge of favourable geological conditions. Speculative amounts are not included.

Estimated additional reserves recoverable is the tonnage within the estimated additional amount in place which geological and engineering information indicates with reasonable certainty might be recovered in the future.

TABLE NOTES

The tables cover bituminous coal (including anthracite), sub-bituminous coal and lignite. Data for peat are given in Chapter 8. There is no universally accepted system of demarcation between coals of different rank and what is regarded as sub-bituminous coal tends to vary from one country to another. Moreover, if it is not isolated as such, sub-bituminous is sometimes included with bituminous and sometimes with lignite.

There are no internationally agreed standards for estimating coal reserves and, although the WEC attempts to establish precisely worded definitions, it is a matter of judgement for each country to determine the quantities that, in its opinion, meet these definitions.

Table 1.1 Coal: proved recoverable reserves at end-1999

Excel files	million tonnes			
	Bituminous including anthracite	**Sub-bituminous**	**Lignite**	**TOTAL**
Algeria	40			40
Botswana	4 300			4 300
Central African Republic			3	3
Congo (Democratic Rep.)	88			88
Egypt (Arab Rep.)		22		22
Malawi		2		2
Morocco	N			N
Mozambique	212			212
Niger	70			70
Nigeria	21	169		190
South Africa	49 520			49 520
Swaziland	208			208
Tanzania	200			200
Zambia	10			10
Zimbabwe	502			502
Total Africa	**55 171**	**193**	**3**	**55 367**
Canada	3 471	871	2 236	6 578
Greenland		183		183
Mexico	860	300	51	1 211
United States of America	115 891	101 021	33 082	249 994
Total North America	**120 222**	**102 375**	**35 369**	**257 966**
Argentina		430		430
Bolivia	1			1
Brazil		11 929		11 929
Chile	31	1 150		1 181
Colombia	6 267	381		6 648
Ecuador			24	24
Peru	960		100	1 060
Venezuela	479			479

Total South America	**7 738**	**13 890**	**124**	**21 752**
Afghanistan	66			66
China	62 200	33 700	18 600	114 500
India	82 396		2 000	84 396
Indonesia	790	1 430	3 150	5 370
Japan	773			773
Kazakhstan	31 000		3 000	34 000
Korea (Democratic People's Rep.)	300	300		600
Korea (Republic)	78			78
Kyrgyzstan			812	812
Malaysia	4			4
Mongolia				
Myanmar (Burma)	2			2
Nepal	2			2
Pakistan		2 265		2 265
Philippines		232	100	332
Taiwan, China	1			1
Thailand			1 268	1 268
Turkey	278	761	2 650	3 689
Uzbekistan	1 000		3 000	4 000
Vietnam	150			150
Total Asia	**179 040**	**38 688**	**34 580**	**252 308**

Table 1.1 Coal: proved recoverable reserves at end-1999 contd.

	million tonnes			
	Bituminous including anthracite	**Sub-bituminous**	**Lignite**	**TOTAL**
Albania				
Austria			25	25
Bulgaria	13	233	2 465	2 711
Croatia	6		33	39
Czech Republic	2 114	3 414	150	5 678
France	22		14	36
Germany	23 000		43 000	66 000

Greece			2 874	2 874
Hungary		80	1 017	1 097
Ireland	14			14
Italy		27	7	34
Netherlands	497			497
Norway		1		1
Poland	20 300		1 860	22 160
Portugal	3		33	36
Romania	1	35	1 421	1 457
Russian Federation	49 088	97 472	10 450	157 010
Serbia & Montenegro	64	1 460	14 732	16 256
Slovakia			172	172
Slovenia		40	235	275
Spain	200	400	60	660
Sweden		1		1
Ukraine	16 274	15 946	1 933	34 153
United Kingdom	1 000		500	1 500
Total Europe	**112 596**	**119 109**	**80 981**	**312 686**
Iran (Islamic Rep.)	1 710			1 710
Total Middle East	**1 710**			**1 710**
Australia	42 550	1 840	37 700	82 090
New Caledonia	2			2
New Zealand	33	206	333	572
Total Oceania	**42 585**	**2 046**	**38 033**	**82 664**
TOTAL WORLD	**519 062**	**276 301**	**189 090**	**984 453**
Notes:				
1. A quantification of proved recoverable reserves for Mongolia and Albania is not available				
2. The data shown against Serbia & Montenegro include reserves in Bosnia-Herzogovina and Macedonia (Rep.)				
3. Sources: WEC Member Committees, 2000/2001; data reported for previous WEC Surveys of Energy Resources; national and international published sources				

Table 1.2i Bituminous coal (including anthracite): resources at end-1999		
Excel files	**Proved amount in place**	**Estimated additional**

	Tonnage	Maximum depth of deposits	Minimum seam thickness	Amount in place	Reserves recoverable
	million tonnes	metres	metres	million tonnes	million tonnes
Africa					
South Africa	115 515	350	1.0		
Swaziland	567	550	1.0	450	
North America					
Canada	4 609	1 200	0.6	92 224	62 445
United States of America	250 482	671	0.3	445 346	
South America					
Argentina	4				
Chile	64			1	
Venezuela	1 308			6 955	
Asia					
Japan	8 265				
Korea (Republic)	132	1 000	0.6	393	126
Taiwan, China	100	800	0.4		
Turkey	428	1 200	0.8	698	209
Europe					
Austria	1				
Croatia	4				
Czech Republic	7 231	1 600	0.6		6 961
France	160	1 300	1.0		
Germany	44 000	1 500	1.0	186 000	
Hungary	13	900	0.4	1 582	1 965
Netherlands	1 406	1 500	0.8	2 750	1 375
Poland	50 900	1 000	1.0		
Romania	1			N	
Spain	1 300	1 200	0.5	3 000	200
Ukraine	21 699	1 800	0.5	5 423	
Oceania					

Australia	62 240	600	0.3	125 000	75 000
New Zealand	45			942	313
Notes:					

1. The data on resources are those reported by WEC Member Committees in 2000/2001. They thus constitute a sample, reflecting the information available in particular countries: they should not be considered as complete, or necessarily representative of the situation in each region. For this reason, regional and global aggregates have not been computed

2. Sources: WEC Member Committees, 2000/2001

Table 1.2ii Sub-bituminous coal: resources at end-1999

Excel files	Proved amount in place			Estimated additional	
	Tonnage	**Maximum depth of deposits**	**Minimum seam thickness**	**Amount in place**	**Reserves recoverable**
	million tonnes	**metres**	**metres**	**million tonnes**	**million tonnes**
North America					
Canada	1 153	300	1.5	48 764	15 165
Greenland	183	550		200	100
United States of America	167 087	305	1.5	273 593	
South America					
Argentina	700	800	0.5		
Brazil	17 051	870	0.5	15 319	7 660
Chile	91				
Asia					
Pakistan	3 775		0.3	99 490	
Philippines	305	300	0.6		
Turkey	1 526	828	0.1	202	
Europe					
Czech Republic	1 957	500	2.0		4 267
Hungary	622	600	0.8	2 578	1 766
Italy	60	500	1.4	280	
Norway	55	450	0.6		

Romania	991			174	
Slovenia	57	190	10.0		
Spain	800	200	0.8	1 600	500
Sweden	4	15	0.5	20	
Ukraine	21 261	1 800	0.6	5 502	
Oceania					
Australia	2 620	200	1.5	27 800	21 200
New Zealand	376			2 085	682
Notes:					
1. The data on resources are those reported by WEC Member Committees in 2000/2001. They thus constitute a sample, reflecting the information available in particular countries: they should not be considered as complete, or necessarily representative of the situation in each region. For this reason, regional and global aggregates have not been computed					
2. Sources: WEC Member Committees, 2000/2001					

Table 1.2iii Lignite: resources at end-1999

Excel files	Proved amount in place			Estimated additional	
	Tonnage	**Maximum depth of deposits**	**Minimum seam thickness**	**Amount in place**	**Reserves recoverable**
	million tonnes	**metres**	**metres**	**million tonnes**	**million tonnes**
North America					
Canada	2 961	50	1.5	51 034	42 115
United States of America	39 934	61	0.8	393 822	
South America					
Argentina	7 350				
Asia					
Philippines	118	100	0.6		
Thailand	1 391	500	3.0	760	
Turkey	4 535	492	0.1	80	
Europe					
Austria	340				

Croatia	41				
Czech Republic	623	130	1.5		240
France	114	1 000	1.0		
Germany	78 000	600	2.0		
Hungary	1 361	80	1.0	3 245	1 041
Italy	15	150	3.0	22	20
Poland	13 600	350	3.0		
Romania	2 500			4 641	
Slovakia					389
Slovenia	602	547	8.0		
Spain	60	50	0.5		
Ukraine	2 578	400	2.7	320	
Oceania					
Australia	41 900	300	3.0	175 300	157 800
New Zealand	2 297			9 817	7 078

Notes:

1. The data on resources are those reported by WEC Member Committees in 2000/2001. They thus constitute a sample, reflecting the information available in particular countries: they should not be considered as complete, or necessarily representative of the situation in each region. For this reason, regional and global aggregates have not been computed

2. Sources: WEC Member Committees, 2000/2001

Table 1.3 Coal: 1999 production

Excel files	**thousand tonnes**			
	Bituminous	**Sub-bituminous**	**Lignite**	**Total**
Algeria	25			25
Botswana	945			945
Congo (Democratic Rep.)	50			50
Egypt	200			200
Malawi		44		44
Morocco	129			129
Mozambique	18			18
Niger	168			168

Nigeria		20		20
South Africa	223 510			223 510
Swaziland	426			426
Tanzania	5			5
Zambia	128			128
Zimbabwe	4 977			4 977
Total Africa	**230 581**	**64**		**230 645**
Canada	36 538	24 300	11 659	72 497
Mexico	2 366	7 678		10 044
United States of America	568 260	352 260	76 570	997 090
Total North America	**607 164**	**384 238**	**88 229**	**1 079 631**
Argentina	337			337
Brazil	5 602			5 602
Chile	170	470		640
Colombia	32 754			32 754
Peru	20			20
Venezuela	6 500			6 500
Total South America	**45 383**	**470**		**45 853**
Afghanistan	2			2
Bhutan	50			50
China	985 000		45 000	1 030 000
Georgia	12			12
India	292 203		22 212	314 415
Indonesia	70 703			70 703
Japan	3 906			3 906
Kazakhstan	56 436		1 763	58 199
Korea (Democratic People's Rep.)	60 000	21 500		81 500
Korea (Republic)		4 197		4 197
Kyrgyzstan	135		280	415
Laos	202			202
Malaysia		309		309
Mongolia	1 423		3 529	4 952
Myanmar (Burma)	13		27	40
Nepal			9	9
Pakistan		3 307		3 307

Philippines		1 028		1 028
Taiwan, China	90			90
Tajikistan		19		19
Thailand			18 270	18 270
Turkey	1 990		65 050	67 040
Uzbekistan	89		2 864	2 953
Vietnam	8 830			8 830
Total Asia	**1 481 084**	**30 360**	**159 004**	**1 670 448**

Table 1.3 Coal: 1999 production contd.

	thousand tonnes			
	Bituminous	**Sub-bituminous**	**Lignite**	**Total**
Albania			33	33
Austria			1 137	1 137
Bosnia-Herzogovina			1 850	1 850
Bulgaria	90		25 940	26 030
Croatia	15			15
Czech Republic	14 419	44 278	512	59 209
FYR Macedonia			8 400	8 400
France	4 533		558	5 091
Germany	40 500		161 282	201 782
Greece			61 900	61 900
Hungary	700	6 500	7 700	14 900
Italy			19	19
Norway		400		400
Poland	110 200		60 800	171 000
Romania	N	2 751	20 131	22 882
Russian Federation	166 000		83 400	249 400
Serbia & Montenegro	49		30 451	30 500
Slovakia			3 748	3 748
Slovenia		758	3 804	4 562
Spain	13 200	3 700	8 500	25 400
Ukraine	34 871	46 176	1 182	82 229
United Kingdom	37 077			37 077

Total Europe	**421 654**	**104 563**	**481 347**	**1 007 564**
Iran (Islamic Rep.)	1 500			1 500
Total Middle East	**1 500**			**1 500**
Australia	222 000	16 200	65 800	304 000
New Zealand	1 630	1 670	210	3 510
Total Oceania	**223 630**	**17 870**	**66 010**	**307 510**
TOTAL WORLD	**3 010 996**	**537 565**	**794 590**	**4 343 151**
Notes:				
1. Sources: WEC Member Committees, 2000/2001; BP Statistical Review of World Energy 2001; Energy - Monthly Statistics, Eurostat; World Mineral Statistics 1995-1999, British Geological Survey; national sources; estimates by the editors				

Table 1.4 Coal: 1999 consumption

Excel files	thousand tonnes			
	Bituminous	**Sub-bituminous**	**Lignite**	**Total**
Algeria	490			490
Botswana	945			945
Congo (Democratic Rep.)	100			100
Egypt (Arab Rep.)	2 000			2 000
Ghana	3			3
Kenya	100			100
Libya/GSPLAJ	5			5
Madagascar	14			14
Malawi	17			17
Mauritania	6			6
Mauritius	75			75
Morocco	3 200			3 200
Niger	168			168
Nigeria		20		20
South Africa	153 460			153 460
Swaziland	180			180
Tanzania	5			5
Tunisia	1			1
Zambia	121			121

Zimbabwe	4 750			4 750
Total Africa	**165 640**	**20**		**165 660**
Canada	23 700	26 600	10 200	60 500
Cuba	20			20
Dominican Republic	160			160
Jamaica	25			25
Mexico	2 716	9 469		12 185
Panama	65			65
Puerto Rico	185			185
United States of America	520 800	350 000	76 600	947 400
US Virgin Islands	260			260
Total North America	**547 931**	**386 069**	**86 800**	**1 020 800**
Argentina	1 300			1 300
Brazil	12 286	6 690		18 976
Chile	4 130	870		5 000
Colombia	4 200			4 200
Peru	500			500
Venezuela	164			164
Total South America	**22 580**	**7 560**		**30 140**
Afghanistan	2			2
Armenia	5			5
Azerbaijan	1			1
Bangladesh	300			300
Bhutan	75			75
China	1 035 000		45 000	1 080 000
Cyprus	20			20
Georgia	25			25
Hong Kong, China	6 393			6 393
India	308 160		22 200	330 360
Indonesia	17 000			17 000
Japan	137 000			137 000
Kazakhstan	41 650		1 600	43 250
Korea (Democratic People's Rep.)	61 680	21 500		83 180
Korea (Republic)	54 137	4 992		59 129

Table 1.4 Coal: 1999 consumption contd.				
	thousand tonnes			
	Bituminous	Sub-bituminous	Lignite	Total
Kyrgyzstan	350		350	700
Malaysia	1 150	1 500		2 650
Mongolia	1 500		3 200	4 700
Myanmar (Burma)	16		27	43
Nepal	300			300
Pakistan		4 370		4 370
Philippines		6 416		6 416
Sri Lanka	1			1
Taiwan, China	40 023			40 023
Tajikistan	100	19		119
Thailand	3 230		18 840	22 070
Turkey	11 200		64 080	75 280
Uzbekistan	1 150		2 850	4 000
Vietnam	5 500			5 500
Total Asia	**1 725 968**	**38 797**	**158 147**	**1 922 912**
Albania			33	33
Austria	3 440		1 640	5 080
Belarus	200			200
Belgium	9 710	310		10 020
Bosnia-Herzogovina			1 850	1 850
Bulgaria	3 400		25 940	29 340
Croatia	284		81	365
Czech Republic	10 402	41 454	512	52 368
Denmark	7 804			7 804
Estonia	80			80
Finland	5 368			5 368
FYR Macedonia	250		8 400	8 650
France	22 416		612	23 028
Germany	64 500		163 335	227 835
Greece	1 382		61 000	62 382
Hungary	1 400	6 500	7 700	15 600

Iceland	100			100
Ireland	1 839		40	1 879
Italy	17 100	N	N	17 100
Latvia	126			126
Lithuania	200			200
Luxembourg	151			151
Moldova	500			500
Netherlands	11 800			11 800
Norway		2 100		2 100
Poland	89 000		60 800	149 800
Portugal	5 000			5 000
Romania	2 411	2 752	20 131	25 294
Russian Federation	154 000		83 000	237 000
Serbia & Montenegro	100		30 400	30 500
Slovakia	12 282		5 042	17 324
Slovenia	80	1 237	3 770	5 087
Spain	28 200	17 400	8 500	54 100
Sweden	3 000			3 000
Switzerland	140			140
Ukraine	61 785		1 240	63 025
United Kingdom	55 529			55 529
Total Europe	**573 979**	**71 753**	**484 026**	**1 129 758**

Table 1.4 Coal: 1999 consumption contd.				
	thousand tonnes			
	Bituminous	**Sub-bituminous**	**Lignite**	**Total**
Iran (Islamic Rep.)	1 900			1 900
Israel	9 200			9 200
Lebanon	200			200
Total Middle East	**11 300**			**11 300**
Australia	44 900	16 200	65 800	126 900
Fiji	24			24
New Caledonia	170			170
New Zealand	230	1 660	260	2 150

Papua New Guinea	1			1
Total Oceania	**45 325**	**17 860**	**66 060**	**129 245**
TOTAL WORLD	**3 092 723**	**522 059**	**795 033**	**4 409 815**
Notes:				
1. Sources: WEC Member Committees, 2000/2001; BP Statistical Review of World Energy 2001; Energy - Monthly Statistics, Eurostat; national sources; estimates by the editors				

COUNTRY NOTES

The following Country Notes on coal have been compiled by the editors, drawing upon a wide variety of material, including information received from WEC Member Committees, national and international publications.

Major international published sources consulted included:

- *Energy Balances of OECD Countries 1997-1998*; 2000; International Energy Agency;
- *Energy Balances of Non-OECD Countries 1997-1998*; 2000; International Energy Agency;
- *Major coalfields of the world*; June 2000; IEA Coal Research.

Australia

Proved amount in place (total coal, million tonnes)	106 760
Proved recoverable reserves (total coal, million tonnes)	82 090
Production (total coal, million tonnes, 1999)	304.0

Australia is endowed with substantial coal resources, with its proved recoverable reserves ranking fifth in the world. The major deposits of black coal (bituminous and sub-bituminous) are located in New South Wales and Queensland; smaller but locally important resources occur in Western Australia, South Australia and Tasmania. The main deposits of brown coal are in Victoria, the only State producing this rank. Other brown coal resources are present in Western Australia, South Australia and Tasmania.

The proved amount of coal in place, reported for the present Survey by the Australian Geological Survey Organisation (AGSO), comprises 62.2 billion tonnes of bituminous coal, 2.6 billion tonnes of sub-bituminous and 41.9 billion tonnes of brown coal/lignite. Within these tonnages, the proportion deemed to be recoverable ranges from 68% of the bituminous coal (with 48% of its reserves surface-mineable) to 90% of the lignite, all of which is suitable for open-cast mining. About one-third of Australia’s massive reserves of bituminous coal are of coking quality.

Indicated and inferred tonnages, additional to the proved amount in place, are vast: AGSO’s current assessment puts bituminous coal at 125 billion tonnes, sub-bituminous at nearly 28 billion tonnes and lignite at around 175 billion tonnes. In total, more than 250 billion tonnes of this additional coal is considered to be eventually recoverable.

In 1999 Australia produced 238 million tonnes of saleable black coal and 66 million tonnes of brown coal. The major domestic market for black coal is electricity generation: in 1998, power stations accounted for 81% of total black coal consumption, with the other large consumers being the iron and steel industry and cement manufacture. Brown coal is used almost entirely for power generation.

Australia has been the world's largest exporter of hard coal since 1984: in 1999, it exported 172 million tonnes. About 54% of 1999 exports were of metallurgical grade (coking coal), destined largely for Japan, the Republic of Korea and Europe.

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Botwana

Proved recoverable reserves (total coal, million tonnes)	4 300
Production (total coal, million tonnes, 1999)	0.9

Vast deposits of bituminous coal have been located in Botswana, principally in the eastern part of the country. Coalfields in Greater Morupule and Mmamabula have been studied in detail, their proven in-situ resources being established as some 2.9 billion tonnes and 4.3 billion tonnes, respectively. These assessments were based upon deposits to a maximum depth of 200-250 metres and a minimum seam thickness of 0.25 metres.

The only mine to have been developed so far is at Morupule, near the town of Palapye, where Morupule Colliery Limited (controlled by Anglo American Corporation) commenced coal extraction in 1973.

With cumulative output to the end of 1999 amounting to nearly 15 million tonnes, Botswana's remaining proved amount of coal in place is nearly 7 200 million tonnes; on an assumed average recovery factor of 60%, the theoretical proved recoverable reserves are some 4 300 million tonnes. The Morupule deposit accounts for about 40% of Botswana's measured coal resource, the balance being attributable to Mmamabula.

Over and above the proved amount in place, there is an estimated additional in-situ amount of some 205 billion tonnes, comprising 29 billion tonnes of "indicated" resources and 176 billion tonnes of "inferred" resources, covering all the major coalfields that have been explored in Botswana. It is not at present possible to provide an estimate of the recoverable portion of these indicated and inferred amounts.

The Morupule mine's chief customers are the Botswana Power Corporation, the copper/nickel mine at Selibe-Phikwe and the soda ash plant at Sua Pan. The BPC power station at Morupule (net capacity 118 MW) generates about half of Botswana's electricity supplies, the balance being provided by imports from South Africa.

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Brazil

Proved amount in place (total coal, million tonnes)	17 051
Proved recoverable reserves (total coal, million tonnes)	11 929
Production (total coal, million tonnes, 1999)	5.6

Brazil has considerable reserves of sub-bituminous coal, mostly located in the southern states of Rio Grande do Sul, Santa Catarina and Paraná.

For the present Survey, the Brazilian WEC Member Committee has reported a proved amount in place (defined as covering measured, indicated and inferred reserves) of just over 17 billion tonnes, of which 70% is categorised as proved recoverable reserves. There is estimated to be some 15.3 billion tonnes of additional coal in place, of which 50% is considered to recoverable.

With respect to the stated level of proved recoverable reserves, it is estimated that 21% could be exploited through surface mining, and that 7% is considered to be of coking quality. In 1999, 50% of Brazilian coal production was obtained by surface mining.

Almost all of Brazil's current coal output is classified as steam coal, of which about 90% is used as power-station fuel and the remainder in industrial plants. Virtually all of Brazil's metallurgical coal is imported: about three-quarters is used as input for coke production.

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Canada

Proved amount in place (total coal, million tonnes)	8 723
Proved recoverable reserves (total coal, million tonnes)	6 578
Production (total coal, million tonnes, 1999)	72.5

Canada has considerable coal resources, with proved reserves of more than 6.5 billion tonnes. The first reassessment of resources that has been reported since the data provided for the 1992 *Survey of Energy Resources* results in substantially lower levels for the proved amount in place. Bituminous coals (including anthracite) are evaluated as 4.6 billion tonnes, based on deposits to a maximum depth of 1 200 metres and a minimum seam thickness of 0.6 metres; sub-bituminous grades are put at approximately 1.1 billion tonnes (maximum depth 300 metres, minimum thickness 1.5 metres); and lignite at 3.0 billion tonnes (maximum depth 50 metres, minimum thickness 1.5 metres). The proved recoverable reserves for each rank have been assessed as approximately 75% of the respective proved amount in place.

Estimates of the tonnages of coal (in-place and recoverable) that are considered to be additional to the "proved" amounts of each rank have been considerably increased: all six quantities now run into tens of billions of tonnes. Such numbers can never possess any high degree of accuracy, but they do serve to underline Canada’s undoubtedly massive coal endowment.

Canada’s coal resources are mainly located in the mid-to-western provinces of Saskatchewan, Alberta and British Columbia, with smaller deposits in the eastern provinces of Nova Scotia and New Brunswick. The first four named provinces are responsible for more than 98% of Canadian coal production. Bituminous deposits are found in the two eastern provinces, together with Alberta and British Columbia; Alberta also possesses sub-bituminous grades, while lignite deposits are found mainly in Saskatchewan.

Alberta is both the largest coal-producing and coal-consuming province; as in the other producing provinces, coal is mainly used for electricity generation. In total, more than 89% of Canadian coal production is used for electricity generation, about 8% for steel production and 3% for other industries, mainly cement.

Ontario, as the second largest coal consumer, conforms to the national pattern of usage. Consumption has increased in Ontario as a number of nuclear generating units have been shut down.

British Columbia produces mostly metallurgical coal, which is all exported (over 28 million tonnes in 1998).

The Canadian coal industry is almost entirely in private ownership; output is currently from large surface mines. Virtually all underground operations have now ceased.

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China

Proved recoverable reserves (total coal, million tonnes)	114 500
Production (total coal, million tonnes, 1999)	1 030.0

China is a major force in world coal, standing in the front rank in terms of reserves, production and consumption, and is rapidly increasing its significance as a coal exporter.

The levels of proved recoverable reserves originally provided by the Chinese WEC Member Committee for the 1992 Survey have been retained for each successive edition; in billions of tonnes, they amount to: bituminous coal and anthracite 62.2; sub-bituminous coal 33.7 and lignite 18.6.

Coal deposits have been located in most of China’s regions but three-quarters of proved recoverable reserves are in the north and north-west, particularly in the provinces of Shanxi, Shaanxi and Inner Mongolia.

After more than twenty years of almost uninterrupted growth, China's coal production peaked at nearly 1.4 billion tonnes in 1996, since when output has fallen year-by-year, largely as a result of the closure of large numbers of small local mining operations. By far the greater part of output is of bituminous coal: lignite constitutes only about 4%.

The major coal-consuming sectors are power stations (including CHP), which accounted for nearly 50% of total consumption (excluding the coal industry's own use/loss) in 1998, the iron and steel industry with a 15% share, and other industrial users with about 25%.

Coal exports more than doubled between 1994 and 2000, when they exceeded 55 million tonnes; China is now the world's fifth largest coal exporter.

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Colombia

Proved recoverable reserves (total coal, million tonnes)	6 648
Production (total coal, million tonnes, 1999)	32.8

Colombia's vast coal resources are located in the north and west of the country. Published data on measured reserves (sourced from the state coal entity Ecocarbón, March 1998) indicated a total of 6 648 million tonnes, of which Cerrejón North and Central Zones account for 55% and the fields in the department of Cesar for 29%. Virtually all Colombia's coal resources fall into the bituminous category: the reserves in the San Jorge field in Córdoba, with an average calorific value in the sub-bituminous/ lignite bracket, are shown under sub-bituminous in Table 1.1.

Development of Colombian coal for export has centred on the Cerrejón deposits which are located in the Guajira Peninsula in the far north, about 100 km inland from the Caribbean coast. The coal is found in the northern portion of a basin formed by the Cesar and Rancheria rivers; the deposit has been divided by the Government into the North, Central and South Zones. In October 1975 the Government opened international bidding for the development of El Cerrejón-North Zone reserves and in December 1976 Carbocol (then 100% owned by the Colombian State) and Intercor (an Exxon affiliate) entered into an Association Contract for the development and mining of the North Zone. The contract has three phases and covers a 33-year period with the production phase scheduled to end early in 2009.

Carbocol was privatised in October 2000, the purchasers being a consortium of Anglo-American, Billiton and Glencore.

Coal exports from Colombia totalled 29.9 million tonnes in 1999, equivalent to 91% of its coal production. Cerrejón North remains one of the world's largest export mines.

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Czech Republic

Proved amount in place (total coal, million tonnes)	9 811
Proved recoverable reserves (total coal, million tonnes)	5 678
Production (total coal, million tonnes, 1999)	59.2

The Czech Republic possesses sizeable coal resources, with a proved amount in place of nearly 10 billion tonnes, of which about 58% is reported to be economically recoverable. In terms of rank, 37% of the proved reserves are classified as bituminous, 60% as sub-bituminous and 3% as lignite.

Bituminous coal deposits are mainly in the Ostrava-Karviná basin in the east of the country, and lie within the Czech section of the Upper Silesian coalfield. The principal sub-bituminous/lignite basins are located in the regions of North and West Bohemia, close to the Krusne Hory (Ore Mountains) which constitute the republic’s north-western border with Germany.

Since 1990, Czech output of bituminous coal has fallen by about 35%, to 14.4 million tonnes in 1999, whilst sub-bituminous/lignite has nearly halved, declining from 79 million tonnes in 1990 to less than 45 million tonnes in 1999. A substantial proportion (nearly 60%) of the republic’s bituminous coal production consists of coking coal. In 1998, exports of bituminous and sub-bituminous coal amounted to 10.5 million tonnes, equivalent to just over 15% of production.

Apart from its coking coal, which is consumed by the iron and steel industry, most of the republic’s bituminous coal is used for electricity and heat generation, with industrial and private consumers accounting for only modest proportions. This pattern of utilisation also applies to sub-bituminous coal, which is still the main power station fuel.

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Germany

Proved amount in place (total coal, million tonnes)	122 000
Proved recoverable reserves (total coal, million tonnes)	66 000
Production (total coal, million tonnes, 1999)	201.8

Notwithstanding a reduction of 1 billion tonnes in the assessment of proved recoverable coal reserves by comparison with that reported for the previous (1998) Survey, Germany remains in the front rank for coal resources, reserves and production. The proved amount in place is stated to be 122 billion tonnes, including 44 billion tonnes of bituminous coals based on deposits to a maximum depth of 1 500 metres and a minimum seam thickness of 1 metre. Geological resources of lignite amount to 78 billion tonnes, with a maximum deposit depth of 600 metres and a minimum seam thickness of 2 metres.

Mineable reserves, equated to the category of proved recoverable reserves, are reported as 23 billion tonnes of bituminous coal and 43 billion tonnes of lignite. Reserves within the reach of operating or planned mines would be considerably smaller – at some 8 billion tonnes in the case of the lignite deposits.

Germany's output of hard coal has fallen from 76.6 million tonnes in 1990 to 40.5 million tonnes in 1999, whilst lignite production has declined even more rapidly, from 357.5 to 161.3 million tonnes over the same period.

The Ruhr coalfield produces over three-quarters of German hard coal. The coal qualities range from anthracite to high-volatile, strongly-caking bituminous coal. The Saar is the second largest coalfield, with substantial deposits of weakly-caking bituminous coal. All German hard coal is deep-mined from seams at depths exceeding 900 metres.

The lignite deposit in the Rhine region is the largest such formation in Europe. In the former East Germany there are major deposits of lignite at Halle Leipzig and Lower Lausitz; these have considerable domestic importance.

The principal markets for bituminous coal are electricity generation, iron and steel, and cement manufacture: other industrial and household uses are relatively modest. Almost all German lignite is consumed in power stations, apart from a considerable tonnage (12.4 million tonnes in 1998) which is converted into brown coal briquettes for the industrial, residential and commercial markets.

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Greece

Proved recoverable reserves (total coal, million tonnes)	2874
Production (total coal, million tonnes, 1999)	61.9

Coal resources are all in the form of lignite. Apart from a very small amount of private mining, all production is carried out by the mining division of the Public Power Corporation (DEI). There are two lignite centres, Ptolemais-Amynteo (LCPA) in the northern region of West Macedonia, and Megalopolis (LCM) in the southern region of Peloponnese. These two centres control the operations of seven open-cast mines; LCPA mines account for about 75% of DEI's output of lignite.

In the lignite-mining areas, six dedicated power stations (total generating capacity: 4 850 MW) produce more than two-thirds of Greece's electricity supply. In 1999, DEI mines produced 61 million tonnes of lignite, which was used to generate about 29 TWh of electricity. Two 330 MW lignite-fired power stations are planned for construction at Florina in the northern region of Western Macedonia.

Greece is the second largest producer of lignite in the European Union and amongst the six largest in the world.

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India

Proved recoverable reserves (total coal, million tonnes)	84 396
Production (total coal, million tonnes, 1999)	314.4

Coal is the most abundant fossil fuel resource in India and places the country in the top rank of world coal producers. The principal deposits of hard coal are in the eastern half of the country, ranging from Andhra Pradesh, bordering the Indian Ocean, to Arunachal Pradesh in the extreme north-east: the States of Bihar, Orissa, Madhya Pradesh and West Bengal together account for about 85% of reserves. In addition to 82.4 billion tonnes of proved reserves of bituminous coal, the Geological Survey of India states that there are 89.5 billion tonnes of indicated reserves and 39.7 billion tonnes of inferred reserves. Coking coals constitute 20% of the tonnage of proved reserves.

Lignite deposits mostly occur in the southern State of Tamil Nadu. India’s geological resources of lignite are estimated to be around 30 billion tonnes, of which about 2 billion tonnes in the Neyveli area are regarded as "mineable under the presently adopted mining parameters", and taken as proved recoverable reserves in the present Survey. Annual production of lignite is currently in the region of 22 million tonnes, almost all of which is used for electricity generation.

Although India’s coal reserves cover all ranks from lignite to bituminous, they tend to have a high ash content and a low calorific value. The low quality of much of its coal prevents India from being anything but a small exporter of coal (traditionally to the neighbouring countries of Bangladesh, Nepal and Bhutan) and conversely, is responsible for sizeable imports (around 10 million tonnes/year of coking coal and 6 million tonnes/year of steam coal) from Australia, China, Indonesia and South Africa.

Within the Ministry of Mines & Minerals, the Department of Coal has the overall responsibility for determining policies and strategies in respect of exploration and development of coal and lignite reserves. Under the administrative control of the Department, key functions are exercised through the public sector undertakings, namely Coal India and its subsidiaries and the Neyveli Lignite Corporation (essentially entrusted with the task of lignite production and associated power generation), and also through the Singareni Collieries Company (a joint sector undertaking of the Government of India and the Government of Andhra Pradesh).

Coal is the most important source of energy for electricity generation in India: about three-quarters of electricity is generated by coal-fired power stations. In addition, the steel, cement, fertiliser, chemical, paper and many other medium and small-scale industries are also major coal users. In the course of phasing out steam traction the direct demand for coal for rail transport has virtually disappeared.

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Indonesia

Proved recoverable reserves (total coal, million tonnes)	5 370
Production (total coal, million tonnes, 1999)	70.7

Indonesia possesses very substantial coal resources: according to recent data from the Directorate of Mineral and Coal Enterprises, measured resources total 11 569 million tonnes and indicated resources amount to a further 27 306 million tonnes. Within these huge tonnages, mineable reserves (taken as corresponding with proved recoverable reserves for the purposes of the present Survey) are given as 5 368 million tonnes, of which about 53% is located in Sumatra and 47% in Kalimantan.

A breakdown of mineable reserves by rank is not currently available from the Directorate of Mineral and Coal Enterprises; the allocation shown in Table 1.1 should be regarded as strictly provisional – it is based upon a breakdown of total coal resources issued by the Directorate of Coal in 1995, which showed lignite as accounting for 59% of coal deposits, sub-bituminous coal 27% and bituminous 14%, with anthracite representing less than 0.4% of the total.

Indonesian coals in production generally have medium calorific values (5 000-7 000 kcal/kg or 21-29 MJ/kg), with relatively high percentages of volatile matter; they benefit from low ash and sulphur contents, making them some of the cleanest coals in the world.

Competitive quality characteristics have secured substantial export markets for Indonesian coal: in 2000 over 58 million tonnes were shipped overseas, representing just over 75% of total coal output.

Within Indonesia, coal's main market is power generation, which accounted for 69% of internal consumption in 1998.

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Pakistan

Proved recoverable reserves (total coal, million tonnes)	2 265
Production (total coal, million tonnes, 1999)	3.3

The republic's coal resources appear to be substantial: The Geological Survey of Pakistan (GSP) gives measured resources as 3 775 million tonnes, with indicated resources of a further 12 124 million tonnes, inferred resources of 87 366 and hypothetical resources as 81 391 million tonnes, as at June 30, 1999. The Pakistan WEC Member Committee considers that 60% of the measured resources should be regarded as proved recoverable reserves.

The discovery of a huge coalfield in the Thar Desert of eastern Sindh province transformed the country's coal resources and Thar now contributes 84% of the measured reserves. Under the auspices of an USAID programme which began in 1985, the field was located in the 1980's; in the early 1990's a drilling programme largely confirmed its extent.

Since issuing the end-June 1997 data quoted in the 1998 WEC Survey, the GSP has re-assessed the allocation of the Thar coal field's resource base, increasing its measured resources by 36%, indicated resources by 61% and inferred resources by 30%; overall some 24 billion tonnes have been transferred out of the "hypothetical" category, whilst maintaining the level of total resources.

Notwithstanding its massive potential, Pakistan's coal production in recent years has been only about 3-3.5 million tonnes per annum. About half is currently produced in the western province of Balochistan; no Thar coal is produced at present.

Small tonnages of indigenous coal are used for electricity generation and by households, but by far the largest portion is used to fire brick-kilns. Just over 1 million tonnes of Australian coking coal is imported each year for use in the iron and steel industry.

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Poland

Proved amount in place (total coal, million tonnes)	64 500
Proved recoverable reserves (total coal, million tonnes)	22 160
Production (total coal, million tonnes, 1999)	171.0

Most of Poland's substantial tonnage of coal resources is in the form of hard coal, which comprises 79% of the reported proved amount in place and nearly 92% of proved recoverable reserves. The WEC Member Committee has reported revised resource assessments by comparison with those advised for the 1998 *Survey of Energy Resources* with (in particular) a 15% reduction in the proved amount of bituminous coal in place and a 68% increase in the corresponding tonnage recoverable.

The latest figures show the proved amount of hard coal in place as almost 51 billion tonnes, on the basis of a maximum deposit depth of 1 000 metres and a minimum seam thickness of 1 metre; the corresponding level for lignite is 13.6 billion tonnes, at a maximum deposit depth of 350 metres and minimum seam thickness of 3 metres.

Poland's hard coal resources are mainly in the Upper Silesian Basin, which lies in the south-west of the country, straddling the border with the Czech Republic: about 80% of the basin is in Polish territory. Other hard-coal fields are located in the Lower Silesia and Lublin basins. There are a number of lignite deposits in central and western Poland, with four of the larger basins currently being exploited for production.

The quality of the Upper Silesian hard coals is generally quite high, with relatively low levels of sulphur and ash content. One-third of Poland's proved reserves of hard coal are regarded as of coking quality.

Although output of hard coal (and, to a lesser extent, of lignite) has declined during the past ten years, and especially since 1997, Poland is still among the world's eight largest coal producers (see Table

1.3). Its 1999 output was 110 million tonnes of hard coal and 61 million tonnes of lignite. Apart from Russia, Poland is the only world-class coal exporter in Europe: its total exports in 1999 were some 24 million tonnes, of which steam coal accounted for 72% and coking for 28%. Germany, Denmark and the UK are currently Poland's largest export markets for coal.

About 57% of inland consumption of hard coal goes to the production of electricity and bulk heat, manufacturing industry accounts for 30% and residential/commercial/agricultural uses 13%. Almost all lignite production is used for base-load electricity generation.

The decline in hard coal production reflects a deep reform of the industry, of which the key objectives have been:

- a reduction in excess production potential;
- substantially reduced employment levels;
- an increase in the quality of coal produced;
- gradual privatisation of the mines.

Lignite is produced from open-cast sites and constitutes the cheapest energy source in Poland. It is expected that lignite output will remain at the present level up to 2020.

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Russian Federation

Proved recoverable reserves (total coal, million tonnes)	157 010
Production (total coal, million tonnes, 1999)	249.4

The levels quoted for Russian coal resources and reserves are unchanged from those given in the 1998 *Survey of Energy Resources*, as the WEC Member Committee was unable to obtain any more recent coal data for the present Survey.

The proved amount of coal in place at end-1996 comprised 75.8 billion tonnes of bituminous coal, based on a maximum deposit depth of 1 200 metres and a minimum seam thickness of 0.6-0.7 metres; 113.3 billion tonnes of sub-bituminous grades (at depths of up to 600 metres and minimum thickness 1-2 metres); and 11.5 billion tonnes of lignite (at 300 metres and 1.5-2 metres, respectively).

Proved recoverable reserves were reported as just over 49 billion tonnes of bituminous coal, of which 23% was considered to be surface-mineable and 55% was suitable for coking. Of the 97.5 billion tonnes of proved recoverable reserves of sub-bituminous coal, 74% was suitable for surface mining, while all of the 10.5 billion tonnes of recoverable lignite reserves fell into this category. Overall, about 94 billion tonnes of Russia's proved reserves were deemed to be recoverable by opencast or strip mining. Further enormous tonnages of coal, of the order of over 30 times the quoted proved reserves, were reported to be recoverable in the future.

Russian coal reserves are widely dispersed and occur in a number of major basins. These range from the Moscow basin in the far west to the eastern end of the Donetsk basin (most of which is within the Ukraine) in the south, the Pechora basin in the far northeast of European Russia, and the Irkutsk, Kuznetsk, Kansk-Achinsk, Lena, South Yakutia and Tunguska basins extending across Siberia to the Far East.

The principal economic hard coal deposits of Russia are found in the Pechora and Kuznetsk basins. The former, which covers an area of some 90 000 km^2, has been extensively developed for underground operations, despite the severe climate and the fact that 85% of the basin is under permafrost. The deposits are in relatively close proximity to markets and much of the coal is of good rank, including coking grades. The Kuznetsk basin, an area of some 26 700 km^2, lies to the east of the city of Novosibirsk and contains a wide range of coals; the ash content is variable and the sulphur is generally low. Coal is produced from both surface and underground mines.

Lying east of the Kuznetsk and astride the trans-Siberian railway, the Kansk-Achinsk basin contains huge deposits of brown (sub-bituminous) coal with medium (in some cases, low) ash content and generally low sulphur; large strip-mines are linked to dedicated power stations and carbo-chemical plants. The vast Siberian coal-bearing areas of the Lena and Tunguska basins constitute largely unexplored resources, the commercial exploitation of which would probably be difficult to establish.

The transportation of coal from mining to consuming areas is often problematical in a country of Russia’s proportions. As the reserves in the western areas have been increasingly depleted the focus of production has moved further east and the burden on the rail system has increased.

From a peak of around 425 million tonnes in 1988, Russia’s total coal production declined dramatically following the disintegration of the USSR, and now stands at about 250-260 million tonnes per annum. In 1998 about 70% of Russian consumption was accounted for by power stations and district heating plants. In recent years Russia has been a net exporter of coal, but on a declining scale.

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South Africa

Proved amount in place (total coal, million tonnes)	115 515
Proved recoverable reserves (total coal, million tonnes)	49 520
Production (total coal, million tonnes, 1999)	223.5

From the first discovery of coal in South Africa in 1699, the country has grown to become one of the leading coal nations of the world. Coal’s prominence in the national energy scene is largely attributable to a very large resource base and historically a ready supply of low-cost labour. In the past South Africa’s political isolation led the country to restrict its dependence on oil imports to a greater degree than any other non-centrally planned economy, and to emphasise the development of its coal resources.

The coal resources reported for the present Survey are based on an assessment published by the Geological Survey of South Africa (now the Council for Geoscience) in 1987, adjusted for cumulative production of coal over the period since its preparation.

The Council for Geoscience, on behalf of the Department of Minerals and Energy, is currently carrying out a major review of South Africa's coal resources; its report is not expected to be released until 2002, at the earliest.

Coal occurs principally in three regions:

- the shaly Volksrust Formation, which covers most of central and northern Mpumalanga province (formerly the Transvaal). The coal is found in isolated basins and troughs which results in the fields being disconnected and widely separated;

- the sandy Vryheid Formation of the northern part of the main Karoo basin (northern Free State, northern Kwazulu-Natal and southern Mpumalanga): this generally continuous area is probably the most important economically;

- the Motleno Formation, which is confined to the north-eastern Cape. It is of minor economic importance compared to other coalfields in South Africa.

Some lignite deposits are known along the Kwazulu-Natal and Cape coasts, but are considered to be of scant economic importance.

Coal occurrences have been divided into 19 separate coalfields, 18 of which are located in an area extending some 600 km from north to south by 500 km from east to west. The Molteno field lies some 300 km south of the main coal-bearing region.

Eskom, the South African electric utility, accounts for well over half of coal consumption. A further large slice is consumed by the Sasol plants in making synthetic fuels and chemicals from coal. The third main user is the industrial sector, including the iron and steel industry. Coal use in residential and commercial premises is relatively small, while demand by the railways has virtually disappeared.

Coal exports are equivalent to about 30% of South African output and are mainly destined for Europe and Asia/Pacific. The main route for exports is via Richards Bay, Kwazulu-Natal, where there is one of the largest coal-export terminals in the world.

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Thailand

Proved amount in place (total coal, million tonnes)	1 391
Proved recoverable reserves (total coal, million tonnes)	1 268

Production (total coal, million tonnes, 1999)	18.3

Thailand has sizeable resources of lignite, notably at Mae Moh in the north of the country. Annual output of lignite increased by almost 90% between 1990 and 1997, but has since been in gradual decline.

All of Mae Moh's production is consumed by the Mae Moh power plant (2 625 MW). On the other hand, most of the lignite produced by other Thai mines is used by industry, chiefly in cement manufacture. Imports of bituminous coal are almost all consumed in the iron and steel sector.

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United Kingdom

Proved recoverable reserves (total coal, million tonnes)	1 500
Production (total coal, million tonnes, 1999)	37.1

Coal deposits are widely distributed and for many years the UK was one of the world's largest coal producers, and by far its largest exporter. Production rose to a peak of nearly 300 million tonnes/year during World War I and thereafter did not fall below 200 million tonnes/year until 1960. Output began a long-term decline in the mid-1960's, falling to less than 100 million tonnes/year by 1990. Reflecting continued competition from natural gas and imported coal, UK coal production sank to 37 million tonnes in 1999.

The UK coal industry was privatised at the end of 1994, with the principal purchaser being RJB Mining, which acquired 16 deep mines from British Coal. At the end of June 2000 there were 19 major deep mines, 14 smaller deep mines and 48 open-cast sites in production. Deep-mined coal output in 1999 was 20.9 million tonnes and open-cast sites produced 15.3 million tonnes; production from slurry etc. amounted to 0.9 million tonnes. Most deep-mined coal has a significantly higher content of sulphur and chlorine than that of internationally-traded coal. There is now virtually no UK production of coking coal.

The decline of the British coal industry makes it exceptionally difficult to quantify resources and reserves in compliance with the definitions specified for this Survey. In British Coal's annual report for 1991/1992, coal in place (in seams over 0.6 metres thick and less than 1 200 metres deep) was estimated as 190 billion tonnes, of which some 45 billion tonnes could be extracted with current technology. The report qualified these estimates by stating that "the working of these resources will depend on economic circumstances, together with any other strategic considerations".

For the purpose of the present Survey, the problem lies in quantifying the proportion of the coal in place which should be regarded as "exploitable under present and expected local economic conditions" (see Definitions), and the proportion of the technologically recoverable reserves which would satisfy the same economic criterion.

By far the greater part of the 190 billion tonnes of coal in place quoted above is not within the take of currently operating mines. The UK Department of Trade and Industry's 1997 *Energy Report* states that "there were estimated to be approximately 1 billion tonnes of economically viable coal reserves at existing mines at the end of 1994". Parker (1997)* estimated proven UK coal reserves accessible to existing deep mines and identified open-cast sites as "of the order of 800 million tonnes". In this Survey, UK proved recoverable reserves of bituminous coal are quoted at the 1997 *Energy Report* level of 1 billion tonnes, although a recent assessment (Parker (2000)**), which allows for the effects of subsequent production and for the closure of certain mines, points to an even lower figure.

Estimates of lignite reserves and resources relate only to the Crumlin deposit in County Antrim, Northern Ireland.

* Parker, M.J., (1997); *UK Coal Reserves in Perspective*; Energy Exploration & Exploitation, vol. 15 no 1.

** Parker, M.J., (2000); *Thatcherism and the Fall of Coal*; Oxford University Press for the Oxford Institute of Energy Studies.

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United States Of America

Proved amount in place (total coal, million tonnes)	457 503
Proved recoverable reserves (total coal, million tonnes)	249 994
Production (total coal, million tonnes, 1999)	997.1

The US coal resource base is the largest in the world. Proved recoverable reserves of 250 billion tonnes are equivalent to about 25% of the global total. The US Department of Energy/Energy Information Administration's (EIA) demonstrated reserve base (DRB), (corresponding to the WEC category of "proved amount in place") is 457 billion tonnes (504 billion short tons), of which bituminous coal (including anthracite) constitutes about 55%, sub-bituminous 36% and lignite 9%. Coal deposits are widely distributed, being found in 38 states and underlying about 13% of the total land area. The Western Region (notably Montana and Wyoming) accounts for about 47% of the DRB, the Interior Region (in particular, Illinois and Kentucky) for 31% and the Appalachian Region (chiefly West Virginia, Pennsylvania and Ohio) for 21%. Bituminous coal reserves are recorded for 27 states, whereas only 8 states have sub-bituminous reserves, of which 90% are located in Montana and Wyoming.

Total proved recoverable reserves represent about 55% of the proved amount of coal in place. Overall, almost 27% of the recoverable reserves of bituminous coal (including anthracite) is surface-mineable, compared with 44% of sub-bituminous reserves and 100% of those of lignite.

US coal output is the second highest in the world, after China, and accounted for about 23% of global production in 1999. Coal is the USA's largest single source of indigenous primary energy; power stations and CHP plants accounted for over 92% of domestic coal consumption in 1998. Coal exports amounted to 53 million tonnes in 1999: the USA remains one of the world's leading suppliers of coking coal and other bituminous grades.

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+ Croatia: Restructuring and Privatising Coal - 11k.
+ Georgia: Restructuring and Privatising Coal - 28k.
+ Hungary: Restructuring and Privatising Coal - 12k.
+ Kyrghystan: Restructuring and Privatising Coal - 2k.
+ Latvia: Restructuring and Privatising Coal - 10k.
+ Lithuania: Restructuring and Privatising Coal - 1k.
+ Macedonia: Restructuring and Privatising Coal - 3k.
+ Moldova: Restructuring and Privatising Coal - 2k.
+ Poland: Restructuring and Privatising Coal - 14k.
+ Romania: Restructuring and Privatising Coal - 25k.
+ Russia: Restructuring and Privatising Coal - 26k.
+ Slovakia: Restructuring and Privatising Coal - 26k.
+ Slovenia: Restructuring and Privatising Coal - 19k.
+ Tajikistan: Restructuring and Privatising Coal - 1k.
+ Turkmenistan: Restructuring and Privatising Coal - 1k.
+ Ukraine: Restructuring and Privatising Coal - 14k.
+ Uzbekistan: Restructuring and Privatising Coal - 1k.
+ Yugoslavia (Serbia and Montenego): Restructuring and Privatising Coal - 1k.

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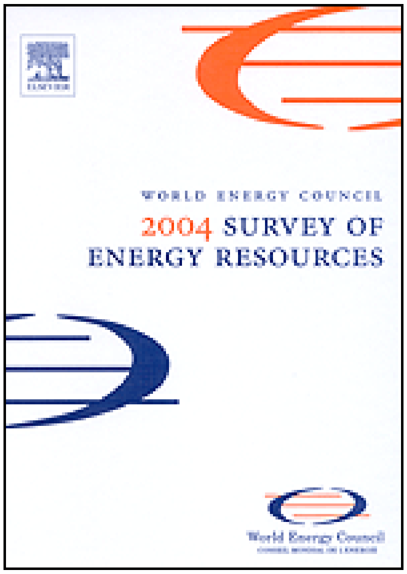

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Chapter 1

Coal (including Lignite)

COMMENTARY

Three years have passed since the last *Survey of Energy Resources* was published, and in that time the coal industry has seen some significant changes. Total world production has increased, yet the number of companies involved in coal mining has reduced, and there has been a notable shift both in demand and production to the Asian market.

That coal can continue to supply the world's energy is not in doubt. The IEA has stated 'World reserves of coal are enormous and, compared with oil and natural gas, widely dispersed…. Proven coal reserves have increased by over 50% in the past 22 years. The correlation of strong growth of proven coal reserves with robust production growth suggests that additions to proven coal reserves will continue to occur in those regions with strong, competitive coal industries'.

Global Recoverable Reserves and Production

Based on figures (data to end-2002) given by WEC Member Committees and from a variety of other sources, total recoverable reserves (i.e. those deposits that are economically viable at today's prices and can be recovered using current technologies) have slightly reduced by 8% since 1999, to just under 910 billion tonnes. This is almost entirely due to economic reappraisal of the German coal mining industry—worldwide the proven reserve base represents nearly 200 years of production at current rates.

However, production figures show an increase of 11% over 1999 levels. Of this, sub-bituminous coal production remained more or less at the same level, while bituminous coal production increased by 440 million tonnes and lignite by 35 million tonnes.

Africa

The bulk of Africa's 220 mt total coal production in 2002 was bituminous coal, dominated by South Africa. 45 thousand tonnes of sub-bituminous coal was produced, from just two countries—Malawi and Nigeria. Although overall production in Congo and Tanzania is low, there have been significant relative gains since 1999. Egypt has experienced a major decline in coal production, from 200 000 tonnes in 1999 to only 37 000 tonnes in 2002.

The proved recoverable reserves figure for Africa has been downgraded by 9%, owing to a significant reappraisal of the reserves reported for Botswana.

2004 Survey of Energy Resources

North America

The amount of proved recoverable coal reserves in Canada, Mexico and Greenland has remained static, with a slight decrease reported for the USA. Total reserves for North America amount to about 250 billion tonnes. Overall production figures show a similar story—a decrease for the region of around 1%, to just over 1 billion tonnes. The USA accounts for the bulk of this production, with 990 mt. It reports increased production of sub-bituminous coal, with a decrease in bituminous coal production in the order of 50 mt.

South America

Production in South America has increased by roughly 16% over the period—notably due to increased production of bituminous coal in Colombia and Venezuela for the export market. There has been a halving of the already low levels of production in both Argentina and Chile.

In regional terms, South America has the second lowest proved recoverable reserves figure, at just under 20 mt, an 8.5% decrease from the 1999 figures.

Asia

The overall production figures for the Asian region have increased by 26%, reflecting the increasing importance of the region as both a supplier and consumer of coal. The major producers are China (1.4 billion tonnes), India (360 mt) and Indonesia (103 mt). Both Japan and Korea have significantly reduced their coal production, due to the high cost of domestic production compared to the price of imported coal on the Asian market.

Reserve figures for the region have remained stable at nearly 260 billion tonnes, a slight increase of 2% over 1999.

Over recent years there have been some concerns raised over the accuracy of Chinese coal statistics, which as such a large supplier can have significant impacts on global demand and production figures, and affect global environmental issues such as CO_2 emissions. It is interesting to note that the end-2002 reserves figures reported for China are the same as at end-1999.

Europe

Coal production in Europe has slightly increased over the 1999 figures, mainly through higher levels of lignite production. Bituminous coal production has decreased, notably in Germany, Spain, France, Poland and the UK.

Proven reserves are significantly lower than in 1999, with a reduction of over 20% during the period. The bulk of this is due to the very significant decrease in the size of German reserves, which due to the economic reappraisal of the mining industry have reduced by almost 90%, from 66 billion tonnes in 1999 to just under 7 billion by the end of 2002.

Middle East

Iran is the only coal producer in the Middle East region, producing 1.8 mt in 2002, an increase of 17% over 1999. Proved recoverable reserves have fallen by 75%, from 1 710 mt in 1999 to just 419 mt in 2002.

Oceania

Australia is the world's leading exporter of coal, and is ranked 4th worldwide in terms of annual production, with 340 mt in 2002. The majority of the coal produced is bituminous coal for export, although it does have a sizeable lignite industry supplying the domestic power generation market. New Zealand is a small producer for a mainly domestic market, although it does export some specialist coals, e.g. for carbon steel. Reserves in New Zealand have remained static, although a 4% drop in bituminous coal reserves in Australia is reported.

Fig. 1.1 shows proven coal reserves by geographical distribution, highlighting the dominance of three key regions—Europe, North America and Asia. Coal resources are more geographically widespread, while reserves are governed by economic viability—and thus are more likely to be concentrated in countries where coal is a commodity, either for domestic

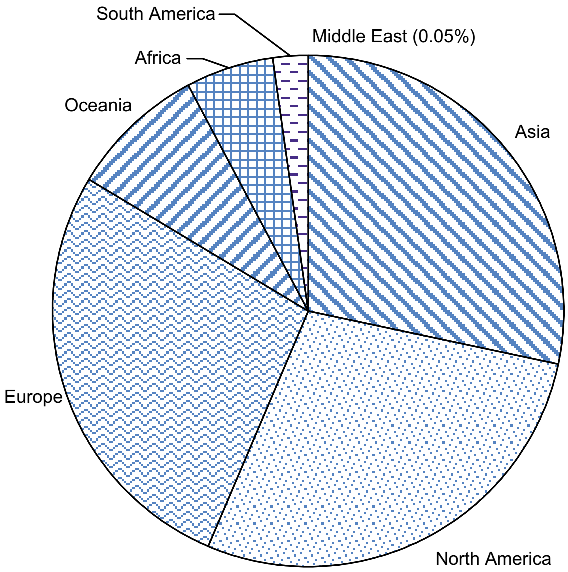


FIGURE 1.1 Proved coal reserves at end-2002—regional distribution.

energy use or as an export product. The top 10 producing countries together make up 85% of total global coal production (Fig. 1.2).

Coal reserves can change significantly and rapidly, as policies change and resources lose

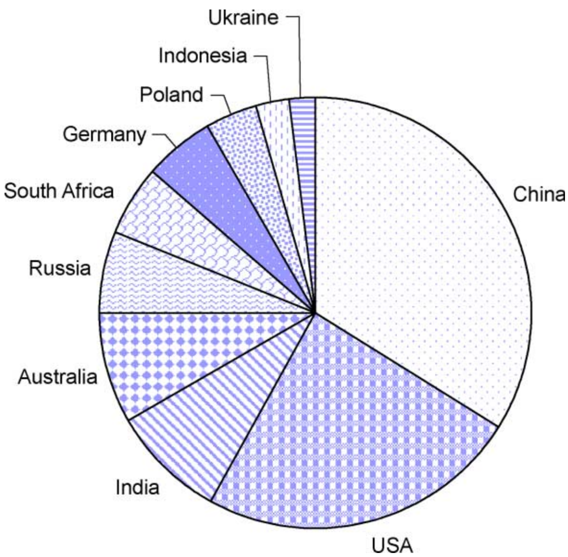


FIGURE 1.2 The top ten coal producing countries in 2002.

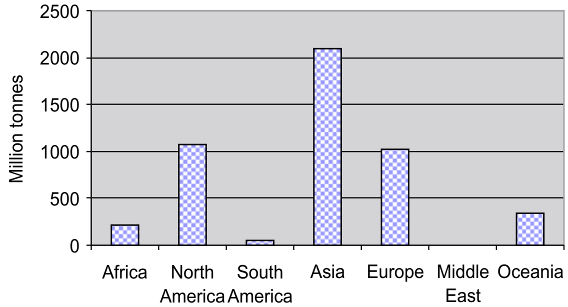


FIGURE 1.3 Coal production, 2002—by region.

or gain viability. This is clearly shown in the European data, where despite maintaining overall production figures (due to increased lignite production in Germany and Greece), European reserves have shifted downwards since 1999, reflecting the decline in the hard coal industry in Western Europe and restructuring in the transitional economies, particularly in Poland.

That Asia is now the focus of global production can clearly be seen in Fig. 1.3. With over 2 billion tonnes of coal produced, an increase of over 25% between 1999 and 2002, the Asian region coal production is double that of the next largest, North America. With global proved recoverable reserves remaining high it would seem there is no practical restraint on the continuing use of coal.

Coal Demand

Significant changes in the location of coal demand have taken place over the last 20 years. In 1980 Europe, the former Soviet Union and North America consumed roughly the same quantities of hard coal for their power generation and steelmaking needs. North America's demand has stayed roughly static, as a percentage of total global consumption (in real terms, an increase of 300 mt over the period). However, by 1990 the trends were of decreasing demand in Europe and the FSU. Demand in the Asia–Pacific region for hard coal, in contrast, has increased dramatically from 34 to 52% over the same period—equivalent to almost 1 billion tonnes.

According to the BP Statistical Review of World Energy, world coal consumption increased by 6.9% in 2002. However, this was almost entirely a Chinese phenomenon: reported consumption in China rose by an extraordinary 27.9%. Excluding China, world coal consumption grew by just 0.6%.

One reason for this is the huge increase in demand for electricity in Asian countries. China's electrification programme, for example, has connected 700 million people over the last 15 years. As a result of the programme, annual electricity production in China has increased by nearly 1 000 TWh: 84% of this is coal-fired. Forecasts indicate that this regional trend will continue, with the bulk of the projected increase in global coal demand coming from the region. According to IEA reports, China has experienced an ongoing decline in coal demand since 1996, but demand increased strongly in 2002, largely owing to continued strong economic growth.

Japan continues to be the largest importer of hard coal—both steam coal and coking coals—and is projected to account for 24% of total world imports by 2020. Other Asia–Pacific countries, such as Malaysia, the Philippines and Thailand, are looking to coal to diversify their energy mix and provide a secure supply of affordable energy to meet their growing electricity needs.

The decline of coal consumption in the EU can be attributed to a number of factors, including more stringent environmental legislation, the availability of gas from the North Sea and Russia, as well as increasingly from North Africa and the Middle East. As older coal-fired plant faced retirement, the capital costs of building combined-cycle gas plant were considerably lower than building a new coal-fired plant with the required environmental controls, and at a time when gas prices were relatively low, were the economic option. However, such long-term decisions can be affected by the vagaries of the gas market—as happened in the UK in 2001 when coal-fired plants were brought back on-line owing to sudden increases in gas prices.

Coal Trade

In 2002, hard coal trade continued to expand, growing to 623 mt (435 mt steam coal, 188 mt coking coal). Worldwide hard coal trade is divided into seaborne trade of 579 mt and internal trade of 44 mt. Steam coal exports from Russia increased by 33% over 2001 levels and from Australia by 6%. Significant reductions in exports were seen from Kazakhstan, China, the USA and Colombia. Coking coal exports generally decreased in 2002, with the exception of China, which achieved a 20% increase in shipments.

In 2002, international hard coal trade in maritime traffic totalled about 16% of the worldwide hard coal output. Almost 85% of hard coal output is thus consumed in the producing country itself—in particular for power generation and by some key industries, such as iron and steel, cement and chemicals. This is especially true for the three biggest hard coal producers—China, the USA and India.

However, between 1998 and 2001 coal exports from China grew from 32 to 90 mt—an increase of 179%, making it the world's second largest coal exporter. Preliminary Chinese data suggest that 2002 exports of 84 mt would maintain China's position in the world export league.

Environmental Issues

Environmental policies are the key factor in determining the *future* role of coal around the world. While coal can and does provide an affordable, reliable, secure and safe source of energy it, along with other fossil fuels, continues to face environmental challenges. The introduction of carbon taxes, emissions trading and other policies to restrict emissions of greenhouse gases to the atmosphere will have an adverse effect on

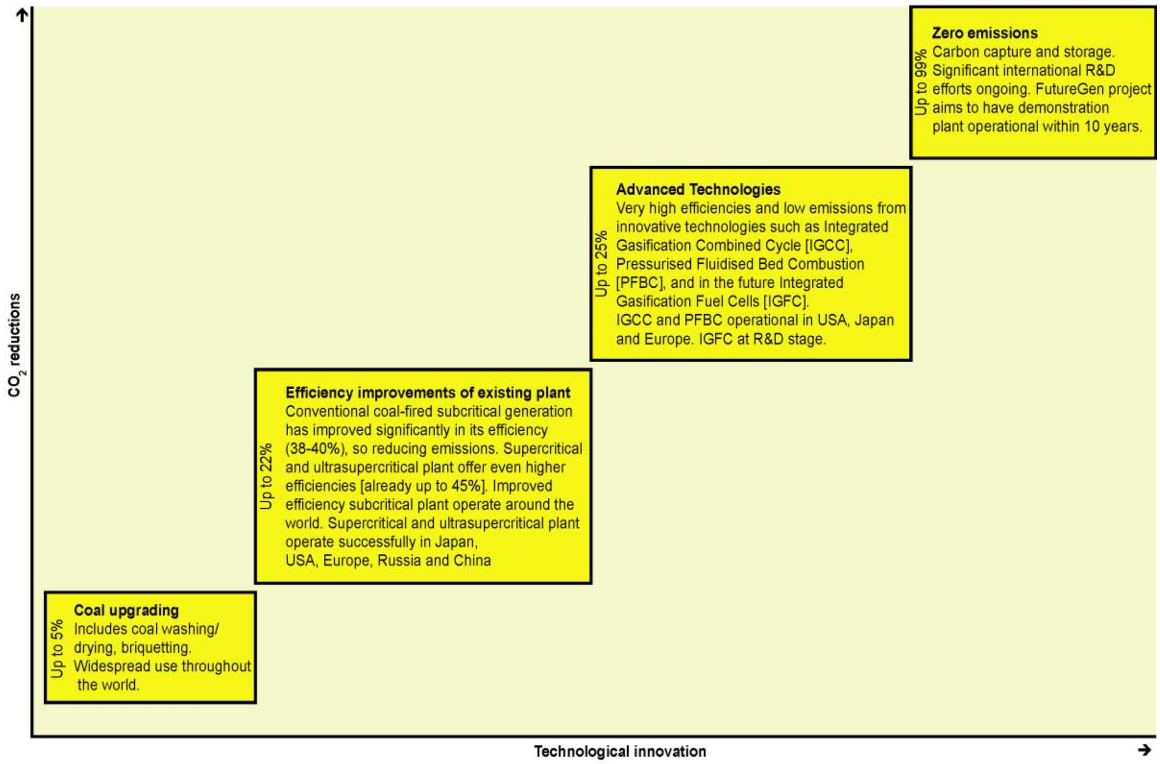


FIGURE 1.4 The coal-fired route to CO_2 reduction (Source: WCI, 2003).

the global coal market. Yet the crucial issue is how coal is used, not the fuel itself (Fig. 1.4).

Technologies have already been developed that are capable of almost entirely eliminating local and regional pollutants from coal-fired power generation, and efficiency gains can significantly reduce carbon dioxide emissions—the thermal efficiency of coal-fired electricity generation underwent an eight-fold improvement during the 20th Century. However, if coal is to maintain its place in the energy mix of the future, the development and deployment of improved coal technologies has to continue.

Ongoing developments in supercritical conventional coal combustion are likely to bring the thermal efficiency of coal burning to over 50%. The gasification of coal in integrated combined cycle (IGCC) systems is becoming increasingly well understood and commercially practical. Near-zero emissions can be realised if such IGCC systems are combined with emerging carbon-capture and storage technology.

Indeed coal, via gasification technology, has the potential to become a mainstay of a future ‘hydrogen economy’. It is an abundant potential source of the huge quantities of manufactured hydrogen that would be required for the widespread application of emissions-free hydrogen-based energy systems.

Christine Copley
World Coal Institute

DEFINITIONS

Proved amount in place is the resource remaining in known deposits that has been carefully measured and assessed as exploitable under present and expected local economic conditions with existing available technology.

Maximum depth of deposits and **minimum seam thickness** relate to the proved amount in place.

Proved recoverable reserves are the tonnage *within* the proved amount in place that can be recovered in the future under present and expected local economic conditions with existing available technology.

Estimated additional amount in place is the indicated and inferred tonnage *additional to* the proved amount in place that is of foreseeable economic interest. It includes estimates of amounts that could exist in unexplored extensions of known deposits or in undiscovered deposits in known coal-bearing areas, as well as amounts inferred through knowledge of favourable geological conditions. Speculative amounts are not included.

Estimated additional reserves recoverable is the tonnage *within* the estimated additional amount in place that geological and engineering information indicates with reasonable certainty might be recovered in the future.

Table Notes

The tables cover bituminous coal (including anthracite), sub-bituminous coal and lignite. Data for peat are given in Chapter 8. There is no universally accepted system of demarcation between coals of different rank and what is regarded as sub-bituminous coal tends to vary from one country to another. Moreover, if it is not isolated as such, sub-bituminous is sometimes included with bituminous and sometimes with lignite.

TABLE 1.1

Coal: proved recoverable reserves at end-2002 (million tonnes)

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
Algeria	40			40
Botswana	40			40
Central African Republic			3	3
Congo (Democratic Republic)	88			88
Egypt (Arab Republic)	21			21
Malawi		2		2
Morocco	N			N
Mozambique	212			212
Niger	70			70
Nigeria	21	169		190
South Africa	48 750			48 750
Swaziland	208			208
Tanzania	200			200
Zambia	10			10
Zimbabwe	502			502
Total Africa	**50 162**	**171**	**3**	**50 336**
Canada	3 471	871	2 236	6 578
Greenland		183		183
Mexico	860	300	51	1 211
United States of America	111 338	101 978	33 327	246 643
Total North America	**115 669**	**103 332**	**35 614**	**254 615**
Argentina		424		424
Bolivia	1			1
Brazil		10 113		10 113
Chile	31	1 150		1 181
Colombia	6 230	381		6 611
Ecuador			24	24
Peru	960		100	1 060
Venezuela	479			479
Total South America	**7 701**	**12 068**	**124**	**19 893**

(*continued on next page*)

TABLE 1.1 (*Continued*)

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
Afghanistan	66			66
China	62 200	33 700	18 600	114 500
India	90 085		2 360	92 445
Indonesia	740	1 322	2 906	4 968
Japan	359			359
Kazakhstan	28 151		3 128	31 279
Korea (DPR)	300	300		600
Korea (Republic)		80		80
Kyrgyzstan			812	812
Malaysia	4			4
Mongolia				
Myanmar (Burma)	2			2
Nepal		1		1
Pakistan		60	2 990	3 050
Philippines	22	144	70	236
Taiwan, China	1			1
Thailand			1 354	1 354
Turkey	278	761	3 147	4 186
Uzbekistan	1 000		3 000	4 000
Vietnam	150			150
Total Asia	**183 358**	**36 368**	**38 367**	**258 093**
Albania			794	794
Austria			20	20
Bulgaria	4	91	2 092	2 187
Croatia	6		33	39
Czech Republic	2 094	3 242	216	5 552
France	15			15
Germany	183		6 556	6 739
Greece			3 900	3 900
Hungary	198	199	2 960	3 357
Ireland	14			14
Italy		27	7	34
Netherlands	497			497
Norway		5		5
Poland	14 000			14 000
Portugal	3		33	36
Romania	22	3	469	494
Russian Federation	49 088	97 472	10 450	157 010
Serbia & Montenegro	9	656	15 926	16 591
Slovakia	N		172	172
Slovenia		40	235	275
Spain	200	300	30	530
Sweden		1		1

TABLE 1.1 (*Continued*)

	Bituminous including anthracite	Sub-bituminous	Lignite	Total
Ukraine	16 274	15 946	1 933	34 153
United Kingdom	220			220
Total Europe	**82 827**	**117 982**	**45 826**	**246 635**
Iran (Islamic Republic)	419			419
Total Middle East	**419**			**419**
Australia	38 600	2 200	37 700	78 500
New Caledonia	2			2
New Zealand	33	205	333	571
Total Oceania	**38 635**	**2 405**	**38 033**	**79 073**
Total World	**478 771**	**272 326**	**157 967**	**909 064**

Notes:
(1) A quantification of proved recoverable reserves for Mongolia is not available.
(2) Sources: WEC Member Committees, 2003; data reported for previous WEC *Surveys of Energy Resources*; national and international published sources.

TABLE 1.2I

Bituminous coal (including anthracite): resources at end-2002

	Proved amount in place			Estimated additional	
	Tonnage (million tonnes)	Maximum depth of deposits (m)	Minimum seam thickness (m)	Amount in place (million tonnes)	Reserves recoverable (million tonnes)
Africa					
Botswana	3 340	85	5.5		
Egypt (Arab Rep.)	27				
South Africa	115 000	350	1.0		
Swaziland	567	550	1.0	450	
North America					
Canada	4 609	1 200	0.6	92 224	62 445

(*continued on next page*)

TABLE 1.21 (*Continued*)

	Proved amount in place			Estimated additional	
	Tonnage (million tonnes)	Maximum depth of deposits (m)	Minimum seam thickness (m)	Amount in place (million tonnes)	Reserves recoverable (million tonnes)
USA	246 804	671	0.3	445 346	
South America					
Argentina	4				
Chile	64				
Venezuela	1 308			6 955	
Asia					
Indonesia	1 139			5 770	53
Japan	4 772	900	0.6	6 298	
Philippines	36	500	0.6	8	5
Taiwan, China	100	800	0.4		
Turkey	428	1 300	0.3	658	
Europe					
Austria	1				
Bulgaria	4	150	0.6		
Croatia	4				
Czech Republic	7 155	1 600	0.6		7 065
France	160	1 300	1.0		
Germany	383	1 600	0.6	23 000	8 371
Hungary	1 595	1 000	0.4	296	37
Netherlands	1 406	1 500	0.8	2 750	1 375
Poland	46 000	1 000	1.0	59 000–80 000	
Romania	29			2 185	187
Serbia & Montenegro	78		0.5		
Spain	1 300	1 200	0.5	3 000	200
Ukraine	21 699	1 800	0.5	5 423	
Middle East					
Iran	12 700–50 000				
Oceania					
Australia	56 500	600	0.3	125 000	75 000
New Zealand	45			942	313

Notes:

(1) The data on resources are those reported by WEC Member Committees. They thus constitute a sample, reflecting the information available in particular countries: they should not be considered as complete, or necessarily representative of the situation in each region. For this reason, regional and global aggregates have not been computed.

(2) Sources: WEC Member Committees, 2003.

TABLE 1.2II

Sub-bituminous coal: resources at end-2002

	Proved amount in place			Estimated additional	
	Tonnage (million tonnes)	Maximum depth of deposits (m)	Minimum seam thickness (m)	Amount in place (million tonnes)	Reserves recoverable (million tonnes)
North America					
Canada	1 153	300	1.5	48 764	15 165
Greenland	183	550		200	100
USA	165 150	305	1.5	273 593	
South America					
Argentina	697	800	0.5	273	
Brazil	17 033	870	0.5	15 319	7 660
Chile	91				
Asia					
Indonesia	2 034			10 301	95
Japan				5 936	
Korea (Republic)	134	1 000	0.6	377	122
Nepal	5		0.5		
Pakistan	105	2 000	0.2	250	140
Philippines	184	300	0.6	115	80
Turkey	1 526	828	0.4	202	
Europe					
Bulgaria	254	390	1.5		
Czech Republic	1 943	500	2.0		4 403
Hungary	3 204	500	0.8	1 289	78
Italy	60	500	1.4	280	
Norway	52	450	0.6		
Romania	8			223	13
Serbia & Montenegro	949		2.0		
Slovenia	57	190	10.0		
Spain	800	200	3.0	1 600	300
Sweden	4	15	0.5	20	
Ukraine	21 261	1 800	0.6	5 502	
Oceania					
Australia	3 500	200	1.5	27 900	20 700
New Zealand	376			2 085	682

Notes:

(1) The data on resources are those reported by WEC Member Committees. They thus constitute a sample, reflecting the information available in particular countries: they should not be considered as complete, or necessarily representative of the situation in each region. For this reason, regional and global aggregates have not been computed.

(2) Sources: WEC Member Committees, 2003.

TABLE 1.2III

Lignite: resources at end-2002

	Proved amount in place			Estimated additional	
	Tonnage (million tonnes)	Maximum depth of deposits (m)	Minimum seam thickness (m)	Amount in place (million tonnes)	Reserves recoverable (million tonnes)
North America					
Canada	2 961	50	1.5	51 034	42 115
USA	39 558	61	0.8	393 822	
South America					
Argentina	7 350	680			
Asia					
Indonesia	4 474			22 655	209
Japan				1 186	
Pakistan	3 180	280	0.3	67 910	
Philippines	82	100	1.0	53	45
Thailand		700	0.3		
Turkey	5 812	492	0.4	534	
Europe					
Austria	335				
Bulgaria	3 655	120	0.8		
Croatia	41				
Czech Republic	623	130	1.5		190
France	114	1 000	1.0		
Germany	7 136	550	5.0	69 260	34 100
Greece	5 800	400	1.0	2 500	1 000
Hungary	5 828	200	1.0	1 341	
Italy	15	150	3.0	22	20
Poland	13 984	350	3.0	41 000	
Romania	4 053			9 905	1 527
Serbia & Montenegro	20 578		10.0		
Slovakia					389
Slovenia	602	547	8.0		
Spain	30	50	0.5		
Ukraine	2 578	400	2.7	320	
Oceania					
Australia	41 900	300	3.0	175 800	158 200
New Zealand	2 297			9 817	7 078

Notes:

(1) The data on resources are those reported by WEC Member Committees. They thus constitute a sample, reflecting the information available in particular countries: they should not be considered as complete, or necessarily representative of the situation in each region. For this reason, regional and global aggregates have not been computed.

(2) Sources: WEC Member Committees, 2003.

TABLE 1.3

Coal: 2002 production (thousand tonnes)

	Bituminous	Sub-bituminous	Lignite	Total
Algeria	20			20
Botswana	956			956
Congo (Democratic Republic)	100			100
Egypt (Arab Republic)	37			37
Malawi		35		35
Morocco	N			N
Mozambique	20			20
Niger	165			165
Nigeria		10		10
South Africa	214 652			214 652
Swaziland	553			553
Tanzania	75			75
Zambia	70			70
Zimbabwe	4 130			4 130
Total Africa	**220 778**	**45**		**220 823**
Canada	29 600	25 900	11 300	66 800
Mexico	5 168	6 237		11 405
United States of America	520 244	397 668	74 806	992 718
Total North America	**555 012**	**429 805**	**86 106**	**1 070 923**
Argentina	160			160
Brazil		5 100		5 100
Chile	95	265		360
Colombia	39 510			39 510
Peru	25			25
Venezuela	8 000			8 000
Total South America	**47 790**	**5 365**		**53 155**
Afghanistan	2			2
Bhutan	65			65
China	1 343 350		50 000	1 393 350
Georgia	6			6
India	334 970		23 920	358 890
Indonesia	103 372			103 372
Japan	1 369			1 369
Kazakhstan	70 603		2 618	73 221
Korea (Democratic People’s Republic)	53 000	15 000		68 000
Korea (Republic)		3 318		3 318
Kyrgyzstan	122		376	498
Laos	100			100
Malaysia		353		353
Mongolia	1 520		3 787	5 307
Myanmar (Burma)	13		27	40

(*continued on next page*)

TABLE 1.3 (*Continued*)

	Bituminous	Sub-bituminous	Lignite	Total
Nepal		8		8
Pakistan		2 300	1 020	3 320
Philippines	120	1 540		1 660
Taiwan, China				
Tajikistan		33		33
Thailand			19 600	19 600
Turkey	2 200		51 000	53 200
Uzbekistan	75		2 660	2 735
Vietnam	15 000			15 000
Total Asia	**1 925 887**	**22 552**	**155 008**	**2 103 447**
Albania			15	15
Austria			1 210	1 210
Bosnia-Herzogovina			10 000	10 000
Bulgaria	100	3 100	23 200	26 400
Croatia				
Czech Republic	14 467	48 391	501	63 359
FYR Macedonia			8 000	8 000
France	1 480	440	150	2 070
Germany	29 209		181 779	210 988
Greece			70 340	70 340
Hungary	660	4 530	7 570	12 760
Italy		100		100
Norway		2 100		2 100
Poland	102 100		58 200	160 300
Romania	3 700	216	26 530	30 446
Russian Federation	168 420		85 000	253 420
Serbia & Montenegro	22	515	33 536	34 073
Slovakia			3 401	3 401
Slovenia		639	4 048	4 687
Spain	9 751	3 558	8 726	22 035
Ukraine	81 857		1 000	82 857
United Kingdom	29 989			29 989
Total Europe	**441 755**	**63 589**	**523 206**	**1 028 550**
Iran (Islamic Republic)	1 760			1 760
Total Middle East	**1 760**			**1 760**
Australia	256 000	17 000	67 000	340 000
New Zealand	2 269	1 972	218	4 459
Total Oceania	**258 269**	**18 972**	**67 218**	**344 459**
Total World	**3 451 251**	**540 328**	**831 538**	**4 823 117**

Notes:
(1) Sources: WEC Member Committees, 2003; *BP Statistical Review of World Energy*, June 2003; *Energy—Monthly Statistics*, Eurostat; *World Mineral Statistics 1997–2001*, British Geological Survey; national sources; estimates by the editors.

TABLE 1.4

Coal: 2002 consumption (thousand tonnes)

	Bituminous	Sub-bituminous	Lignite	Total
Algeria	928			928
Botswana	974			974
Congo (Democratic Republic)	130			130
Egypt (Arab Republic)	1 630			1 630
Ghana	3			3
Kenya	160			160
Libya/GSPLAJ	5			5
Madagascar	12			12
Malawi	55			55
Mauritania	6			6
Mauritius	250			250
Morocco	5 124			5 124
Mozambique	35			35
Namibia	5			5
Niger	165			165
Nigeria		10		10
South Africa	154 878			154 878
Swaziland	200			200
Tanzania	45			45
Tunisia	1			1
Zambia	65			65
Zimbabwe	4 000			4 000
Total Africa	**168 671**	**10**		**168 681**
Canada	19 000	30 000	11 300	60 300
Cuba	10			10
Dominican Republic	220			220
Guatemala	200			200
Honduras	120			120
Jamaica	60			60
Mexico	2 500	12 500		15 000
Panama	70			70
Puerto Rico	150			150
United States of America	516 650	399 100	75 850	991 600
US Virgin Islands	260			260
Total North America	**539 240**	**441 600**	**87 150**	**1 067 990**
Argentina		850		850
Brazil		17 700		17 700
Chile	3 500			3 500
Colombia	3 100			3 100
Peru	600			600
Uruguay	1			1
Venezuela	60			60

(*continued on next page*)

TABLE 1.4 (*Continued*)

	Bituminous	Sub-bituminous	Lignite	Total
Total South America	**7 261**	**18 550**		**25 811**
Afghanistan	2			2
Armenia				
Azerbaijan	5			5
Bangladesh	740			740
Bhutan	70			70
China	1 265 000		50 000	1 315 000
Cyprus	72			72
Georgia	10			10
Hong Kong, China	8 718			8 718
India	355 000		24 000	379 000
Indonesia	28 990			28 990
Japan	159 700			159 700
Kazakhstan	46 900		2 600	49 500
Korea (DPR)	23 500	7 500		31 000
Korea (Republic)	67 144	7 627		74 771
Kyrgyzstan	500		375	875
Malaysia	2 300	3 000		5 300
Mongolia	750		4 400	5 150
Myanmar (Burma)	13		27	40
Nepal		420		420
Pakistan	900	2 300	1 020	4 220
Philippines	7 210	5 670		12 880
Sri Lanka	1			1
Taiwan, China	50 603			50 603
Tajikistan	100	30		130
Thailand			19 570	19 570
Turkey	13 800		51 400	65 200
Uzbekistan	75		2 650	2 725
Vietnam	10 000			10 000
Total Asia	**2 042 103**	**26 547**	**156 042**	**2 224 692**
Albania			90	90
Austria	3 770		1 530	5 300
Belarus	450			450
Belgium	10 300	200	200	10 700
Bosnia-Herzogovina		3 600	5 300	8 900
Bulgaria	3 750	3 000	24 000	30 750
Croatia	900		100	1 000
Czech Republic	10 086	47 193	501	57 780
Denmark	6 708	N	N	6 708
Estonia	120			120
Finland	6 850			6 850
FYR Macedonia	40		8 000	8 040
France	18 720	280	180	19 180
Germany	68 671		172 848	241 519

TABLE 1.4 (*Continued*)

	Bituminous	Sub-bituminous	Lignite	Total
Greece			68 150	68 150
Hungary	940	5 000	7 570	13 510
Iceland	150			150
Ireland	2 700			2 700
Italy	19 700	100	N	19 800
Latvia	150			150
Lithuania	123		2	125
Luxembourg	150			150
Moldova	100			100
Netherlands	13 300			13 300
Norway		1 200		1 200
Poland	87 700		58 200	145 900
Portugal	5 000			5 000
Romania	7 372	216	26 530	34 118
Russian Federation	139 200		75 000	214 200
Serbia & Montenegro	105	865	33 536	34 506
Slovakia	4 900		4 200	9 100
Slovenia	92	1 198	4 361	5 651
Spain	31 500	4 267	8 726	44 493
Sweden	3 300			3 300
Switzerland	200			200
Ukraine	85 000		1 000	86 000
United Kingdom	58 500			58 500
Total Europe	**590 547**	**67 119**	**500 024**	**1 157 690**
Iran (Islamic Republic)	1 580			1 580
Israel	12 100			12 100
Lebanon	200			200
Total Middle East	**13 880**			**13 880**
Australia	49 000	17 000	67 000	133 000
Fiji	20			20
New Caledonia	150			150
New Zealand	288	1 899	265	2 452
Papua New Guinea	1			1
Total Oceania	**49 459**	**18 899**	**67 265**	**135 623**
Total World	**3 411 161**	**572 725**	**810 481**	**4 794 367**

Notes:

(1) Sources: WEC Member Committees, 2003; *BP Statistical Review of World Energy*, June 2003; *Energy—Monthly Statistics*, Eurostat; national sources; estimates by the editors.

COUNTRY NOTES

The following Country Notes on Coal have been compiled by the editors, drawing upon a wide variety of material, including information received from WEC Member Committees, national and international publications.

Major international published sources consulted included:

- *Energy Balances of OECD Countries 2000–2001*; 2003; International Energy Agency;
- *Energy Balances of Non-OECD Countries 2000-2001*; 2003; International Energy Agency;
- *Major coalfields of the world*; June 2000; IEA Coal Research.

Argentina

Proved amount in place (total coal, million tonnes)	8 051
Proved recoverable reserves (total coal, million tonnes)	424
Production (total coal, million tonnes, 2002)	0.2

The principal coal-mining areas are located in the west of the country along the foothills of the Andes and in the Andes themselves, in the provinces of Catamarca, La Rioja, San Juan, Mendoza, Neuquén, Río Negro, Chubut and Santa Cruz, with smaller coalfields in Córdoba, the centre of Chubut and the Atlantic coast of Santa Cruz.

The biggest coalfield is Río Turbio, located to the west of the city of Río Gallegos in the southern province of Santa Cruz, close to the border with Chile. Río Turbio's coal is a steam coal with low sulphur content (down to 1%), falling into the sub-bituminous rank; it constitutes 99% of the hard coal resources of the country, and supports the only coal extraction activity in the Argentine Republic. The Río Turbio coalfield, including the concession for operating the associated railway and port facilities, was privatised in 1994 but is currently under administration by a Federal auditor.

The Argentinian Member Committee has reported proved amounts in place of 697 million tonnes of sub-bituminous coal and 7 350 million tonnes of lignite, together with a minor quantity (4 million tonnes) of bituminous grade. For sub-bituminous, the maximum deposit depth is 800 m, with seams ranging from 0.5 to 2.0 m in thickness. The lignite resources are at a maximum depth of 680 m. The only proved recoverable reserves reported are 424 million tonnes of sub-bituminous.

Coal output from the Río Turbio mine is quite modest, at around 200 thousand tonnes per annum. The greater part is used for electricity generation, the balance as industrial fuel.

Australia

Proved amount in place (total coal, million tonnes)	101 900
Proved recoverable reserves (total coal, million tonnes)	78 500
Production (total coal, million tonnes, 2002)	340.0

Australia is endowed with very substantial coal resources, with its proved recoverable reserves ranking fifth in the world. The major deposits of black coal (bituminous and sub-bituminous) are located in New South Wales and Queensland; smaller but locally important resources occur in Western Australia, South Australia and Tasmania. The main deposits of brown coal are in Victoria, the only State producing this rank. Other brown coal resources are present in Western Australia, South Australia and Tasmania.

The coal resource data reported for the present *Survey* by the Australian WEC Member Committee have been provided by Geoscience Australia, formerly the Australian Geological Survey Organisation (AGSO). The proved amount of coal in place comprises 56.5 billion tonnes of bituminous coal, 3.5 billion tonnes of sub-bituminous and 41.9 billion tonnes of brown coal/lignite. Within these tonnages, the proportion deemed to be recoverable ranges from 68% of the bituminous coal (with 54% of its reserves surface-mineable) to 90% of the lignite, all of which is suitable for open-cast mining. About 36% of Australia's massive reserves of bituminous coal are of coking quality. The maximum depth of the deposits ranges from 600 m in the case of bituminous coal to 200 m for sub-bituminous and 300 m for lignite. Minimum seam thicknesses are 0.3, 1.5 and 3.0 m, respectively.

Indicated and inferred tonnages, additional to the proved amount in place, are vast: Geoscience Australia's current assessment puts bituminous coal at 125 billion tonnes, sub-bituminous at nearly 28 billion tonnes and lignite at around 175 billion tonnes. In total, more than 250 billion tonnes of this additional coal is considered to be eventually recoverable.

In 2002 Australia produced 273 million tonnes of saleable black coal (bituminous and sub-bituminous) and 67 million tonnes of brown coal. The major domestic market for black coal is electricity generation: in 2001, power stations accounted for 88% of total black coal consumption, with the other large consumers being the iron and steel industry and cement manufacture. Brown coal is used almost entirely for power generation.

Australia has been the world's largest exporter of hard coal since 1984: in 2002, it exported 198 million tonnes. About 53% of 2002 exports were of metallurgical grade (coking coal), destined largely for Japan, the Republic of Korea, India and Europe.

Botswana

Proved recoverable reserves (total coal, million tonnes)	40
Production (total coal, million tonnes, 2002)	1.0

Vast deposits of bituminous coal have been located in Botswana, principally in the eastern part of the country. The only mine to have been developed so far is at Morupule, near the town of Palapye, where Morupule Colliery Limited (controlled by Anglo American Corporation) commenced coal extraction in 1973.

For the present *Survey*, the Botswana WEC Member Committee has reported proved recoverable reserves of 40 million tonnes, of which 50% can be mined by open-cast methods. The reported tonnages relate solely to the economically recoverable reserves that are currently being exploited at the Morupule Mine. With cumulative output to the end of 2002 amounting to nearly 18 million tonnes, Botswana's remaining proved amount of coal in place is reported to be 3 340 million tonnes.

All of Botswana's current coal production (956 thousand tonnes in 2002) is of power generation quality, none of coking quality. The Morupule mine's chief customers are the Botswana Power Corporation, the copper/nickel mine at Selibe-Phikwe and the soda ash plant at Sua Pan. The BPC power station at Morupule (net capacity 118 MW) generates about half of Botswana's electricity supplies, the balance being provided by imports from South Africa.

Brazil

Proved amount in place (total coal, million tonnes)	17 033
Proved recoverable reserves (total coal, million tonnes)	10 113
Production (total coal, million tonnes, 2002)	5.1

Brazil has considerable reserves of sub-bituminous coal, mostly located in the southern states of Rio Grande do Sul, Santa Catarina and Paraná.

For the present *Survey*, the Brazilian WEC Member Committee has reported a proved amount in place (described as covering measured, indicated and inferred reserves) of just over 17 billion tonnes, of which almost 60% is categorised as proved recoverable reserves. The maximum depth of the deposits is 870 m, whilst the minimum seam thickness is 0.5 m. There is estimated to be some 15.3 billion tonnes of additional coal in place, of which 50% is considered to be recoverable.

With respect to the stated level of proved recoverable reserves, it is estimated that 21% could be exploited through surface mining, and that 7% is considered to be of coking quality. In 2002, 63% of Brazilian coal production was obtained by surface mining.

Almost all of Brazil's current coal output is classified as steam coal, of which about 85% is used as power-station fuel and the remainder in industrial plants. Virtually all of Brazil's metallurgical coal is imported: about three-quarters is used as input for coke production.

Canada

Proved amount in place (total coal, million tonnes)	8 723
Proved recoverable reserves (total coal, million tonnes)	6 578
Production (total coal, million tonnes, 2002)	66.8

Canada has considerable coal resources, with proved reserves of more than 6.5 billion tonnes. The levels of resources that have been reported by the Canadian WEC Member Committee are unchanged from those advised for the 2001 *Survey of Energy Resources.* Bituminous coals (including anthracite) are evaluated as 4.6 billion tonnes, based on deposits to a maximum depth of 1 200 m and a minimum seam thickness of 0.6 m; sub-bituminous grades are put at approximately 1.1 billion tonnes (maximum depth 300 m, minimum thickness 1.5 m); and lignite at 3.0 billion tonnes (maximum depth 50 m, minimum thickness 1.5 m). The proved recoverable reserves for each rank have been assessed as approximately 75% of the respective proved amount in place.

Estimates of the tonnages of coal (in-place and recoverable) that are considered to be additional to the 'proved' amounts of each rank all run into tens of billions of tonnes (see Tables 1.2I, II and III). Such numbers can never possess any high degree of accuracy, but they do serve to underline Canada's undoubtedly massive coal endowment.

Canadian coal reserves are mainly located in the western provinces of Saskatchewan, Alberta and British Columbia, with smaller deposits in the eastern provinces of Nova Scotia and New Brunswick. Bituminous deposits are found in the two eastern provinces together with Alberta and British Columbia; Alberta also possesses sub-bituminous grades, while lignite deposits are found only in Saskatchewan.

Western Canada dominates coal production, accounting for 99.5% of the total. Alberta is the largest coal-producing province, mainly of thermal grades. British Columbia is the second largest, producing mainly metallurgical coals. Saskatchewan produces lignite. About 40% of Canadian coal production is exported.

Around 90% of Canadian coal consumption is used for electricity generation, 7% in the steel industry and 3% in other industries. Alberta is the largest coal-consuming province, Ontario the second. Ontario relies on coal imports—there are no coal mines in the province.

The Canadian coal industry is entirely privately owned. Output is mainly from surface mines: only one underground mine is in operation, with a limited production.

China

Proved recoverable reserves (total coal, million tonnes)	114 500
Production (total coal, million tonnes, 2002)	1 393.4

China is a major force in world coal, standing in the front rank in terms of reserves, production and consumption, and recently, as a coal exporter. The levels of proved recoverable reserves (as at end-1990), originally provided by the Chinese WEC Member Committee for the 1992 *Survey*, have been retained for each successive edition; in billions of tonnes, they amount to: bituminous coal and anthracite 62.2; sub-bituminous coal 33.7 and lignite 18.6. The level of proved reserves retained for the present *Survey* implies a coal R/P ratio of 82, on the basis of 2002 production.

It is interesting to note that the same figure (114.5 billion tonnes) for total proved reserves was quoted at the 11th Session of the UN Committee on Sustainable Energy (Geneva, November 2001), in the context of an estimate of 988 billion tonnes for China's coal resources. This reference, in a paper co-authored by Professor Huang Shengchu, a vice-president of the China Coal Information Institute, indicates a degree of continuity in the official assessments of China's coal reserves and supports the retention of the level originally advised by the Chinese WEC Member Committee in 1991.

Coal deposits have been located in most of China's regions but three-quarters of proved recoverable reserves are in the north and northwest, particularly in the provinces of Shanxi, Shaanxi and Inner Mongolia.

After more than 20 years of almost uninterrupted growth, China's coal production peaked at nearly 1.4 billion tonnes in 1996, followed by 4 years during which output fell year by year, largely as a result of the closure of large numbers of small local mining operations. Annual output has regained an upward path in the past two years and reached a new peak in 2002. By far the greater part of output is of bituminous coal: lignite constitutes only about 4%.

The major coal-consuming sectors are power stations (including CHP), which accounted for 50% of total consumption in 2001, the iron and steel industry with a 15% share, and other industrial users with about 17%.

Coal exports more than doubled between 1999 and 2002, when they totalled 84 million tonnes; China is now the world's second largest coal exporter, after Australia.

Colombia

Proved recoverable reserves (total coal, million tonnes)	6 611
Production (total coal, million tonnes, 2002)	39.5

Colombia's vast coal resources are located in the north and west of the country. Data on measured reserves at end-2001, published by the Ministerio de Minas y Energía, indicate a total of some 6.6 billion tonnes, of which Zona Norte and Cerrejón in the department of La Guajira account for 55% and fields in the department of Cesar for 29%. 'Indicated reserves' quoted in the same publication are 2 932 million tonnes. Virtually all Colombia's coal resources fall into the bituminous category: the reserves in the San Jorge field in Córdoba, with an average calorific value in the sub-bituminous/lignite bracket, are shown under sub-bituminous in Table 1.1.

Development of Colombian coal for export has centred on the Cerrejón deposits which are located in the Guajira Peninsula in the far north, about 100 km inland from the Caribbean coast. The coal is found in the northern portion of a basin formed by the Cesar and Rancheria rivers; the deposit has been divided by the Government into the North, Central and South Zones. In October 1975 the Government opened international bidding for the development of El Cerrejón-North Zone reserves and in December 1976 Carbocol (then 100% owned by the Colombian State) and Intercor (an Exxon affiliate) entered into an Association Contract for the development and mining of the North Zone. The contract has three phases and covers a 33-year period with the production phase scheduled to end early in 2009.

Carbocol was privatised in October 2000, the purchasers being a consortium of Anglo-American, Billiton and Glencore; in early 2002 the three partners acquired the whole of Intercor's interest.

Coal exports from Colombia totalled 39.1 million tonnes in 2001, equivalent to 90% of its coal production. Cerrejón North remains one of the world's largest export mines.

Czech Republic

Proved amount in place (total coal, million tonnes)	9 721
Proved recoverable reserves (total coal, million tonnes)	5 552
Production (total coal, million tonnes, 2002)	63.4

The Czech Republic possesses sizeable coal resources, with a proved amount in place of nearly 10 billion tonnes, of which some 57% is reported to be economically recoverable. In terms of rank, 38% of the proved reserves are classified as bituminous, 58% as sub-bituminous and 4% as lignite. The tonnages reported by the Czech Member Committee for the present *Survey* show little change from those advised in 2000. The maximum depth of deposits varies from 1 600 m in the case of bituminous to 500 m for sub-bituminous and only 130 m for lignite; minimum seam thicknesses range from 0.6 (for bituminous) to 1.5 (lignite) and 2.0 m for sub-bituminous.

Bituminous coal deposits are mainly in the Ostrava-Karviná basin in the east of the country, and lie within the Czech section of the Upper Silesian coalfield. The principal sub-bituminous/lignite basins are located in the regions of North and West Bohemia, close to the Krusne Hory (Ore Mountains), which constitute the republic's north-western border with Germany. Currently all Czech output of bituminous coal and lignite is deep-mined, whereas 99% of sub-bituminous is surface-mined.

Since 1990, Czech output of bituminous coal has fallen by 35%, to 14.5 million tonnes in 2002, whilst sub-bituminous/lignite has declined by 38%, from 79 million tonnes in 1990 to 48.9 million tonnes in 2002. Over half of the republic's bituminous coal production consists of coking coal. In 2002, total exports of coal amounted to 7.7 million tonnes, equivalent to just over 12% of production.

Apart from its coking coal, which is consumed by the iron and steel industry, most of the republic's bituminous coal is used for electricity and heat generation, with industrial and private consumers accounting for relatively modest proportions. This pattern of utilisation also applies to sub-bituminous coal, which is still the main power station fuel.

France

The last lignite mine closed down at the end of January, 2003: all coal extraction will cease in 2004.

Germany

Proved amount in place (total coal, million tonnes)	7 519
Proved recoverable reserves (total coal, million tonnes)	6 739
Production (total coal, million tonnes, 2002)	211.0

The data advised by the German WEC Member Committee for the 2004 Survey reflect a reassessment of coal resources and reserves. The new numbers comply with the recommendations of the UN-ECE, within the context of the definitions specified for the SER. The proved amount in place is now given as approximately 7.5 billion tonnes, the bulk of which consists of lignite. The hard coal component has a maximum deposit depth of 1 600 m below the surface, and a minimum seam thickness of 0.6 m, whilst the corresponding parameters for lignite are 550 and 5 m, respectively.

Proved recoverable reserves comprise 183 million tonnes of hard coal and 6 556 million tonnes of lignite. Earlier assessments of German coal reserves (e.g. end-1996 and end-1999) contained large amounts of speculative resources which are no longer taken into account. Much of the former ‘proved amount in place’ and ‘proved recoverable reserves’ has been moved to ‘additional amount in place’ and ‘additional reserves recoverable’, respectively.

Germany’s output of hard coal has fallen from 76.6 million tonnes in 1990 to 29.2 million tonnes in 2002, whilst lignite production has virtually halved, from 357.5 to 181.8 million tonnes over the same period. Germany is still the world’s largest lignite producer.

The Ruhr coalfield produces over three-quarters of German hard coal. The coal qualities range from anthracite to high-volatile, strongly caking bituminous coal. The Saar is the second largest coalfield, with substantial deposits of weakly caking bituminous coal. All German hard coal is deep-mined from seams at depths exceeding 900 m.

The lignite deposit in the Rhine region is the largest single formation in Europe. In the former East Germany there are major deposits of lignite at Halle Leipzig and Lower Lausitz; these have considerable domestic importance.

The principal markets for bituminous coal are electricity generation, iron and steel, and cement manufacture: other industrial and household uses are relatively modest. The bulk of German lignite is consumed in power stations, although a considerable tonnage (11 million tonnes in 2001) is converted into brown coal briquettes for the industrial, residential and commercial markets.

Greece

Proved amount in place (total coal, million tonnes)	5 800
Proved recoverable reserves (total coal, million tonnes)	3 900
Production (total coal, million tonnes, 2002)	70.3

Coal resources are all in the form of lignite. Apart from a very small amount of private mining, all production is carried out by the mining division of the Public Power Corporation (DEI). There are two lignite centres, Ptolemais-Amynteo (LCPA) in the northern region of Western Macedonia, and Megalopolis (LCM) in the southern region of the Peloponnese. These two centres control the operations of seven open-cast mines; LCPA mines account for nearly 80% of DEI’s lignite output. In 2002, LCPA produced 55.8 million tonnes of lignite, LCM 14.5 million tonnes.

In the lignite-mining areas, six dedicated power stations (total generating capacity: 4 850 MW) produce more than two-thirds of Greece’s electricity supply. Two 330 MW lignite-fired power stations are planned for construction at Florina in Western Macedonia; the first unit came into operation in April 2003.

Greece is the second largest producer of lignite in the European Union and the fourth largest in the world.

India

Proved recoverable reserves (total coal, million tonnes)	92 445
Production (total coal, million tonnes, 2002)	358.9

Coal is the most abundant fossil fuel resource in India, which is the world’s third largest coal producer. The principal deposits of hard coal are in the eastern half of the country, ranging from Andhra Pradesh, bordering the Indian Ocean, to Arunachal Pradesh in the extreme north-east: the eastern States of Chhattisgarh, Jharkhand, Orissa and West Bengal together account for about 77% of reserves. The Ministry of Coal (quoting the Geological Survey of India) states that, in addition to 90.1 billion tonnes of proved reserves of bituminous coal, there are 112.6 billion tonnes of indicated reserves and 38.0 billion tonnes of inferred reserves. Coking coals constitute 18% of the tonnage of proved reserves.

Lignite deposits mostly occur in the southern State of Tamil Nadu. India's geological resources of lignite are estimated to be some 35.4 billion tonnes, of which about 2.4 billion tonnes in the Neyveli area are regarded as 'mineable under the presently adopted mining parameters', and taken as proved recoverable reserves in the present *Survey*. Annual production of lignite is currently in the region of 24 million tonnes, almost all of which is used for electricity generation.

Although India's coal reserves cover all ranks from lignite to bituminous, they tend to have a high ash content and a low calorific value. The low quality of much of its coal prevents India from being anything but a small exporter of coal (traditionally to the neighbouring countries of Bangladesh, Nepal and Bhutan) and conversely, is responsible for sizeable imports (around 13 million tonnes/yr of coking coal and 12 million tonnes/yr of steam coal) from Australia, China, Indonesia and South Africa.

Coal is the most important source of energy for electricity generation in India: about three-quarters of electricity is generated by coal-fired power stations. In addition, the steel, cement, fertiliser, chemical, paper and many other medium and small-scale industries are also major coal users.

Indonesia

Proved amount in place (total coal, million tonnes)	7 647
Proved recoverable reserves (total coal, million tonnes)	4 968
Production (total coal, million tonnes, 2002)	103.4

Indonesia possesses very substantial coal resources: according to recent data advised by the Ministry of Energy and Mineral Resources for the purpose of this *Survey*, the proved amount in place totals 7 647 million tonnes, within which Indonesia's proved recoverable reserves amount to 4 968 million tonnes. In each case, lignite has the largest share (58.5%), with sub-bituminous coal accounting for 26.6% and bituminous grades for 14.9%. For all ranks, the recoverable proportion of the coal in place is approximately 65%.

The Ministry reports an estimated additional amount in place (based on 'indicated' and 'inferred' resources in the original data) as some 38.7 billion tonnes, with the same proportionate breakdown by rank as for the proved amount in place and proved reserves.

Indonesian coals in production generally have medium calorific values (5 000–7 000 kcal/kg or 21–29 MJ/kg), with relatively high percentages of volatile matter; they benefit from low ash and sulphur contents, making them some of the cleanest coals in the world.

Competitive quality characteristics have secured substantial export markets for Indonesian coal: in 2002 over 74 million tonnes were shipped overseas, representing nearly 72% of total coal output. Asian customers took 81% of Indonesia's coal exports.

Within Indonesia, coal's main market is power generation, which accounted for 68% of internal consumption in 2002.

Pakistan

Proved amount in place (total coal, million tonnes)	3 285
Proved recoverable reserves (total coal, million tonnes)	3 050
Production (total coal, million tonnes, 2002)	3.3

The republic possesses substantial coal resources. The Geological Survey of Pakistan (GSP) quotes a total coal resource at 30 June 2002 of just over 185 billion tonnes, within which measured reserves are 3 303 million tonnes, and mineable reserves 1 982 million tonnes. The Pakistan WEC Member Committee reports the proved amount in place as 105 million tonnes of sub-bituminous coal and 3 180 million tonnes of lignite; of these quantities, proved recoverable reserves consist of 60 million and 2 990 million tonnes, respectively.

The Pakistan MC has reported all the coal resources of the Sind province as falling within the lignite rank. These lignite resources have been divided into two main categories: (a) non-developed coalfields, and (b) developed coalfields.

(a) The non-developed coalfields have been further sub-divided into:
    (i) The Thar coalfield: this will be Pakistan's first open-cast coalfield and may come into production within 3–4 years. The proved amount in place is put at 2 700 million tonnes, all of which is considered to be recoverable via open-cast mining. Over and above this tonnage Thar's 'indicated' resources are 9 400 million tonnes, 'inferred' resources 51 billion tonnes and 'hypothetical' resources 113 billion tonnes. Thar accounts for 88.5% of Pakistan's reported recoverable reserves.
    (ii) All other coalfields of Sind Province, such as Thatta, Sonda, Jherruck, Ongar and Indus East: these fields, when developed, will be underground mines: they have little chance of becoming producing fields in the near future. In aggregate, they have 230 million tonnes in place, with a maximum deposit depth of 280 m and seam thicknesses varying from 0.3 to 6.0 m. Proved reserves are 140 million tonnes, equivalent to 60% of the coal in place. 'Indicated' resources are given as 1.5 billion tonnes and 'inferred' as 4.8 billion.

(b) The developed lignite mines are Lakhra and Meting-Jhimpur; the main coal-producing area is Lakhra, where production is expected to rise. The total amount of coal in place is 250 million tonnes, at a maximum deposit depth of 150 m and with seam thicknesses between 0.75 and 2.5 m. Proved recoverable reserves are 150 million tonnes, with additional in-place tonnages of 660 million 'indicated' and 550 million 'inferred'.

The lignite coals are mainly being consumed by the brick kiln industry, with some by the cement industry, although the latter is now mostly converting to imported coal as the local lignite has a low calorific value as well as high sulphur and ash contents.

The coals of the Balochistan, Punjab and NWFP provinces have been grouped in the sub-bituminous rank category; although the rank of such coals ranges from sub-bituminous to bituminous, it is not possible to separate them. The proved amount of sub-bituminous coal in place is 105 million tonnes, to a maximum depth of 2 000 m and with seams from 0.2 to 2.0 m thick. Proved recoverable reserves are 60 million tonnes, with 'indicated' resources put at 35 million and 'inferred' at 215 million. Sub-bituminous coals are, like lignite, mostly used by the brick kiln industry but some coals of Balochistan and NWFP are also being used by the cement industry.

Notwithstanding its massive potential, Pakistan's coal production in recent years has been only some 3–3.5 million tonnes per annum. About half is currently produced in the western province of Balochistan; no Thar coal is produced at present.

Small tonnages of indigenous coal are used for electricity generation and by households but, as seen above, by far the largest portion is used to fire brick kilns. Just over 1 million tonnes of Australian coking coal is imported each year for use in the iron and steel industry.

Poland

Proved amount in place (total coal, million tonnes)	59 984
Proved recoverable reserves (total coal, million tonnes)	14 000
Production (total coal, million tonnes, 2002)	160.3

Most of Poland's substantial tonnage of coal resources is in the form of hard coal, which comprises 77% of the reported proved amount in place. The Polish WEC Member Committee has reported revised resource assessments by comparison with those advised for the 2001 *Survey of Energy Resources* with (in particular) a 10% reduction in the proved amount of bituminous coal in place and a 31% decrease in the corresponding tonnage recoverable.

The latest figures show the proved amount of hard coal in place as 46 billion tonnes, on the basis of a maximum deposit depth of 1 000 m and a minimum seam thickness of 1 m; the corresponding level for lignite is almost 14 billion tonnes, at a maximum deposit depth of 350 m and minimum seam thickness of 3 m. The estimated additional amounts in place are 59–80 billion tonnes of hard coal and 41 billion tonnes of lignite, but assessments of the recoverable portions of these quantities are not available.

The reported 'proved amount in place' comprises the total geological resources of coal (called in Polish terminology 'documented geological resources—category A, B and C'); the 'proved recoverable reserves' comprise the documented reserves of coal, known in the Polish classification as 'industrial reserves'; the 'estimated additional amounts in place' include forecast 'additional resources of coal, which are in unexplored extensions of known deposits below 1 000 m and inferred amounts estimated on the results of geological information'.

Poland's hard coal resources are mainly in the Upper Silesian Basin, which lies in the southwest of the country, straddling the border with the Czech Republic: about 80% of the basin is in Polish territory. Other hard-coal fields are located in the Lower Silesia and Lublin basins. There are a number of lignite deposits in central and western Poland, with four of the larger basins currently being exploited for production.

The quality of the Upper Silesian hard coals is generally quite high, with relatively low levels of sulphur and ash content. One-third of Poland's proved reserves of hard coal are regarded as of coking quality.

Although output of hard coal (and, to a lesser extent, of lignite) has declined during the past 15 years, and especially since 1997, Poland is still among the world's eight largest coal producers (see Table 1.3), with a 2002 output of 102 million tonnes of hard coal and 58 million tonnes of lignite. The decline in hard coal production reflects a deep restructuring of the industry, with the aim of eliminating the non-profitable mines by a reduction in excess production potential, substantially lower employment levels, elimination of government subsidies, etc.

Apart from Russia, Poland is the only world-class coal exporter in Europe: its total exports in 2002 were some 23 million tonnes, of which steam coal accounted for 84% and coking for 16%. Germany, Austria and Denmark are currently Poland's largest export markets for coal.

About 61% of inland consumption of hard coal goes to the production of electricity and bulk heat, industrial uses account for 26% and residential/commercial/agricultural uses 13%. Almost all lignite production is used for base-load electricity generation.

Russian Federation

Proved amount in place (total coal, million tonnes)	200 576
Proved recoverable reserves (total coal, million tonnes)	157 010
Production (total coal, million tonnes, 2002)	253.4

The levels quoted for Russian coal resources and reserves are unchanged from those given for end-1996 in the 1998 *Survey of Energy Resources*, as the WEC Member Committee was unable to obtain any more recent coal data for the present *Survey*.

The proved amount of coal in place at end-1996 comprised 75.8 billion tonnes of bituminous coal, based on a maximum deposit depth of 1 200 m and a minimum seam thickness of 0.6–0.7 m; 113.3 billion tonnes of sub-bituminous grades (at depths of up to 600 m and minimum thickness 1.0–2.0 m); and 11.5 billion tonnes of lignite (at 300 m and 1.5–2.0 m, respectively).

Proved recoverable reserves were reported as just over 49 billion tonnes of bituminous coal, of which 23% was considered to be surface-mineable and 55% was suitable for coking. Of the 97.5 billion tonnes of proved recoverable reserves of sub-bituminous coal, 74% was suitable for surface mining, while all of the 10.5 billion tonnes of recoverable lignite reserves fell into this category. Overall, about 94 billion tonnes of Russia's proved reserves were deemed to be recoverable by opencast or strip mining. Further enormous tonnages of coal, of the order of 20 times the quoted proved reserves, were reported to be recoverable in the future.

Russian coal reserves are widely dispersed and occur in a number of major basins. These range from the Moscow basin in the far west to the eastern end of the Donetsk basin (most of which is within the Ukraine) in the south, the Pechora basin in the far northeast of European Russia, and the Irkutsk, Kuznetsk, Kansk-Achinsk, Lena, South Yakutia and Tunguska basins extending across Siberia to the Far East.

The principal economic hard coal deposits of Russia are found in the Pechora and Kuznetsk basins. The former, which covers an area of some 90 000 km^2, has been extensively developed for underground operations, despite the severe climate and the fact that 85% of the basin is under permafrost. The deposits are in relatively close proximity to markets and much of the coal is of good rank, including coking grades. The Kuznetsk basin, an area of some 26 700 km^2, lies to the east of the city of Novosibirsk and contains a wide range of coals; the ash content is variable and the sulphur is generally low. Coal is produced from both surface and underground mines.

Lying east of the Kuznetsk and astride the trans-Siberian railway, the Kansk-Achinsk basin contains huge deposits of brown (sub-bituminous) coal with medium (in some cases, low) ash content and generally low sulphur; large strip-mines are linked to dedicated power stations and carbo-chemical plants. The vast Siberian coal-bearing areas of the Lena and Tunguska basins constitute largely unexplored resources, the commercial exploitation of which would probably be difficult to establish.

From a peak of around 425 million tonnes in 1988, Russia's total coal production declined dramatically following the disintegration of the USSR, and now stands at about 250–260 million tonnes per annum. In 2001 over 70% of Russian consumption was accounted for by power stations and district heating plants; the iron and steel industry and the residential sector were the other main centres of coal usage.

South Africa

Proved amount in place (total coal, million tonnes)	115 000
Proved recoverable reserves (total coal, million tonnes)	48 750
Production (total coal, million tonnes, 2002)	214.7

The South African WEC Member Committee has reported the proved amount in place on the basis of a maximum deposit depth of 350 m and a minimum seam thickness of 1 m. The coal resources reported for the present *Survey* are based on an assessment published by the Geological Survey of South Africa (now the Council for Geoscience) in 1987, adjusted for cumulative production of coal over the period since its preparation, and thus differ only marginally from those reported for the 2001 *Survey*.

The Council for Geoscience, on behalf of the Department of Minerals and Energy, is currently carrying out a major review of South Africa's coal resources; its report is expected to be completed by the end of 2004. There are some indications that the reassessed reserves could be as low as 38 billion tonnes.

Coal occurs principally in three regions.

- The shaly Volksrust Formation, which covers most of central and northern Mpumalanga

province (formerly the Transvaal). The coal is found in isolated basins and troughs which results in the fields being disconnected and widely separated.
- The sandy Vryheid Formation of the northern part of the main Karoo basin (northern Free State, northern Kwazulu-Natal and southern Mpumalanga): this generally continuous area is probably the most important economically.
- The Molteno Formation, which is confined to the north-eastern Cape. It is of minor economic importance compared to other coalfields in South Africa.

Some lignite deposits are known along the Kwazulu-Natal and Cape coasts, but are considered to be of scant economic importance.

Coal occurrences have been divided into 19 separate coalfields, 18 of which are located in an area extending some 600 km from north to south by 500 km from east to west. The Molteno field lies some 300 km south of the main coal-bearing region.

South Africa's coals are generally low in sulphur but high in ash. Beneficiation is essential for export-quality coal. Lower-quality coal is for the local power generation market.

Eskom, the South African electric utility, accounts for nearly 60% of coal consumption. A further large slice is consumed by the Sasol plants in making synthetic fuels and chemicals from coal. The third main user is the industrial sector, including the iron and steel industry. Coal use in residential and commercial premises is relatively small, while demand by the railways has virtually disappeared.

Coal exports are equivalent to about 30% of South African output and are mainly destined for Europe and Asia/Pacific. The main route for exports is via Richards Bay, Kwazulu-Natal, where there is one of the world's largest coal-export terminals.

Thailand

Proved recoverable reserves (total coal, million tonnes)	1 354
Production (total coal, million tonnes, 2002)	19.6

Thailand has sizeable resources of lignite, notably at Mae Moh in the north of the country. The Thai WEC Member Committee reports proved recoverable reserves of 1 354 million tonnes; the maximum deposit depth taken into consideration is approximately 700 m, while the minimum seam thickness is 0.30 m. As an indication of the extent of Thailand's coal resources, the 2002 edition of the annual publication *Thailand Energy Situation*, issued by the Department of Energy Development and Promotion, quotes total lignite reserves as 2 942 million tonnes. In this context, the reserves are defined as including 'the remaining reserve from produced area as well as the measured and indicated reserve from undeveloped area'.

Annual output of lignite increased by almost 90% between 1990 and 1997, but has since levelled out. All of Mae Moh's production is consumed by the Mae Moh power plant (2 625 MW). On the other hand, most of the lignite produced by other Thai mines is used by industry, chiefly in cement manufacture. Imports of bituminous coal are mostly destined for consumption in the iron and steel sector.

United Kingdom

Proved recoverable reserves (total coal, million tonnes)	220
Production (total coal, million tonnes, 2002)	30.0

Coal deposits are widely distributed and for many years the UK was one of the world's largest coal producers, and by far its largest exporter. Production rose to a peak of nearly 300 million tonnes/yr during World War I and thereafter did not fall below 200 million tonnes/yr until 1960. Output began a long-term decline in the mid-1960s, falling to less than 100 million tonnes/yr by 1990. Reflecting continued competition from natural gas and imported coal, UK coal production sank to only 30 million tonnes in 2002.

The UK coal industry was privatised at the end of 1994, with the principal purchaser being RJB Mining (now UK Coal plc), which acquired 16 deep mines from British Coal. As at 22 April 2003 there were 16 major deep mines, 8 smaller deep mines and 46 open-cast sites in production. Deep-mined coal output in 2002 was 16.4 million tonnes and open-cast sites produced 13.1 million tonnes; production from slurry etc. amounted to 0.5 million tonnes. Most deep-mined coal has a significantly higher content of sulphur and chlorine than that of internationally-traded coal. There is now virtually no UK production of coking coal.

The decline of the British coal industry has been accompanied by a sharp decrease in economically recoverable reserves. For the purpose of the present *Survey*, the level adopted reflects that stated by the Department of Trade and Industry in its publication *UK Energy Sector Indicators 2003*: ‘There were estimated to be approximately 220 million tonnes of economically viable coal reserves at mid-November 2001’. This figure is compatible with the view expressed in the Energy White Paper (Version 11, as at 21 February 2003): ‘Within 10 years most of our existing deep mines are likely to have exhausted their economic reserves’.

United States of America

Proved amount in place (total coal, million tonnes)	451 512
Proved recoverable reserves (total coal, million tonnes)	246 643
Production (total coal, million tonnes, 2002)	992.7

The United States coal resource base is the largest in the world. The US WEC Member Committee reports a Proved Amount in Place at 1 January 2003 of 451.5 billion tonnes (based on the Energy Information Administration’s Demonstrated Reserve Base). This total is comprised of 246.8 billion tonnes of bituminous coal (including anthracite) with a maximum deposit depth of 671 m and minimum seam thickness of 0.25 m; 165.1 billion tonnes of sub-bituminous (at up to 305 m depth and 1.52 m minimum seam thickness) and 39.6 billion tonnes of lignite (at up to 61 m depth and 0.76 m minimum seam thickness).

The reported Proved Recoverable Reserves amount to 246.6 billion tonnes, equivalent to about 27% of the global total. They comprise 111.3 billion tonnes of bituminous coal (including anthracite), 102 billion tonnes of sub-bituminous and 33.3 billion tonnes of lignite. The overall ratio of proved recoverable reserves to the proved amount in place is 0.55. This ratio varies widely from one rank to another, reflecting relative degrees of accessibility and recoverability: bituminous deposits average 0.45, sub-bituminous 0.62 and lignite 0.84. Open-cast or surface mining techniques can be applied to around 28% of bituminous reserves, to nearly 45% of the sub-bituminous and to 100% of the lignite.

Data for Proved Amount in Place and Recoverable Reserves are measured and indicated (proved and probable), in a commingled data base. The data cannot be separated into ‘proved only’ and ‘probable only’.

On top of the tonnages summarised above, the US WEC Member Committee reports enormous quantities of coal as ‘estimated additional amounts in place’: in total these come to well over a trillion tonnes, composed of 445 billion tonnes of bituminous, 274 billion sub-bituminous and 394 billion lignite. These estimates are derived from a US Department of the Interior study of coal resources as at 1 January 1974, but are regarded as still providing valid indications of the magnitude of the USA’s additional coal resources. Data on the Estimated Additional Amount in Place are primarily inferred. These resources extend deeper than the Proved Amount in Place, include thinner beds in some areas, and are based on older source data in many cases. The Estimated Additional Amount in Place has been adjusted only to indicate the arithmetic difference with Proved Amount in Place.

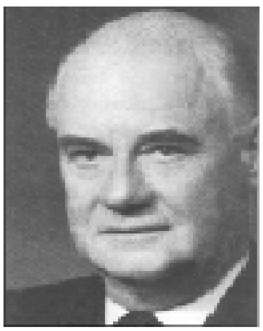
Coal deposits are widely distributed, being found in 38 states and underlying about 13% of the total land area. The Western Region (owing largely to Montana and Wyoming) accounts for about 47% of the EIA's Demonstrated Reserve Base, the Interior Region (chiefly Illinois and western Kentucky) for 32% and the Appalachian Region (chiefly West Virginia, Pennsylvania and Ohio) for 21%. Bituminous coal reserves are recorded for 27 states, whereas only 8 states have sub-bituminous reserves, of which 90% are located in Montana and Wyoming, and 10 have lignite reserves, mostly in Montana and Texas.

US coal output is the second highest in the world, after China, and accounted for about 21% of global production in 2002. Coal is the USA's largest single source of indigenous primary energy; power stations, CHP and heat plants accounted for almost 92% of domestic coal consumption in 2001. Coal exports amounted to 35 million tonnes in 2002: despite a decline in its exports in recent years, the USA remains a leading supplier of coking coal and other bituminous grades.

WEC's History

Shortly after World War I, Scotsman Daniel Dunlop (left), a visionary working in the British electricity industry, decided to bring together leading energy experts for a World Power Conference to discuss current and emerging energy issues. In 1923, he began working with countries around the globe to establish national committees that would stimulate attendance and prepare for technical participation at such a conference.

The First World Power Conference was held the next year, 1924, in London and attracted 1,700 delegates from 40 countries. The meeting was so successful that those attending decided to establish a permanent organisation to continue the dialogue begun at the conference.



On July 11, 1924, the World Power Conference was formally established. National Member Committees formed the core of the organisation, an International Executive Council (IEC) was established to act as the governing body, and a set of Objects was adopted to guide the organisation's work. Daniel Dunlop was appointed Chairman. In 1928, Charles Gray (left) became Secretary of the IEC. He was to hold that position for nearly 40 years, until 1965, when Eric Ruttley took over the post. The title and role of the position evolved over the years into what is today the position of WEC Secretary General.

The Objects were modified in 1958 and again in 1968, at the Conference in Moscow, when the organisation's name was changed to the World Energy Conference. The new title provided a more accurate description of the organisation's focus on the entire spectrum of energy. Shortly thereafter, the annual meeting of the World Energy Conference (WEC) became known as the 'Congress' to differentiate the annual event from the parent organisation.

In 1978, a special WEC Conservation Commission published a seminal report, *World Energy: Looking Ahead to 2020*, which was a comprehensive examination of the global energy scene, bringing together market economy countries, centrally planned economies and developing countries. This report was widely read and formed a starting point for many of WEC's future reports, studies, and activities.

In 1981, the IEC agreed that the triennial Conference would henceforth be designated as the "Triennial Congress".

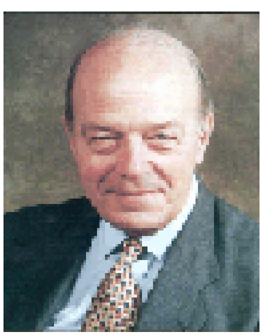
At the 1986 Congress, held in Cannes, France, a new feature, the Technical Exhibition, consisting mainly of energy supply equipment, was introduced. The Exhibition met with such a high degree of success that it became a regular part of following Congresses.

Also at the Cannes Congress, Eric Ruttley (left) resigned as Secretary General of WEC after steering the organisation through two decades of extraordinary changes. He was succeeded by Ian Lindsay, who came to WEC with over 30 years' experience in the oil industry. Over the next decade, Lindsay was to continue Ruttley's success in increasing WEC's membership, authority, and influence.

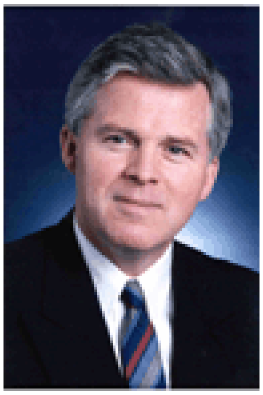
In 1989, WEC published another landmark report, *Global Energy Perspectives 2000-2020*. This report was an important consensus based on two global energy scenarios, one moderate and one more conservative. The report gained worldwide attention and was used by many policymakers and decision-makers as they considered the future.

At the 1989 Montreal Congress, based on the success of the *Global Energy Perspectives* report, WEC decided to undertake an ambitious new study, *Energy for Tomorrow's World: Realities, Real Options, The Agenda for Achievement*. The new study would serve as the main focus and underpinning for the 1992 Congress in Madrid. A special Commission Board convened a small team of high-level energy specialists lent by five Member Committees to draft the study report. After much effort, the report was finally published in 1993.

In the three years leading up to the 1992 Madrid Congress, WEC reorganised its finances to increase substantially the annual subscriptions it charged its members. The more robust financial picture enabled WEC to support expanded programmes and services for its membership, which had swelled to nearly 100 countries. A special WEC Foundation was also set up to help fund the work of WEC, with 24 Member Committees and several outside organisations contributing nearly £1.2 million. The organisation also changed its name to the World Energy Council, and the International Executive Council was renamed the Executive Assembly.



In December, 1997, WEC Secretary General Ian Lindsay (left) became seriously ill and died unexpectedly the following spring. He was deeply mourned. His 12-year tenure of service and his significant contribution to WEC's growth and its increasing importance on the world energy scene were recognised during the first session of the Executive Assembly at the Houston Congress. After an international search, Gerald Doucet (below, left), President and CEO of the Canadian Gas Association, was selected as WEC's new Secretary General.

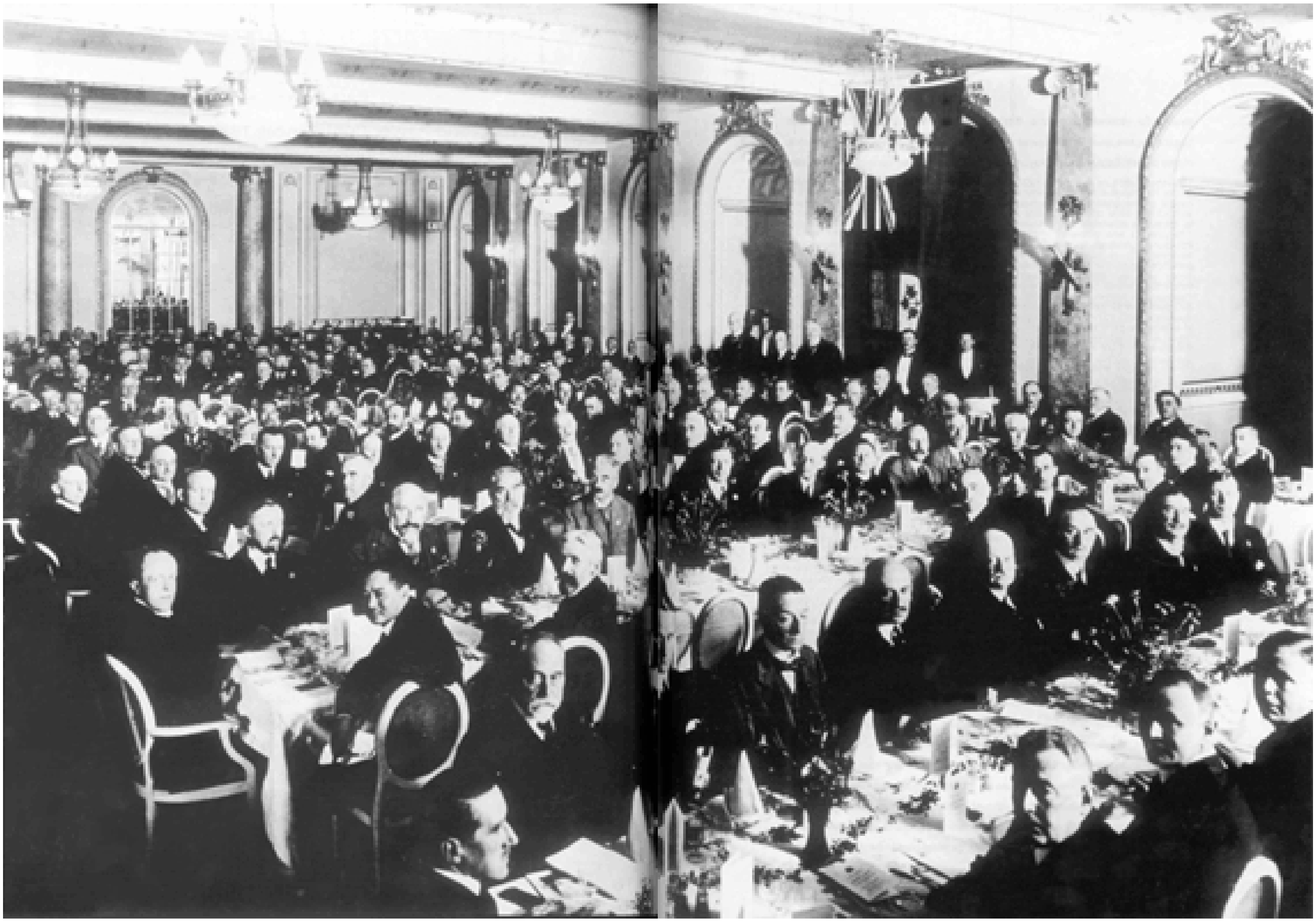


Also at the Houston Congress, WEC's Global Energy Information System (GEIS), an Internet-based, value-added information service, was introduced. GEIS has become a significant benefit of WEC membership and an important interactive communication tool for members as well as a way to publicise WEC and its work to the world at large.

In 2000, WEC published another landmark report, *Energy for Tomorrow's World - Acting Now!*, which re-examined the premises and conclusions of the 1993 *Energy for Tomorrow's World*. Nearly 20,000 copies of the report were distributed to WEC members, energy leaders, government officials, and the media.

In 2001, a major step forward was taken when WEC was incorporated as a charity limited by guarantee under UK law.

Throughout its history, the WEC has been non-governmental and non-commercial and thus has been seen as objective and realistic in its analyses and in its agendas for action. As we enter the 21st century, WEC continues to grow and expand, building on its long and stable history as one of the key players on the global energy scene.



Official dinner at the first World Power Conference, London 1924

[Material for this report was excerpted from the 1998 publication, World Energy 1923-1998 and Beyond, written by Professor Ian Fells to celebrate WEC's 75th anniversary.]