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COAL MAP OF SOUTH AMERICA

By

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Pamphlet to accompany
COAL INVESTIGATIONS
MAP C–145

CONTENTS

SUMMARY

All nine countries that were visited in South America contain coal deposits. Some coal deposits are more economical to exploit than others, but all have been or could be developed to some extent for local use. Export of Venezuelan and Colombian coal will probably increase in the near future. Deforestation is an environmental concern in many parts of South America. For this reason, coal as an alternative energy source could be developed. If and when this happens, opportunities could be present for the United States and foreign companies to invest in and (or) cooperatively conduct coal exploration, development, mining, and utilization programs in South America.

INTRODUCTION

This report was prepared to provide (1) a map of the coal fields and occurrences of coal in South America; (2) written documentation and references of the coal deposits identified on the coal map; and (3) data regarding the quality of the coal in each deposit.

The authors hope this report, which we believe to be the most complete compilation of published data on coal for the continent, will provide coal resource information to help guide exploration, development, mining, industrial and domestic use, export and import of coal, and aid in land-use planning throughout South America. On first examination, our research seems to substantiate a common belief that coal resources of South America are small. However, the data gathered for this report indicate that this belief may be erroneous. Such an error is easily understood because much, if not most, of South America's coal-bearing rocks are concealed from view by (1) thick jungle and associated soils, (2) younger volcanic rocks, (3) non-coal-bearing Tertiary and Quaternary valley fill adjacent to mountain ranges, and (4) complex structural features within nearly inaccessible high mountain ranges. These factors have made it exceedingly difficult for geologists and explorers, who have mostly worked without the aid of adequate maps, to find and evaluate the coal potential of South America.

Reports on the geology, mining, and paleobotany-paleontology of coal and coal-bearing rocks in South America helped us classify coal fields and coal occurrences as to their age, rank, depth of burial, number of beds, and sulfur and ash content. A list of selected references by nation is included, and a section has been included which lists the most pertinent references used in this study. In addition, data was obtained from written and oral communications with foreign coal authorities during the visits to each country.

BACKGROUND

This study was started by the late Gordon H. Wood, Jr. The original compilation, completed before his death, was a result of library research and it did not include updated information from scientists and others in the coal-bearing countries of South America. During the Fall of 1991, the senior author (Weaver) visited Uruguay, Argentina, Chile, Peru, Ecuador, Colombia, Venezuela, Brazil, and Bolivia. The purpose of the nine-country visit was twofold: (1) to discuss with geologists and other authorities in each country the quantity, quality, and distribution of known coal resources and the status of coal recovery and utilization and (2) to inform them of the current role of coal research in the U.S. Geological Survey. Paraguay was not visited because of time constraints. Guyana and Suriname were visited in the spring of 1993.

METHODS

The geologic and mining engineering literature on the coal fields and coal occurrences of South America range from modern formal published reports to letters and other informal documents that date back as far as the late 1700's. Because of the great range in age of reports and in the expertise of their authors, the quality of the reports ranges from poor to excellent. Some reports state without further information that coal was exposed in a river bed, canyon wall, or on a hillside. Other reports provide much data, which may or may not include precise locations, age designations of coal beds, ranks of coal, chemical analyses, stratigraphy, thicknesses of overburden, thicknesses of coal beds, mine maps and cross sections, petrographic descriptions of coal, and postulated depositional environments of coal. Only a few reports include enough data to be considered as adequately describing an individual mine, group of mines, or a coal field. Consequently, the authors adopted the following methods and guidelines for assessing South American coal resources.

1. No attempt was made to estimate the coal resources (recoverable coal) of the individual mines, occurrences, and coal fields of South America.

2. Data presented for individual coal occurrences were derived from the credited coal company or geological survey(s) or mining companies of the country.

3. The coal map is comprehensive and shows most of the known coal fields and reported occurrences. This is in contrast to most published maps which show only "major" coal fields and occurrences. The map also shows areas that may be underlain by coal and where the geology suggests that coal could be present.

Information on the size of coal fields and coal occurrences in South America is summarized on the map. The map clearly shows that many occurrences can be grouped into fields because such occurrences have a common geologic history. Each coal field or coal occurrence shown on the map is identified by a serial number that is unique within

each country. In the tables for each country, each coal deposit is further identified by a name, or where there is no name, that fact is indicated. Each deposit listing also has supporting data gathered from the literature or from cooperating specialists from the South American countries.

DEFINITIONS AND CRITERIA USED IN THIS REPORT

Identified coal-in-place. Known coal occurrence. Location, rank, quantity, quality, and depth of burial are known or are estimated from specific geologic evidence. Identified coal may be at any depth of burial, but it will not be more than 3 mi (4.8 km) from the point where a coal thickness is measured (Wood and others, 1983). The areas on the map marked by symbols and colors for rank designation and geologic age, respectively, are known coal occurrences.

Hypothetical coal-in-place. Coal which probably exists at depth, is more than 3 mi (4.8 km) from points of thickness measurement, is believed to be similar to known coal occurrences that surround points of measurement, and is a logical extension of known coal (identified coal-in-place). On the map these areas appear as pink areas surrounding areas of known coal occurrence.

Speculative coal-in-place. Undiscovered coal that is postulated to exist in (1) geologic settings suitable for the formation of peat from swamp deposits and the formation of peat to coal, or (2) areas where coal beds are hidden in the subsurface because of burial by younger sedimentary or volcanic rocks or hidden because of overlying structural features such as thrust faults or nappes (Cooper and others, 1979). These speculative areas are included primarily in the sedimentary basins shown on the map.

SEDIMENTARY BASINS

The known large sedimentary basins of South America that are reported to contain coal are shown on the map. Basins are areas of the earth's crust where sediment has accumulated. Such basins are a common habitat of fossil fuels of all types. Coal is common among the sedimentary rocks of some types of basins but may be a minor constituent of, or entirely lacking in, other types of sedimentary basins. The geologic history of a basin determines (1) whether coal is present or not, and (2) the physical and chemical characteristics that control the economic potential of coal deposits.

Five of the eight largest coal areas of the world (estimated coal resources of more than 500×10^9 tonnes) are essentially coincident with large sedimentary basins and the other three coal areas each include large basins (E.R. Landis and J.N. Weaver, written commun., 1992). Basins are shown on the map to facilitate inferences of coal deposits from known or reported coal areas or occurrences.

COAL BASINS, FIELDS, AND OCCURRENCES

Coal basins can be coincident with sedimentary basins. In many cases, however, coal basins are part of larger sedimentary basins. Because of local and regional tectonic disturbances, some coal basins have been deformed.

Coal fields and coal basins can be areally coincident; however, coal fields are commonly smaller than coal basins and their boundaries are commonly geographically and economically defined.

Coal occurrences usually are reports of coal of undetermined extent. Occurrences may range from organic material such as coalified wood in otherwise non-coal-bearing rocks, to preliminary indications of economically valuable coal deposits.

AGE

The geologic ages of the coal-bearing rocks of each coal field and occurrence are reported in the tables for each country and are shown on the map. Colors represent ages of the coal-bearing rocks. Geologic age assignments follow those accepted by the U.S. Geological Survey. The Periods are abbreviated in the tables as follows: Carboniferous = Carb., Mississippian = Miss., Pennsylvanian = Penn., Permian = Perm., Triassic = Tri., Jurassic = Jur., Cretaceous = Cret., Tertiary = Tert., and Quaternary = Quat. Age assignments straddling period boundaries are shown, for example, as Perm./Carb. Where the coal is mostly of one age, that period is placed first as Perm./Carb. (such as in Brazil and Uruguay).

RANK

The rank of coal is classified from analytical data according to the degree of metamorphism, progressive alteration, or coalification (maturation) in the natural series from lignite to anthracite (Wood and others, 1983). The rank classes and rank groups of coal and their abbreviations, as shown in the tables for each country, are listed in the following table.

The rank of coal can be used to infer the approximate dry, mineral-matter-free heat value, fixed carbon, and volatile matter in coal, because the amounts of the constituents vary little within each rank (Wood and others, 1983). The determination of rank is a necessary part of coal classification and description. Geologists throughout the world have found that the rank of coal can vary gradually over many miles and vertically over hundreds to thousands of feet. In the Andean Region, it has been noted that many of the rank assignments shown in the country tables vary because of adjacent intrusions and (or) structural complexities.

Different ranks of coal are shown by different symbols on the map. Anthracite is represented by a square, bituminous by a circle, subbituminous by an ellipsoid, lignite by a

Coal rank classes and groups and their abbreviations as used in this report (Wood and others, 1983)

Class	Group	Abbreviation
I. Anthracite		an
	1. Meta-anthracite	ma
	2. Anthracite	an
	3. Semianthracite	sa
II. Bituminous		bit
	1. Low volatile bituminous coal	lvb
	2. Medium volatile bituminous coal	mvb
	3. High volatile A bituminous coal	hvAb
	4. High volatile B bituminous coal	hvBb
	5. High volatile C bituminous coal	hvCb
III. Subbituminous		sub
	1. Subbituminous A coal	subA
	2. Subbituminous B coal	subB
	3. Subbituminous C coal	subC
IV. Lignite		lig
	1. Lignite A	ligA
	2. Lignite B	ligB

triangle, and peat by a diamond. Dashed symbols indicate data that were acquired from drill holes.

PEAT

Peat, and organic material which develops from the incomplete breakdown of wetland vegetation, may occur where the natural drainage of rainwater is reduced or impeded (Bord Na Mona, 1984). Utilization of peat deposits depends on their inherent properties. The organic components of peat vary according to the degree of decomposition. One of the primary uses of peat is as a fuel, and for this reason it has been included on this map.

The mineral and (or) inorganic ash content greatly influence peat fuel combustion. In a calorific comparison with other fuels, air-dried peat (35 percent moisture content) has a higher energy content than wood, while processed and beneficiated peat products approached the lower end of the coal spectrum.

Peat has been used as a form of energy in numerous countries for at least the last 2,000 years, and it has been used on an industrial scale since before World War I. It is often extremely valuable in remote areas which lack other indigenous energy forms. On a small scale, it may replace scarce firewood as the principle source of household energy. On a larger scale, it may be used for industrial steam and power generation.

COAL AND PEAT DEPOSITS

AGE OF SOUTH AMERICAN COAL DEPOSITS

The map shows the age of the coal occurrences as ascertained from literature and specialists in the countries of South America. Some of the age determinations were based on investigations of the fossil flora in the coal beds or in immediately adjacent strata and of the fossil fauna in adjacent terrestrial and marine rocks. Most ages were derived from paleobotanical and paleontologic data from older or younger rocks miles away from the coal deposits. The remainder of the age determinations are probably estimates whose correctness mostly depends on the experience of the

researcher. Almost all of the age determinations were done many years ago and, therefore, may be open to revision.

The age of South American coal deposits ranges from Late Mississippian (Lower Carboniferous) to Quaternary, but the deposits are principally of Tertiary and Cretaceous ages.

MISSISSIPPIAN COAL

The oldest known coal beds in South America are Mississippian (Lower Carboniferous). They are in Brazil and Peru and are reportedly thin; none have been mined. Because there is so little information on Mississippian coal and because the beds are so thin, such coal has been combined with Pennsylvanian coal in this report and referred to as Carboniferous. The age of the coal in the southern Brazil States (Rio Grande do Sul, Santa Catarina, Paraná is controversial. The Companhia de Pesquisa de Recursos Minerais (CPRM) reports in a review of Brazil data that coal in those States is Permian in age. The Paraná basin contains all of the country's commercial coal, which is in the Rio Bonito Formation of the Gondwana sequence (Machado, 1983).

PENNSYLVANIAN, PENNSYLVANIAN AND PERMIAN, AND PERMIAN COAL

Coal beds of Pennsylvanian, Pennsylvanian and Permian, and Permian age are known in Brazil, Argentina, and Peru, and they are of particular economic and resource importance in Brazil. The coal beds of the Paraná coal field of southeastern Brazil are typical of similar beds throughout the Southern hemisphere. They are the principal source of bituminous and subbituminous coal in South America, and, for the last century, they have been the principal source of coal mined on the continent.

TRIASSIC COAL

Coal beds of Triassic age are rare in South America, and they are only in northwestern Argentina and northern Chile.

JURASSIC COAL

Coal deposits of Jurassic age are generally of small lateral extent and are known only in Argentina and Peru.

CRETACEOUS COAL

Coal beds of Cretaceous age have been identified only in Argentina, Peru, and Colombia. They are concentrated in the intermontane valleys of the Andes Mountains and they are of potential economic and resource value only in Peru and Argentina.

TERTIARY COAL

Tertiary coal fields and occurrences compose approximately one-half of all coal deposits of all ages in South America. The areal extent of Tertiary coal deposits is several times greater than the extent of all other deposits of other ages. The tonnage of Tertiary coal is estimated to be much greater than for any other age or combination of ages. More than 55 percent of Tertiary fields and occurrences are in Venezuela. Most of the estimated tonnage of Tertiary coal underlies the Amazon River drainage basin in Brazil, Peru, and Colombia. The remainder of the Tertiary coal appears to be evenly distributed throughout the coal-bearing nations of the continent. Tertiary coal is not recognized in Paraguay and Uruguay.

PEAT

Within South America, peat deposits of various dimensions have been found primarily in Brazil, Bolivia, Colombia, Guyana, Venezuela, Paraguay, Suriname, and southern Chile. Brazil contains the most laterally extensive peat deposits. Most deposits are in swamplands in river valleys and on alluvial plains. Some deposits have been developed locally for agriculture but few have been evaluated for economic potential as an energy source. Starting in the early 1980's, technical assessment of the peat deposits in Brazil has been undertaken by the Companhia de Pesquisa de Recursos Minerais (CPRM).

EXPLANATION OF SELECTED COLUMNS IN THE TABULAR DATA FOR EACH COUNTRY

INTERNAL ADMINISTRATIVE AREA (INTERNAL ADM. AREA)

Each country is divided into provinces, states, regions, or departments. These boundaries are geographical or political boundaries within each country and they help to identify coal regions or occurrences. The Internal Administrative Area is included for each listing in the table for each country.

Argentina: province
Bolivia: department
Brazil: state
Chile: region
Colombia: department
Ecuador: province
Guyana: region
Paraguay: department
Peru: department
Suriname: district
Uruguay: department
Venezuela: state

MAP NUMBER

Each coal deposit or occurrence shown on the map is identified by a serial number that is unique within each country.

COAL FIELD, OCCURRENCE/MINE NAME

Each coal deposit has been assigned a name. The name generally reflects a geographical feature or a town near the deposit. An operating mine can be distinguished from a coal occurrence or coal field because a mining company is usually listed in the "Operator" column.

OPERATOR

This column identifies an owner, a company mining coal at a particular location, or a government geological survey doing exploration at a specific site.

MINE TYPE

Mine type indicates if the coal is being mined in a surface open-pit (S) or underground (U) mine.

RECOVERY ACTIVITY

This column was included in an effort to expand the "mine type" column. Activities listed in this column include drill holes, small mines for local domestic use, and exploration.

NUMBER OF BEDS

The number of beds listed is the total number of beds reported at an occurrence. This number does not indicate the total number of beds being mined. In most cases, less than half the reported beds are being mined.

COAL QUALITY PARAMETERS

The ash, sulfur, volatile matter, moisture, and heat values are mostly reported on an as-received basis. There are some discrepancies in the values. For example, some heat values will be too low or high for the reported rank class or group. This is a reflection of the discrepancies in international coal quality standards. Frequently the basis for such heat values is unknown or unreported; these values were included in the tables in lieu of no entry at all.

SUMMARY

The South American continent has abundant energy resource potential. Coal has been found to exist in nine of the South American countries and peat is present in eight countries. Available estimates of the amount of coal and peat present are based on inadequate and, sometimes, unreliable information. The range of physical and chemical characteristics of coal and peat is undefined in most reported resource areas. Nevertheless, the resource potential for use of coal and peat as alternative, indigenous energy sources is large. A better understanding of the quality and quantity of coal and peat resources in South America is required for planning and efficient utilization in an environmentally acceptable manner.

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TABLES

Coal mines and occurrences in Argentina

[Note: Data reflect information acquired during visit to country. LM, local mining--type unknown; an., anthracite; bit., bituminous; sub., subbituminous; lig., lignite; Internal adm. area, Internal administrative area; YCF, Yacimientos Carboníferos Fiscales; Tert., Tertiary; Jur., Jurassic; Tri., Triassic; Perm., Permian.]

Internal adm. area	Map number	Coal Field, occurrence/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash(%)[2]	Sulfur(%)[2]	Vol. matter(%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
Santa Cruz	1	Río Coyle	n.a.	none	n.a.	Tert.	lig.	3	n.a.	n.a.	n.a.	n.a.	2,000
Santa Cruz	2	Río Santa Cruz	n.a.	none	n.a.	Tert.	lig.	3	n.a.	n.a.	n.a.	n.a.	2,000
Santa Cruz	3	Río Turbio	YCF	none	LM	Tert.	sub.	5+	10-25	0.6-0.8	46-50	13.5	5,800-7,000
Santa Cruz	4	Lago Viedma	n.a.	none	n.a.	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Cruz	5	La Crilla	n.a.	none	LM	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Chubut	6	Indio	n.a.	none	LM	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Chubut	7	Lepa	n.a.	none	n.a.	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Chubut	8	Río Corintos	n.a.	none	n.a.	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Río Negro	9	Santa Ana	n.a.	none	n.a.	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Río Negro	10	Pico Quemado	n.a.	none	LM	Tert.	bit.	4	10-20	0.2-0.5	41	3-5	6,106
Neuquen	11	Jorge Newberry	n.a.	none	LM	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Neuquen	12	Burgos	n.a.	none	n.a.	Jur.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Mendoza	13	Cervantes/ La Manga	n.a.	none	n.a.	Jur.	an.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Mendoza	14	Cerro Morado	n.a.	none	LM	Tri.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Cruz	15	Cabo Curios	n.a.	none	n.a.	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.

Argentina--Continued

Mendoza	16	Santa Maxima/El Salito	n.a.	none	n.a.	Tri.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Mendoza	17	El Quemado	n.a.	none	n.a.	Tri.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Mendoza	18	Santa Clara	n.a.	none	n.a.	Tri.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
San Juan	19	Rickard	n.a.	none	LM	Tri.	bit.	1+	n.a.	n.a.	n.a.	n.a.	n.a.
Mendoza	20	La Alta	n.a.	none	n.a.	Perm.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
San Juan	21	La Delfina	n.a.	none	LM	Tri.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
San Juan	22	Alto Río Jachal	n.a.	none	n.a.	Tri.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
La Rioja	23	La Negra	n.a.	none	LM	Tri.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
La Rioja	24	Tambillas	n.a.	none	n.a.	Tri.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Cruz	25	Arroyo Pescado/Río Deseado	n.a.	none	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Cruz	26	Meseta Deseada	n.a.	none	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Catamarca	27	Chaschuil	n.a.	none	n.a.	Tri.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Tucuman ?	28	Boison	n.a.	none	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Salta	29	Escolpe	n.a.	none	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Cruz	30	Arroyo del Carbón	n.a.	none	LM	Tert.	bit.	13	n.a.	n.a.	n.a.	n.a.	n.a.
Jujuy	31	Valle de Lerma	n.a.	none	n.a.	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Jujuy	32	Mina Azules	n.a.	none	LM	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Jujuy	33	Tacanaite	n.a.	none	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Salta	34	Porongal	n.a.	none	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Jujuy	35	Santa Barbara	n.a.	none	LM	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.

Argentina--Continued

Jujuy	36	Arroyo Tunalito	n.a.	none	LM	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Jujuy	37	Arroyo Barro Blanco	n.a.	none	LM	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Jujuy	38	Duranzo Huaico	n.a.	none	LM	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Jujuy	39	Arroyo El Zaquan	n.a.	none	LM	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Tierra del Fuego	40	Río Lopez	n.a.	none	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Tierra del Fuego	41	Bahía Slogget	n.a.	none	n.a.	Tert.	lig./sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.

[1] : Indicates the total number of beds present--does not reflect the number of beds mined. [2] : Ash, sulfur, volatile matter, and moisture values are mostly based on an as-received

Coal mines and occurrences in Bolivia
[Note: Data has been reviewed by scientists from GEOBOL and from the Economic Section of the US Embassy in La Paz. Corrections and suggested changes have been incorporated into the table and map.
E., exploration phase; n.a., not available; an., anthracite; lig., lignite; Quat., Quaternary; Tert., Tertiary; Perm., Permian.]

Internal adm. area	Map number	Coal Field, occurrence/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. matter (%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
La Paz/Manco Kapac	1	Isla Del Sol	n.a.	n.a.	n.a.	Perm.	an.	3	42.0	0.74	14.0	n.a.	4,630
Cochabamba/ Capinota	2	Apillapampa	n.a.	n.a.	LM	Perm.	an.	1+	n.a.	n.a.	n.a.	n.a.	n.a.
Cochabamba/ Cabinota	3	Padcaya	n.a.	n.a.	n.a.	Quat.	lig.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tarija/ Arce	4	Guandacay/ Río Cambari	n.a.	n.a.	n.a.	Tert.	lig.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tarija/ Arce	5	Río Tomolosa	n.a.	n.a.	n.a.	Tert.	lig.	3	49.0	1.24	27.77	n.a.	4,300
Potosí/R. Bustillo	6	Uncia	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Chuquisaca/Luis Calvo	7	Filo Azaro/ Ticucha	n.a.	n.a.	n.a.	Quat.	lig.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Coohabamba/ Punata	8	Cochabamba wells	n.a.	E	drill hole	Tert.	lig.	3+	n.a.	n.a.	n.a.	n.a.	n.a.
Coohabamba/ Chapara	9	Patati	n.a.	n.a.	n.a.	Tert.	lig.	2+	30.12	4.2	43.46	n.a.	4,300
Cochabamba/ Chapare	10	Sacaba	n.a.	n.a.	n.a.	Tert.	lig.	2	66.5	0.5	19.30	n.a.	n.a.
Cochabamba/ Chapare	11	Villa Tunari	n.a.	n.a.	n.a.	Tert.	lig.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Cruz/ A. Sandovai	12	La Gaiba	n.a.	n.a.	n.a.	Tert.	lig.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Bolivia--Continued

Pando/ Madre de Díos	13	Amazonas	n.a.	E	drill hole	Tert.	lig.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cochabamba/ Chapare	14	San Antonio/ Río Chapara	n.a.	n.a.	n.a.	Tert.	lig.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
La Paz/Ingavi	15	Guaqui	n.a.	n.a.	n.a.	Tert.	lig.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
La Paz/Pacajes	16	Corocoro/ Cachaca	n.a.	n.a.	n.a.	Tert.	lig.	1+	n.a.	n.a.	n.a.	n.a.	n.a.
La Paz/Franz Tamayo	17	Ulla Ulla	n.a.	n.a.	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
La Paz/Iturralde	18	San Buena-vantura-Beu	n.a.	n.a.	n.a.	Perm.	an.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Cochabamba/ Punata	19	Punata/ Cliza	n.a.	n.a.	n.a.	Tert.	lig.	1+	n.a.	n.a.	n.a.	n.a.	n.a.
La Paz/Pacajes	20	Achiri	n.a.	n.a.	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
La Paz/Murillo	21	Tacagua /El Alto	n.a.	n.a.	n.a.	Tert.	lig.	4	n.a.	n.a.	n.a.	n.a.	n.a.
Oruro/Sejama	22	Totora	n.a.	n.a.	n.a.	Quat.	peat	2	28.0-85.0	n.a.	5.0-37.0	n.a.	n.a.
Oruro/Saucari	23	Chochoca	n.a.	n.a.	n.a.	Quat.	peat	2	26.16	n.a.	44.26	n.a.	n.a.
La Paz/Murillo	24	Milluni	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
La Paz/Murillo	25	Chacaltaya	n.a.	none	outcrop	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
La Paz/Murillo	26	Chugulaguillo	n.a.	none	outcrop	Quat	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
La Paz/Losyza	27	Monte Blanco	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

[1]: Indicates the total number of beds present-does not reflect the number of beds being mined
[2]: Ash, sulfur, volatile matter and moisture values are mostly based on an as-received basis

Coal mines and occurrences in Brazil
[Note: Data reflect information acquired during visit to country. Internal adm. area, internal administrative area. Carb., Carboniferous; Perm., Permian; Tert., Tertiary; Quat., Quaternary; S., surface mine; U., underground mine; E., exploration phase; LM., local mining--type unknown; N.A., not available; ?, unknown; an., anthracite; bit., bituminous; sub., subbituminous; lig., lignite.]

Internal adm. area	Map number	Coal Field, occurrence/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. matter (%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
Rio Grande Do Sul	1	Mina Selvai	CNMC	S	n.a.	Perm.	sub.	5	51.0	1.14	22.11	n.a.	3,322
Rio Grande Do Sul	2	Mina Hula Negra	n.a.	S	n.a.	Perm.	sub.	?	?	n.a.	n.a.	n.a.	n.a.
Rio Grande Do Sul	3	Mina Candiota	CRM	S	n.a.	Perm.	sub.	10	52.20	1.7	21.00	11.30	3,230
Rio Grande Do Sul	4	Charqueadae/ Guaíba	COPELMI	U	n.a.	Perm.	sub.	3	53.60	0.70	19.50	6.70	2,737
Rio Grande Do Sul	5	Calombo	MSH	n.a.	n.a.	Perm.	sub.	?	?	n.a.	n.a.	n.a.	n.a.
Rio Grande Do Sul	6	Faxinal	COPELMI	S	n.a.	Perm.	sub.	4	59.32	1.57	17.58	n.a.	2,646
Rio Grande Do Sul	7	Mina Racralo	COPELMI	S	n.a.	Perm.	sub.	8+	57.10	1.70	20.93	n.a.	2,852
Rio Grande Do Sul	8	Mina Butlá Leste	COPELMI	S	n.a.	Perm.	sub.	2	52.00	1.80	21.72	5.00	3,320
Rio Grande Do Sul	9	Mina do Leão i	CRM	S	n.a.	Perm.	sub.	3	57.10	0.70	19.30	5.00	2,860
Rio Grande Do Sul	10	Arrolo Dos Ratos	n.a.	n.a.	n.a.	Perm.	sub.	11	?	n.a.	n.a.	n.a.	n.a.
Rio Grande Do Sul	11	Iruí	CRM	S	n.a.	Perm.	sub.	2	41.80	0.30	24.30	9.60	4,158

Brazil--Continued

Rio Grande Do Sul	12	Gravataí/Morungava-Chico Loma	n.a.	n.a.	n.a.	Perm.	sub.	12	53	1.6	n.a.	n.a.	n.a.
Rio Grande do Sul	12-a	Sta. Terezinha	n.a.	n.a.	n.a.	Perm.	sub.	n.a.	?	n.a.	n.a.	n.a.	n.a.
Rio Granda Do Sul	13	Capané	CP	S	n.a.	Perm.	sub.	1	48.00	1.50	n.a.	n.a.	3,300
Santa Catarina	14	Linha Batista	CPSA	S	none	Perm.	bit.	1	?	n.a.	n.a.	n.a.	n.a.
Santa Catarina	15	Santa Augusta	CCU	U	n.a.	Perm.	bit.	3	33.75	1.00	17.17	n.a.	5,450
Santa Catarina	16	Mina A	CPSA	U	n.a.	Perm.	bit.	3	31.80	13.12	25.70	n.a.	5,500
Santa Catarina	17	Poço 10 Içara	CPSA	U	n.a.	Perm.	bit.	2	32.60	1.45	22.00	n.a.	5,500
Santa Catarina	18	Mina B	CPSA	U	n.a.	Perm.	bit.	2	?	n.a.	n.a.	n.a.	n.a.
Santa Catarina	19	Poço 3	CBCA	n.a.	n.a.	Perm.	bit.	?	?	n.a.	n.a.	n.a.	n.a.
Santa Catarina	20	Verdinho UM2	CCSA	U	n.a.	Perm.	bit.	2	32.10	1.93	27.50	n.a.	n.a.
Santa Catarina	21	Painel-F	C.C.C.	n.a.	n.a.	Parm.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	22	Poço 3-4	C.C.C.	n.a.	n.a.	Perm.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	23	São Simão	CBCA	U	n.a.	Parm.	bit.	2	32.00	2.60	28.33	n.a.	5,800
Santa Catarina	24	Antonio de Lucca "A"	CBCA	U	n.a.	Perm.	bit.	2	33.03	3.30	23.45	n.a.	5,300
Santa Catarina	25	Antonio de Lucca "B"	CBCA	U	n.a.	Perm.	bit.	2	33.03	3.30	23.45	n.a.	5,300
Santa Catarina	26	São Geraldo	CCU	U	n.a.	Perm.	bit.	2	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	27	Estiva dos Pregos	COCALIT	n.a.	n.a.	Perm.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	28	Volta Redonda	CCSA	U	n.a.	Perm.	bit.	2	32.10	1.93	27.50	n.a.	n.a.
Santa Catarina	29	Morozini	CPSA	S	n.a.	Perm.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	30	Rio Deserto	ICRDL	U	n.a.	Perm.	bit.	2	34.32	2.61	12.41	n.a.	5,322
Santa Catarina	31	Itanema II (CA)	CTSA	S	n.a.	Perm.	bit.	1	28.80	2.30	29.90	n.a.	n.a.
Santa Catarina	32	Fontanela	CMSA	n.a.	n.a.	Perm.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.

Brazil--Continued

Santa Catarina	33	Esperança	CMSA	U	n.a.	Perm.	bit.	2	34.05	2.10	31.30	n.a.	5,270
Santa Catarina	34	Mina # E/F/G	MFCNMCBB	U	n.a.	Perm.	bit.	2	31.25	2.15	30.00	n.a.	5,578
Santa Catarina	35	Fontanala (SA)	n.a.	n.a.	n.a.	Perm.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	36	Fonseca (CA)	n.a.	n.a.	n.a.	Perm.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	37	Goulart	n.a.	n.a.	n.a.	Perm.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	38	Cidade Mineira (CA)	CMSA	S	n.a.	Perm.	bit.	2	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	39	Forquilhinha	CTSA	S	n.a.	Perm.	bit.	2	30.90	n.a.	29.00	n.a.	n.a.
Santa Catarina	40	Santana	CCU	n.a.	n.a.	Perm.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	41	Poço 1	IBRAMIL	n.a.	n.a.	Perm.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	42	Figueira	IBRAMIL	n.a.	n.a.	Perm.	bit.	2	n.a.	n.a.	n.a.	n.a.	n.a.
Rio Grande Do Sul	43	São Sepé	n.a.	S ?	n.a.	Perm.	sub.	4	36-38	n.a.	n.a.	n.a.	n.a.
Paraná	44	Campina Dos Pupos (Tibagi)	KPM	n.a.	n.a.	Perm.	sub./bit.	2	45.00	10.00-13.00	10.00-24.00	2.0-4.0	4,200-4,600
Paraná	45	Barbosa	n.a.	n.a.	n.a.	Perm.	bit.	1	45.00-60.00	n.a.	n.a.	n.a.	n.a.
Paraná	46	Ribeirão Novo	n.a.	n.a.	n.a.	Perm.	bit.	3	50.00	n.a.	n.a.	n.a.	n.a.
Paraná	47	Amando Simões (Rio Peixe)	CCC	U	n.a.	Perm.	bit.	2	22.00-23.00	6.0-10.0	22.00-29.00	2.3-3.0	5,750
Paraná	48	Ibaití	n.a.	n.a.	n.a.	Perm.	bit.	1	33.00-40.00	n.a.	n.a.	n.a.	n.a.
Paraná	49	Tomazina	n.a.	n.a.	n.a.	Perm.	bit.	1	26.00	4.08	37.43	n.a.	5,735
Paraná	50	Rio das Cinzas	n.a.	n.a.	n.a.	Perm.	bit.	2	29.00	n.a.	n.a.	n.a.	n.a.
Paraná	51	Mina Do Cedro	n.a.	n.a.	n.a.	Perm.	bit.	1	29.00	n.a.	n.a.	n.a.	n.a.
Paraná	52	São João Do Triunfo	n.a.	n.a.	n.a.	Perm.	bit.	11 ?	n.a.	n.a.	n.a.	n.a.	n.a.
São Paulo	53	Buri	n.a.	n.a.	LM	Perm.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.

Brazil–Continued

São Paulo	54	Bacia Cerquilho	n.a.	n.a.	LM	Perm.	sub.	1	30.00	n.a.	n.a.	n.a.	n.a.
São Paulo	55	Monta Mor	n.a.	n.a.	n.a.	Parm.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
São Paulo	56	Cerquilho	n.a.	n.a.	LM	Perm.	an.	1	1.0	n.a.	n.a.	n.a.	n.a.
Piauí	57	União	PETROBRÁS	E	drill hole	Perm.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Golás/Maranhão/ Pará	58	Tocantis/ Araguaia	CPCAN	E	drill hole	Carb.	bit./ an. ?	1	n.a.	n.a.	n.a.	n.a.	n.a.
Pará	59	Rio Fresco	IDESP	nona	outcrop	Carb.	an.	2+	n.a.	n.a.	n.a.	n.a.	n.a.
Minas Gerais	60	Bacia Gandarela	n.a.	none	outcrop	Quat.	lig.	1	11.5	n.a.	n.a.	n.a.	n.a.
Río de Janairo	61	Barra Mansa	n.a.	n.a.	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
São Paolo	62	Jambeiro	n.a.	n.a.	n.a.	Tart.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Mato Grosso	63	Serra do Môa	DNPM	none	outcrop	Crat.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Maranhão	64	Nova Yorque	n.a.	none	outcrop	Carb.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Amapa	65	Río Calçoene	n.a.	none	outcrop	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Maranhão	66	Mocambo	PETROBRÁS	E	drill hole	Tert/ Cret.	lig.	20	n.a.	n.a.	n.a.	n.a.	n.a.
Piaui	67	Parnaíba	n.a.	E	drill hole	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Pernambuco	68	Jatobá	DNPM/CPRM	E	drill hole	Cret.	lig.	5	5.00-16.00	n.a.	n.a.	n.a.	n.a.
Bahia	69	Lagoa Do Paulo	PETROBRÁS	n.a.	drill hole	Cret.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Minas Garais	70	Fonseca	n.a.	n.a.	n.a.	Cret.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Amazonas	71	Alto Solimões	PETROBRÁS	n.a.	drill hole	Cret.	lig.	2	47.00	n.a.	n.a.	n.a.	n.a.
Bahia	72	N/E Coast	CPRM	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bahia	73	S/E Coast	CPRM	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Rio Grande Do Sul	74	L'Esta Porto Alegre	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Rio Grande Do Sul	75	Cambara Do Sul	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Brazil–Continued

Paraná	76	Curitiba	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Paraná	77	Ponta Grossa	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Paraná	78	Alto Rio Ivaí	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Paraná	79	Alto Rio Iguaçu	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
São Paulo	80	Valle Paraíba Do Sul	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Minas Garais	81	Sul de Minas	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Minas Gerais	82	Triângulo Mineiro	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Minas Gerais	83	Alto Rio São Francisco	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Minas Gerais	84	NE de Minas	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Goiás	85	Arredores de Brazília	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Bahia	86	SW Bahia	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Maranhão	87	Barreirinha	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Maranhão	88	Lago Açu	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Maranhão	89	Pinheiro	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Pará	90	Ilha de Marajó	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Amapa	91	Araguari	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Amazonas	92	Médio Amazonas	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Amazonas	93	Baixo Rio Madeira	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Amazonas	94	Baixo Rio Purus	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Amazonas	95	Alto Rio Negro	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Amazonas	96	Baixo Rio Branco	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Mato Grosso	97	Xapuri	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Rondônia	98	Abunã	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Brazil–Continued

Mato Grosso	99	Guajará/ Mirim	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Rio de Janeiro	100	Brejo da Mingota	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Santa Catarina	101	Sul Catarinense	n.a.	n.a.	n.a.	Perm.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Rio de Janeiro	102	Rio da Prata	n.a.	n.a.	n.a.	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

CBCA: Massa Falida da Cia. Brasileira Carbonífera de Araranguá; CCC: Companhia Carbonífera do Cambuí;
C.C.C.: Companhia Carbonífera Catarinense, S.A.; CCSA: Carbonífera Criciúma, S.A.;
CCU: Companhia Carbonífera de Urussanga; COCALIT: Coque Catarinense Ltda.;
COPELMI: Companhia de Pesquisas e Lavras Minerais; CMSA: Carbonífera Metropolitana, S.A.
CNMC: Companhia de Mineração Candiota; CP: Carbonífera Palermo Ltda.;
CPSA: Carbonífera Próspera, S.A.; CPCAN: Comissão do Plano de Carvão Nacional;
CPRM: Companhia de Pesquisa de Recursos Minerais; CRM: Companhia Riograndese de Mineração;
CTSA: Carbonífera Treviso; DNPM: Departamento Nacional da Produção Mineral;
IBRAMIL: Ibracoque Mineração Ltda.; ICRDL: Industria Carbonífera Rio Deserto Ltda.;
IDESP: Instituto de Desenvolvimento do Estado do Pará; KPM: Klabin do Paraná Mineração, S/A;
MFCNMCBB: Massa Falida da Companhia Nacional da Mineração de Carvão do Barro Blanco;
MSH: Mineradora Santa Heloísa Ltda.; PETROBRÁS: Petroleo Brasileiro, S.A.

[1]: Indicates the total number of beds present-does not reflect the number of beds being mined
[2]: Ash, sulfur, volatile matter, and moisture values are mostly based on as-received basis

Coal mines and occurrences in Chile

[Note: Data reflect information acquired from COCAR, ENACAR, and SERNAGEOMIN during visit to country. LM, local mining--type unknown; an., anthracite; bit., bituminous; sub., subbituminous; lig., lignite; Internal adm. area, Internal administrative area; n.a., data not available; S, surface mine; U, underground; ?, uncertain; Quat., Quaternary; Tert., Tertiary; Tri., Triassic.]

Internal adm. area	Map number	Coal field, occurrence/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. matter(%)[2]	Moisture (%)[2]	Heat Value (kcal/kg)
Atacama	1	Cerro La Tema	n.a.	n.a.	?	Tri.	an.	2	n.a.	n.a.	n.a.	n.a.	n.a.
Atacama	2	Cerro La Guardia	n.a.	n.a.	?	Tri.	an.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Atacama	3	Alto del Carmen	n.a.	n.a.	?	Tri.	an.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Concepción	4	Guilacoga	n.a.	n.a.	LM	Tri.	an.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Concepción	5	Concepción	n.a.	n.a.	outcrop	Tert.	bit.	3	n.a.	n.a.	n.a.	n.a.	n.a.
Concepción	6	Colico Sur	ENACAR	U	?	Tert.	bit.	4	n.a	n.a	n.a	n.a	n.a.
Concepción	7	Schwager (Coronel)	Schwager	U	under sea	Tert.	bit.	3+	n.a.	n.a.	n.a.	n.a.	3,722-3,944
Concepción	8	Lota	ENACAR	U	under sea	Tert.	bit.	9	7.7-12.9	0.61-1.82	37.0-41.0	2.8-3.5	7,500
Concepción	9	Ramadillas	n.a.	U	?	Tert.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Concepción	10	San Justo	n.a.	U	?	Tert.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Arauco	11	Curanilahue	n.a.	n.a.	LM	Tert.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Arauco	12	Trongol	ENACAR	n.a.	LM	Tert.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Araucanía	13	Pilpico	n.a.	U	?	Tert.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Araucanía	14	Lebu	ENACAR (CVL)	U	?	Tert.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Araucanía	15	Plegaria	n.a.	n.a.	LM	Tert.	bit.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Araucanía	16	Lirquen	n.a.	none	?	Tart.	bit./lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Araucanía	17	Temuco	n.a.	n.a.	?	Tri.	an.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Chile--Continued

Valdivia	18	San José de Mariquina	n.a.	n.a.	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Valdivia	19	Río San Pedro	n.a.	n.a.	LM	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Valdivia	20	Pupunahue	n.a.	U	?	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Los Lagos	21	Punta de la Galera	n.a.	n.a.	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Los Lagos	22	Valdivia Basin	n.a.	n.a.	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Los Lagos	23	Paraga	n.a.	n.a.	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Los Lagos	24	Orsona/ La Unión	n.a.	n.a.	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	25	Mina Chilena	ENACAR	n.a.	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	26	Río Rubens	BHP Utah	none	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	27	Mina Dorotea	ENACAR	none	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	28	Mina Magdalena	ENACAR	n.a.	LM	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	29	Mina Elena (Valle)	ENACAR	n.a.	LM	Tert.	sub.	8	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	30	Mina Josefina (Sara)	ENACAR	n.a.	LM	Tert.	sub.	14	9.7	0.38	37.0	19.0	12,222?
Magallanes	31	Isla Riesco	ENACAR	n.a.	LM	Tert.	sub.	24	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	32	Peckett	COCAR	S	?	Tert.	sub.	13	17.0	0.6-1.0	n.a.	1.3	2,270
Magallanes	33	Mina Vulcano	ENACAR ?	none	?	Tart.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	34	Mina Loreto	ENACAR	none	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	35	Mina Santa Clara	ENACAR	none	?	Tert.	sub.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Magallanes	36	Tierra del Fuego	n.a.	n.a.	?	Quat.	peat	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

[1]: Indicates total number of beds present; not number of beds mined
[2]: Ash, sulfur, volatile matter and moisture are mostly based on an as-received basis

ENACAR: Empresa Nacional del Carbón, S.A.; COCAR: Compañía de Carbones Chile, S.A.;
CVL: Compañía Victoria de Lebu; BHP Utah: Broken Hill Properties; SCHWAGER: Schwager, S.A.

Coal mines and occurrences in Colombia
[Note: Data reflect information acquired during visit to country. Internal adm. area, internal administrative area; S., surface mine; E., exploration phase; LM, local mining-type unknown; an., anthracite; bit., bituminous; sub., subbituminous; lig., lignite; Tert., Tertiary; Cret., Cretaceous.]

Internal adm. area	Map number	Coal Field, occurrence/ mine name	Operator	Mine typa	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. Mattar (%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
Guajira	1(a)	El Cerrejón/Zona Norte	Carbocol	S	n.a.	Tart.	bit./sub.	40	8.25	0.75	32.80	n.a.	6,500
Guajira	1(b)	El Cerrejón/Zona Central	Intercor	S	n.a.	Tert.	bit./sub.	40	5.94	0.81	34.38	n.a.	6,666
Guajira	2	n.a.	Prodeco	E/S	n.a.	Tert.	bit./sub.	30	n.a.	n.a.	n.a.	n.a.	n.a.
Guajira	3	Oreganal	Cb del Car	E/S	n.a.	Tert.	bit./sub.	30	5.0-7.0	0.6-0.75	35.0-37.0	n.a.	n.a.
César	4	La Jagua de Ibirico	Cb del Car	S	n.a.	Tert.	bit./sub.	10?	n.a.	n.a.	n.a.	n.a.	n.a.
César	5	El Descanso	Carbocol	E	LM	Tert.	bit./sub.	?	7.92	0.56	n.a.	n.a.	5,993
César	6	La Loma	Drummond/ Carbocol	E	LM	Tert.	bit./sub.	16	4.63	0.6	41.44	n.a.	7,320
César	7	Calenturitas	Prodeco	E	LM	Tert.	bit./sub.	?	5.0-7.0	0.4-0.6	34.0-36.0	n.a.	6,388-6,555
César	8	La Palma/Perija	CarboAndes	S	n.a.	Tert.	bit./sub.	?	low	low	high	n.a.	6,666
Norta de Sentander	9	Tasajero	Carbocol	n.a.	n.a.	Tert.	bit.	?	12.52	1.0	34.07	n.a.	7,260
Santander	10	San Vicente	Carbocol	n.a.	n.a.	Tert.	bit.	?	29.35	1.75	28.45	n.a.	5,830
Antioquia	11	Urabe/ Mutata/Cigoroda	Carbocol	n.a.	n.a.	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	4,722
Cordoba	12	Mina Zimba	Cb del Car	n.a.	LM	Tert.	sub./bit.	17	17.00	1.50	34.50	n.a.	4,722
Cordoba	13	Taraza/Río Man	n.a.	n.a.	LM	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	4,722
Cordoba	14	Cienaga de Oro	n.a.	n.a.	LM	Tert	lig./sub.	7	n.a.	n.a.	n.a.	n.a.	4,722

Colombia--Continued

Sucre	15	San Jacinto	n.a.	n.a.	n.a.	Tert.	lig.	2	n.e.	n.a.	n.a.	n.a.	n.a.
Bolivar	16	Puri/Caceri	n.a.	n.a.	n.a.	Tert.	sub.	4	n.a.	n.a.	n.a.	n.a.	n.a.
Cordoba	17	Alto San Jorge	Cerbocol	S	n.a.	Tert.	sub.	17	16.56	1.32	35.48	n.a.	4,792
Antioquia	18	Amaga/Sopetran	Carbocol	n.a.	LM	Tert./Cret.	sub./an.	9	12.30	0.42	36.40	n.a.	5,455
Caldas	19	Rio Sucio/Quinchia	Carbocol	n.a.	n.a.	Tert.	bit.	8+	n.a.	n.a.	n.a.	n.a.	n.a.
Choco	20	Tado	Carbocol	none	n.a.	Tert.	sub./bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Cauca	21	Mercaderes	Carbocol	n.a.	n.a.	Tert.	sub.	4	n.a.	n.a.	n.a.	n.a.	n.a.
Valle del Cauca	22	Suerez/Playon/ Dinde	Carbocol	none	n.a.	Tert.	sub./an.	3	n.a.	n.a.	n.a.	n.a.	n.a.
Valle del Cauca	23	Valle del Cauca	Carbocol	S	n.a.	Tert.	sub./an.	12	30.10	1.70	25.70	n.a.	5,122
Cundinamarca	24	Pubenza/Dindal	Carbocol	n.a.	LM	Tert./Cret.	sub.	9	n.a.	n.a.	n.a.	n.a.	n.a.
Cudinamarca	25	Guatiquia	Carbocol	n.a.	LM	Tert./Cret.	bit.	4	n.a.	n.a.	n.a.	n.a.	n.a.
Boyaca	26	Tunja/Peipa/ Duitema	n.a.	none	n.a.	Tert./Cret.	sub.	8	n.a.	n.a.	n.a.	n.a.	n.a.
Boyaca	27	Sogamoso/Morca/ Topaga/ Paz del Rio/Jerico	n.a.	n.a.	LM	Tert./Cret.	sub.	17	n.a.	n.a.	n.a.	n.a.	n.a.
Boyeca	28	Vesquez	Carbocol	n.a.	LM	Tert./Cret.	an./sub.	3	21.2	1.30	29.30	n.a.	5,788
Cundinamerca/ Boyaca	29	Lenguazaque	Prodeco	S	n.a.	Tert.	bit.	10	n.a.	n.a.	n.e.	n.a.	n.a.
Cundinamarca/ Boyaca	30	Sueva/Umbita/ Lagitota	Carbocol	n.a.	LM	Tert.	bit.	5	n.a.	n.a.	n.a.	n.a.	n.a.
Cundinamarca/ Boyaca	31	Cogua/Samaca	Carbocol	n.a.	LM	Tert.	bit.	14	n.a.	n.a.	n.a.	n.a.	n.a.
Cundinamarce/ Boyaca	32	Guecheta	Carbocol	n.e.	n.a.	Tert.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Cundinamarca	33	La Pradera	Carbocol	n.a.	n.a.	Tert.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Cundinamarca	34	El Salto	Carbocol	n.a.	n.a.	Tert./Cret.	bit.	2	8.0-15	0.90-0.96	28.0-34.0	n.a.	6,650-7,333
Cundinamarca	35	Río Frio	Carbocol	n.a.	n.a.	Tert./Cret.	bit.	17	n.a.	n.a.	n.a.	n.a.	n.a.
Amazonas	36	Latecla	n.a.	n.a.	E	Tert.	sub.	2	n.a.	n.a.	n.a.	n.a.	n.a.

Carbocol: Carbones da Colombia, S.A. (INTERCOR and EXXON are affiliated with Carbocol); Cb del Car: Carbones del Caribe, S.A.; Prodeco: Productos de Colombia, S.A.; Drummond: Drummond Lta.; CarboAndes: Carbones de loe Andes, S.A.

[1]: indicates the total numbar of beds present-does not raflact the number of beds being mined
[2]: Aeh, eulfur, voiatile matter, and moisture are mostly based on an as-received basis

Coal mines and occurrences in Ecuador

[Note: Data has been reviewed by scientists from the Instituto Ecuatoriano de Minería in Quito. Data reflects their suggested changes in the table below and on the map. LM, local mining--type unknown; E, exploration phase; ?, unknown; n.a., not available; lig., lignite; sub., subbituminous; Internal adm. area, Internal Administrative Area.]

Internal adm. area	Map number	Coal Field, occurrence/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash(%)[2]	Sulfur (%)[2]	Vol. matter (%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
Loja	1	Malacatos	n.a.	?	LM	Tert.	lig./sub.	8	15	8	n.a.	n.a.	4,500
Loja	2	Río Malacatos (Loja)	n.a.	?	LM	Tert.	sub.	5	8	8	n.a.	n.a.	2,600-5,500
Azuay	3	Nabón	n.a.	None	n.a.	Tert.	lig.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Pichincha	4	San Antonio de Pichincha	n.a.	None	n.a.	Quat.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Azuay	5	Cañar/Azoques-Biblián	n.a.	?	LM	Tert.	lig./sub.	2	6.4-6.0	1-1.7	n.a.	n.a.	4,000
Cañar/Azuay	6	Biblián	n.a.	?	LM	Tert.	sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Guayas	7	Punta Santa Elena	n.a.	None	drill hole	Tert.	lig.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Guayas	8	Progreso	n.a.	?	drill hole	Tert.	lig.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Manabi	9	Pedernales	n.a.	None	drill hole	Tert.	lig.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Manabi	10	Cabo San Mateo	n.a.	?	drill hole	Tert.	lig.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Morona-Santiago	11	Cuenca Amazonas	n.a.	E	drill hole	Tert.	lig.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Chimborazo	12	Cuenca El Derrumbo	n.a.	None	n.a.	Tert.	lig./sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Napo	13	Tena	n.a.	E	drill hole	Tert.	lig.	4	n.a.	n.a.	n.a.	n.a.	n.a.

[1]: Indicates the total number of beds present-does not reflect the number of beds being mined

[2]: Ash, sulfur, volatile matter and moisture values are mostly based on an as-received basis

Coal mines and occurrences in Guyana

[Note: Data reflect information acquired through a literature search as well as data obtained from the Guyana Geology and Mines Commission. Internal adm. area, Internal Administrative Area; ?, unknown; n.a., not available; Quat., Quaternary]

internal adm. area	Map number	Coal Field, occurrence/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. Matter (%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
Demerara	1	Enmore	none	none	n.a.	Quat.?	peat	?	n.a.	n.a.	n.a.	n.a.	n.a.
Demerara ?	2	Hubu	none	none	n.a.	Quat.	peat	?	n.a.	n.a.	n.a.	n.a.	n.a.
?	3	Springlands	none	none	n.a.	Quat.	peat	?	n.a.	n.a.	n.a.	n.a.	n.a.
?	4	Low Ground	none	none	n.a.	Quat. ?	peat	?	n.a.	n.a.	n.a.	n.a.	n.a.

[1]: Indicates the total of beds present; does not reflect the number of beds being mined

[2]: Ash, sulfur, volatile matter and moisture are mostly based on an as-received basis

Coal mines and occurrences in Paraguay

[Note: Data was reviewed by scientists from the Ministerio de Obras y Communicaciones in Asunción. Suggested changes have been incorporated into the table and map. Internal adm. area, Internal administrative area; lig., lignite; n.a., not available; ?, uncertain; LM., local mining-type unknown; Jur., Jurassic.]

Internal adm. area	Map number	Coal Field, occurrence/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. matter (%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
Caaguazu	1	Coronel Oviedo	n.a.	none	outcrop	Jur.	lig.	1	37.6	0.3	37.3	10.0	4,540-6,800
Caaguazu	2	San Juaquin	n.a.	n.a.	n.a.	Jur.	peat	1	48.0	0.1	33.3	48.0	n.a.
Presidente Hayes	3	Ypacaray	n.a.	n.a.	LM	Jur.	peat	1	n.a.	n.a.	n.a.	n.a.	n.a.
Neembucu	4	Pilar	n.a.	n.a.	n.a.	Jur.	peat	?	n.a.	n.a.	n.a.	n.a.	n.a.

[1]: Indicates the total number of beds present-does not reflect the number of beds being mined

[2]: Ash, sulfur, volatile matter, and moisture values are mostly based on an as-received basis

Coal mines and occurrences in Peru
[Note: Data has been reviewed by scientists from Minero Perú and from SENAGE (formerly INGEMMET). Changes and corrections have been made according to their recommendations.
E., exploration phase; LM., local mining--type unknown; n.a., not available, ?, unknown; lig., lignite; meta., meta-anthracite; an., anthracite; bit., bituminous; sub., subbituminous; Internal adm. area, internal administrative area;Tert., Tertiary; Cret., Cretaceous; Jur., Jurassic.]

Internaladm. area	Map number	Coal Field, occurrence/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. matter (%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
Tumbes	1	Zorritos	n.a.	n.a.	LM	Tert.	lig.	?	20.-36.	4-5	27.00-32.00	n.a.	2,700-4,300
Tumbes	2	Caleta Cruz	n.a.	n.a.	LM	Tert.	lig.	7	n.a.	n.a.	n.a.	n.a.	n.a.
Tumbes	3	Casitas	n.a.	n.a.	LM	Tert.	lig.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Piura/Sullana	4	Jahuay Negro	n.a.	n.a.	LM	Tert.	lig.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Piura/Paita	5	Silla de Paita	n.a.	n.a.	LM	Tert.	lig.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Lambayeque	6	Motupe	n.a.	n.a.	LM	Cret.	an.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Cajamarca/ Hualgayoc	7	Piñapata/Tuco	n.a.	n.a.	LM	Cret.	an.	5	6.0-35.0	0.6-1.2	3.0-8.0	n.a.	6,400-7,600
Cajamarca	8	Hualgayoc	n.a.	n.a.	LM	Cret.	an.	4	n.a.	n.a.	n.a.	n.a.	n.a.
Cajamarca/ Celendin	9	Punte	n.a.	n.a.	n.a.	Cret.	an.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Cajamarca/ Santa Cruz	10	Cupisnique	n.a.	n.a.	n.a.	Cret.	an.	5	8.0-12.0	0.6	n.a.	n.a.	6,750
Cajamarca/ Santa Cruz	11	San Benito	n.a.	n.a.	n.a.	Cret.	an.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Cajamarca/ La Encañada	12	Yanacancha	n.a.	n.a.	LM	Cret.	an./bit.	2+	n.a.	1.5	40.0-50.0	n.a.	7,000
Cajamarca/ Cajabamba	13	Huayday	n.a.	n.a.	LM	Cret.	an.	8	n.a.	n.a.	n.a.	n.a.	n.a.

Peru--Continued

Cajamarca/ Cajabamba	14	Ambara	n.a.	n.a.	LM	Cret.	an.	?	n.a.	n.a.	n.a.	n.a.	n.a.
La Libertad/Lotuaco	15	C°ichur	n.a.	n.a.	n.a.	Cret.	an.	?	n.a.	n.a.	n.a.	n.a.	n.a.
La Libertad/Otzuco	16	Caña Brava	n.a.	n.a.	LM	Cret.	an.	10	n.a.	n.a.	n.a.	n.a.	n.a.
La Libertad/Otzuco	17	Colpa/Agua Caliente	n.a.	n.a.	n.a.	Cret.	an.	10	n.a.	n.a.	n.a.	n.a.	n.a.
La Libertad/Otzuco	18	Huertas	n.a.	n.a.	n.a.	Cret.	an.	10	n.a.	n.a.	n.a.	n.a.	n.a.
La Libertad/Otzuco	19	San Jose ?	n.a.	n.a.	n.a.	Cret.	an.	10	n.a.	n.a.	n.a.	n.a.	n.a.
La Libertad/Otzuco	20	Antracita ?	n.a.	n.a.	n.a.	Cret.	an.	10	n.a.	n.a.	n.a.	n.a.	n.a.
La Libertad/Otzuco	21	La Libertad ?	n.a.	n.a.	LM	Cret.	an.	10	6.0-10.0	1.0-2.5	2.5-12.0	n.a.	7,000-7,500
La Libertad/Otzuco	22	Silcahuanga ?	n.a.	n.a.	n.a.	Cret.	an.	10	n.a.	n.a.	n.a.	n.a.	n.a.
La Libertad/Otzuco	23	Callacuyan ?	n.a.	n.a.	n.a.	Cret.	an.	5	n.a.	n.a.	n.a.	n.a.	n.a.
La Libertad/Otzuco	24	Juanita/Tres Ríos ?	n.a.	n.a.	n.a.	Cret.	an.	10	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash	25	Conchucos	n.a.	n.a.	n.a.	Cret.	an.	2	6.0-14.0	n.a.	4.0-6.0	n.a.	6,000-7,300
Ancash/ Pallasca	26	Galgada	n.a.	n.a.	LM	Cret.	an.	5	10.5-32.0	0.7-0.8	4	n.a.	4,377-6.660
Ancash/ Pallasca	27	Ancos	n.a.	none	n.a.	Cret.	an.	3	0.5-32.0	0.7-0.8	4	n.a.	n.a.
Ancash	28	Hayday	n.a.	none	n.a.	Cret.	an.	5	n.a.	n.a.	2.0	n.a.	n.a.
Ancash/ Pallasca	29	San Carlos/ Santa	n.a.	n.a.	LM	Cret.	an./meta.	5+	13.0	n.a.	6.0-8.0	n.a.	n.a.

Peru--Continued

Ancash	30	Sihuas/ Tarica	n.a.	n.a.	n.a.	Cret.	an.	1	4.0-6.0	n.a.	4.0-6.0	n.a.	n.a.
Ancash/ Pallasca	31	Santa	n.a.	none	n.a.	Cret.	bit./an.	6+	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash/ Caraz	32	Buenaventura /Caraz	n.a.	n.a.	LM	Cret.	an.	1	8.5	0.8	3.5	n.a.	6,750
Ancash/ Pallasca	33	Pallasquina	n.a.	n.a.	n.a.	Cret.	an.	5+	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash/ Pallasca	34	Potreros	n.a.	n.a.	LM	Cret.	an.	5+	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash/ Pallasco	35	La Limena	n.a.	n.a.	LM	Cret.	an	2	13.0	n.a.	2.0	n.a.	n.a.
Ancash	36	La Salsada	n.a.	n.a.	n.a.	Cret.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash/ Huari	37	San Luis	n.a.	n.a.	n.a.	Cret.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash/ Huari	38	Chacas	n.a.	n.a.	n.a.	Cret.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash/ Huari	39	Huari	n.a.	n.a.	n.a.	Cret.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash/ Huari	40	Santa Rosa	n.a.	n.a.	n.a.	Cret.	an.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Huanuco	41	Huallanca	n.a.	n.a.	n.a.	Cret.	an.	6	20.0	n.a.	6.5	n.a.	6,394
Ancash/ Huari	42	San Marcos/ Huari	n.a.	n.a.	n.a.	Cret.	an.	15	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash/ Huari	43	Tampillas	n.a.	n.a.	n.a.	Cret.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Ancash/ Huari	44	Juproc	n.a.	n.a.	n.a.	Cret.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Pasco/DAC	45	LLacsa	n.a.	n.a.	n.a.	Cret.	sub.	4+	n.a.	n.a.	n.a.	n.a.	n.a.
Pasco/DAC	46	Goyllarisquiza	n.a.	n.a.	LM	Cret.	sub./bit.	4	54.0	12.0	23.4	n.a.	n.a.
Pasco/DAC	47	Quishuar-cancha/Jara	n.a.	n.a.	n.a.	Cret.	sub.	4	48.0	2.8	29.0	n.a.	3,500
Pasco/DAC	48	Vincuscancha	n.a.	n.a.	n.a.	Cret.	sub.	4	n.a.	n.a.	n.a.	n.a.	n.a.
Huanuco/ Dos de Mayo	49	Queropalca	n.a.	n.a.	LM	Cret.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Lima/ Chancay	50	Huancho	n.a.	n.a.	n.a.	Cret.	bit./sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Lima/ Chancay	51	Yacu	n.a.	n.a.	n.a.	Cret.	bit./sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.

Peru--Continued

Lima/ Cajatambo	52	Oyon	n.a.	n.a.	LM	Cret.	sub.	11	6.0-12.0	0.7	16.0-22.0	n.a.	7,000-7,600
Lima/ Cajatambo	53	Saquicocha	n.a.	n.a.	n.a.	Cret.	sub.	11	n.a.	n.a.	n.a.	n.a.	n.a.
Lima/ Chancay	54	Yanquil	n.a.	n.a.	n.a.	Cret.	sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Lima/ Chancay	55	Parquin	n.a.	n.a.	n.a.	Cret.	sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Junin/ Yauli	56	Marcapomaco-cha	n.a.	n.a.	n.a.	Cret.	sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Junin/ Yauli	57	Pomacocha	n.a.	n.a.	n.a.	Cret.	sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Junin/ Concepción	58	Jatunhuasi	n.a.	n.a.	LM	Cret.	bit./sub.	6	6.0-20.0	0.6-2.0	32.0-38.0	n.a.	5,000-7,000
Junin/ Concepción	59	Nahunpuquio	n.a.	n.a.	n.a.	Cret.	sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Huancavelica	60	Vilca	n.a.	n.a.	n.a.	Cret.	sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Huancavelica	61	Lircay	n.a.	n.a.	n.a.	Cret.	sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Huancavelica	62	Pilpichaca	n.a.	n.a.	n.a.	Cret.	sub.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Huancavelica	63	Santa Ana	n.a.	n.a.	n.a.	Cret.	sub./bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Huancavelica	64	Churcampa	n.a.	n.a.	n.a.	Cret.	sub./bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Cusco ?	65	Llallahue ?	n.a.	n.a.	n.a.	Cret./Jur.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Arequipa/ islay	66	Toro Velingo	n.a.	n.a.	n.a.	Cret./Jur.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Puno/Puno	67	Vilque	n.a.	n.a.	n.a.	Cret./Jur.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Puno	68	Mañazo	n.a.	n.a.	n.a.	Cret./Jur.	bit.	?	n.a.	n.a.	n.a.	n.a.	n.a.
Moquegua	69	Isquirpo	n.a.	n.a.	n.a.	Cret./Jur.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Moquegua	70	Tamizgue	n.a.	n.a.	n.a.	Cret./Jur.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Moquegua	71	Pampilla	n.a.	n.a.	n.a.	Cret./Jur.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Arequipa/ Caylloma	72	Sumbay	n.a.	n.a.	n.a.	Cret./Jur.	bit.	4	17.4	1.06	6.66	n.a.	6,945

Peru–Continued

Arequipa/ Cayilloma	73	Murco	n.a.	n.a.	n.a.	Cret./Jur.	bit.	2	15.0	3.5	27.0	n.a.	7,300
Arequipa/ Castilla	74	Corire	n.a.	n.a.	n.a.	Cret./Jur.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Moquegua/ Carumas	75	Carumas	n.a.	n.a.	n.a.	Cret./Jur.	bit./an.	3	2.0-5.0	n.a.	9.0-38.0	n.a.	n.a.
Moquegua/ Carumas	76	Estampar-que ?	n.a.	n.a.	n.a.	Cret./Jur.	bit.	3	n.a.	n.a.	n.a.	n.a.	n.a.
Moquegua/ Carumas	77	Misquini ?	n.a.	n.a.	n.a.	Cret./Jur.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Tacna/Palca	78	Palca	n.a.	n.a.	n.a.	Cret./Jur.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Cuzco/Paruro	79	Paruro	n.a.	n.a.	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Cuzco/ Chumbivilca	80	Livitaca	n.a.	n.a.	n.a.	Tert.	lig.	2	n.a.	n.a.	n.a.	n.a.	n.a.
Arequipa/ La Union	81	Cotahuasi	n.a.	n.a.	n.a.	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Loreto	82	Chambara	n.a.	n.a.	n.a.	Tert.	lig.	1+	n.a.	n.a.	n.a.	n.a.	n.a.
Loerto	83	Requena	n.a.	E	drill hole	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Lorato	84	Requena	n.a.	none	outcrop	Cret.	an.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Loreto	85	San Pablo/Río Amazonas	n.a.	E	drill hole	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Lorato	86	Pebas/Río Amazonas	n.a.	E	drill hole	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Loreto	87	Iquitos/Río Amazonas	n.a.	E	drill hole	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Loreto	88	Nauta/Río Amazonas	n.a.	E	drill hole	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Loreto	89	San Antonio/Río Marañon	n.a.	E	drill hole	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.

[1]: indicates tha totai numbar of beds present-does not reflect the number of beds being mined
[2]: Ash, sulfur, volatile matter and moisture values are mostly based on an as-received basis

DAC: Daniel A. Carrion

Coal mines end occurrences in Suriname
[Note: Deta reflect compilation of existing literature and data obtained by the Geology and Mines Survey.
Internal edm. area, Internal administrative aree; n.a., not available; ?, unknown; Plei., Pleistocene; Quat., Quaternary]

Internal adm. area	Map number	Coal Field, occurrenca/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. matter (%)[2]	Moistura (%)[2]	Heat value (kcal/kg)
Coronia/ Samaracca	1	Coronie	n.a.	none	n.a.	Quat. ?	peat	?	4.4-12	n.a.	n.a.	94-95	4,500
Marowijne	2	Moengo Tapoa	n.a.	nona	n.a.	Quat. ?	peat	?	n.a.	n.a.	n.a.	n.a.	n.a.
Sipaliwini	3	Corantijn	n.a.	none	E	Plei.	peat	?	n.a.	n.a.	n.a.	n.a.	4,200

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Coal mines and occurrences in Uruguay

[Note: Data reflect information acquired from DINAMIGE during visit to the country. Internal adm. area, Internal administrative area; E., exploration phase; ?, unknown; n.e., not available; sub., subbituminous; Tert., Tertiary; Perm., Permian but some Carboniferous; Carb., Carboniferous.]

Internal adm. area	Map number	Coal Field, occurrence/ mine name	Operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. matter (%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
Cerro Largo	1	Cañada de Los Burros	n.a.	none	outcrop	Perm./ Carb.	sub.	3	36.46	1.4-4.1	26.0-35.0	10.0-14.0	n.a.
Cerro Largo	2	Picada de Gregorio	n.a.	E	drill hole	Perm./ Carb.	sub.	3	36.0-46.0	1.4-4.1	n.a.	n.a.	n.a.
Cerro Largo	3	Cuchilla de Melo	n.a.	none	outcrop	Perm./ Carb.	sub.	3	36.0-46.0	1.4-4.1	n.a.	n.a.	n.a.
Treinta y Tres	4	Estancia La Cordillera	n.a.	none	outcrop	Perm./ Carb.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Tacuarembo	5	Ansina/Paso Borracho	n.a.	E	drill hole	Perm./ Carb.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Tacuarambo	6	Clara	n.a.	E	drill hole	Perm./ Carb.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Cerro Largo	7	Cerro Blanco	n.a.	E	drill hole	Perm./ Carb.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Cerro Largo	8	Río Negro/ Pallaros	n.a.	E	outcrop	Perm./ Carb.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Canelones or San Jose	9	Bañado Este de Santa Teresa	n.a.	?	drill hole	Tert.	peat	3	10.0	n.a.	54.0	15.0	2,577
Maldonado	10	Carrasco	n.a.	?	n.a.	Quat.	peat	?	n.a.	n.a.	n.a.	n.a.	1,132-2,002

[1]: Indicates the total number of beds present-does not reflact the number of beds being mined

[2]: Ash, sulfur, volatile matter and moisture values are mostly based on an as-received basis

Coal mines and occurrences in Venezuela
[Note: Data has been reviewed by scientists from Carbozulia and from the Ministerio de Energía y Minas. Amended changes have been incorporated into the table and map. S., surface mine; U., underground mine; E., exploration phase; LM., local mining-type unknown; *, export quality; bit., bituminous; sub., subbituminous; lig., lignite; ?, unknown; n.a., not available; Tert., Tertiary; Quat., Quaternary]

Interanl adm. area	Map number	Coal Field, occurrence/ mine name	operator	Mine type	Recovery activity	Age	Rank	Number of beds[1]	Ash (%)[2]	Sulfur (%)[2]	Vol. matter (%)[2]	Moisture (%)[2]	Heat value (kcal/kg)
Zulia	1	Guasare/Mina Norte	CZ-CV-M	S/U	drill hole	Tert.	sub./bit.	30	7.5	0.6	34.5	n.a.	7,027
Zulia	2	Guasare/Paso Diablo*	CZ/AGC	S	drill hole	Tert.	sub./bit.	30	7.5	0.6	34.5	n.a.	7,030
Zulia	3	Guasare/ Socuy	CZ/SCI/VO	E	drill hole	Tert.	sub./bit.	30	3.40	0.6	37.26	4.93	7,494
Zulia	4	Guasare/ Cachiri/Inclarte	CZ	E	drill hole	Tert.	sub./bit.	30	2.86	0.8	38.3	4.28	7,438
Zulia	5	Tocuco/Ariculsa/ Río de Oro	CZ	E	n.a.	Tert.	sub./bit.	15	3.0	0.5	38.0	n.a.	7.200
Táchira	6	Franja Nooriental La Fría-El Vijia	CSO	E	n.a.	Tert.	sub./bit.	1	18.8	0.94	43.3	n.a.	7,000
Táchira	7	Lobatera	CSO	S	drill hole	Tert.	sub./bit.	1+	18.8	0.94	43.3	n.a.	n.a.
Táchira	8	Las Adjuntas	CSO	n.a.	n.a.	Tert.	sub./bit.	7+	n.a.	n.a.	n.a.	n.a.	n.a.
Táchira	9	Rubio	CSO	S	n.a.	Tert.	sub./bit.	7+	18.8	0.94	43.3	n.a.	n.a.
Táchira	10	Santo Domingo	CSO	E	S/U	Tert.	sub./bit.	20	1.5-19.7	0.19-4.6	38.5-53.0	n.a.	n.a.
Táchira	11	San Antonio	CSO	E	n.a.	Tert.	sub./bit.	?	1.5-19.7	0.19-4.6	38.5-53.0	n.a.	n.a.
Anzoátegui	12	Naricual	Ven. 1166 YGPLC	S/U	n.a.	Tert.	bit./sub.	27	2.1	1.2	39.8	n.a.	7,680
Anzoátegui	13	Mina Aguas Caliente	CV	E	n.a.	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Anzoátegui	14	Las Delicias	CPO	n.a.	n.a.	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.

Venezuela–Continued

Anzoátegui	15	San Antonio E	CPO	n.a.	n.a.	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Anzoátegui	16	Minas De Arriba	CPO	n.a.	n.a.	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Anzoátegui	17	Fila Maestra*	CV	S	n.a.	Tert.	bit./sub.	28	6.0	0.95	40	n.a.	12,000
Anzoátegui	18	Santa Maria de Ipin*	CPO	E	drill hole	Tert.	lig.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Guarico	19	Unare	CPO	E	n.a.	Tert.	sub.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Aragua	20	El Corozo/ Sabana Grande	CPO	E/S	n.a.	Tert.	bit.	2+	6.84	2.25	42.74	n.a.	7,300
Aragua	21	Taguay	CPO	E	n.a.	Tert.	sub.	2+	8.8	2.9	38.0	n.a.	5,700
Aragua	22	El Peñón*	CPO	E	n.a.	Tert.	lig./sub.	3+	6.41	3.28	42.77	n.a.	5,700 ?
Falcon	23	Cerro Pelao	CF	S	n.a.	Tert.	lig./sub.	2	5.0	4.1	34.20	8.9	6,388
Anzoátegui	24	Placoa	CF	none	n.a.	Quat.	peat	n.a.	2.7	2.3	n.a.	n.a.	n.a.
Anzoátegui	25	Monagas	CPO	none	drill hole	Tert.	lig./bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Anzoátegui	26	Pariaguan	CPO	none	n.a.	Tert.	bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.
Aragua	27	Parapara	CPC	none	n.a.	Tert.	sub./bit.	1	n.a.	n.a.	n.a.	n.a.	n.a.

CZ: Carbozulia, S.A.; CV: Cavoven; AGC: Agipcoal; SCI/VO: Shell Coal International/ Veba Oel; YGPLC: Young Group PLC; CF: CorpoFalcon, S.A.; CSO: Corposuoeste; CPO: Corporiente; CPC: Corpocentro; M: Messey.

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*U.S. G.P.O.:1994-301-077:80061