

COLOMBIAN COAL IN INTERNATIONAL TRADE^{1/}

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Introduction

Colombia has large coal resources and ambitious plans for developing them. In 1983, coal production was about 6 million metric tons, 8 percent of which was exported. Current plans include exports of 50 million tons and domestic consumption of some 20 million tons by the year 2000. Colombian coal could supply as much as 10 percent of world steam coal demand within a few years. The managers of Carbones de Colombia (Carbocol) and Exxon are developing what may become one of the world's largest coal mines and are seeking market shares in Europe and the United States. Although Colombia has a transportation cost advantage over many competitors, especially the United States and South Africa, many producers, including Australia, Poland, South Africa, and the United States, will compete for the European market during the next decade.

Colombia's Coal Resources

Recent studies estimate Colombia's coal reserves at about 16.5 billion metric tons, with coal resources ranging from 40 to 80 billion metric tons. The deposits are located in 11 basins, with the majority of the known deposits located in the Eastern Cordilleras. Most of the measured reserves are located in two regions, the region within a 120-mile radius of Bogota and the El Cerrejon basin on the Guajira Peninsula (15).

The El Cerrejon deposits have the greatest near-term export potential. The deposits extend over an area of 150 square kilometers and include 34 seams, some 2 to 5 meters thick. The coal deposits are shallow, suitable for surface mining, noncaking, with low sulfur and ash and high Btu content (table 1) (13). Contracts for international coal sales typically require a sulfur content of less than 1.5 percent and a heating value of over 10,000 Btu/lb.

Carbocol

The state-owned Carbocol company was created in 1976 and, under the policy control of the Ministry of Mines and Energy, was charged with developing a modern national coal industry. Carbocol's shareholders are Government-owned corporations: Ecopetrol, the national oil company, owns 49 percent; Proexpo, the export promotion bank, owns 46 percent; and IFI, the national industrial development institute, holds the remainder. Carbocol's assets were valued at approximately \$600 million at the end of 1983 (15).

In 1979 a coal law was enacted limiting land exploitation rights for coal only to such state-owned companies as Carbocol. Since that date all new coal rights have been awarded to Carbocol. The company reports on

Table 1

ANALYSIS OF EL CERREJON COAL FROM TWO LOCATIONS

	North Zone	Central Zone
Moisture.....pct	9.20	8.20
Ash.....pct	8.00	8.30
Volatile matter...pct	34.90	34.00
Sulfur.....pct	0.60	0.66
Heating value..Btu/lb	11,900	12,200
Hardgrove index.....	48.00	51.00
Fixed carbon.....pct	47.90	59.50

Source: Zinder-Neris, Inc. World Steam Coal Service, October 1983.

coal developments from both private and Government sources and promotes domestic coal consumption. Carbocol also participates in new coal ventures, secures rights to land with coal reserves, undertakes mining projects on its own, and markets its coal production. Carbocol acts not only as policy arm of the Government but also as an operating concern.

The El Cerrejon Project

Development of the El Cerrejon coal deposits in Colombia's northeastern peninsula is the cornerstone of Carbocol's long-range plans. Of the two coal projects underway within the El Cerrejon basin, the Central Zone Mine is being developed by Carbocol with a consortium of Spanish and Colombian firms, and the North Zone Mine is being developed jointly by Carbocol and Exxon.

- The Central Zone Mine

The Central Zone Mine, the smaller of the two, with reserves of 450 million tons to a depth of 150 meters, started operations in 1982. About 400,000 tons was produced in 1983; 260,000 tons was delivered to a new, 150-megawatt powerplant nearby, and 140,000 tons was exported to Spain and Puerto Rico. Production should reach 1.0 million tons in 1984 and then rise to the planned capacity of 1.5 million tons in 1985. The coal to be exported is trucked to the port of Santa Marta, but when a rail line to a new coal port is completed, transportation costs should drop and coal shipping capacity for both the Central Zone and North Zone

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projects should increase significantly. A rail line from the North Zone to the port of Bahia de Portete is planned, with an extension to the Central Zone. With adequate rail and port capacity, the Central Zone has potential production capacity of over 8 million tons per year (7, 15).

- The North Zone Mine

Production in the North Zone, at the El Cerrejon North Block open pit mine, began in February 1984. The mine is operated by International Colombia Resources Corporation (Intercor), an Exxon affiliate. Reserves, in several seams to a depth of 300 meters, have been estimated at 3.0 billion tons. Mine output for 1986 is planned at 6.0 million tons, rising to 15 million tons by 1989 and to a target rate of 25 to 30 million tons at full capacity. Puerto Bolivar, under development at Bahia de Portete, will be capable of handling vessels of 150,000 dwt. The port coal handling system will include three stacker reclaimers and a linear shiploader with a loading rate of 10,000 to 11,000 tons per hour. Stockpiling capacity at the port will be 1.7 million tons. Two unit trains of about 100 cars each will operate on the 160 km rail line from the mine to the port. When completed, the mine railroad, and port will be operated by 3,000 Intercor employees (7-8, 13).

The size of the Carbocol-Intercor project can be appreciated when compared to the seaborne coal trade of some coal producing nations. In 1983, South Africa shipped about 29 million tons, Canada about 17 million tons, and the United States about 55 million tons (14). If the target output of 30 million tpy is reached, Colombia's shipments from one mine will exceed one-half of current U.S. shipments of both thermal and coking coal. Exports of 2.0 million tons per year are planned for 1985, growing to 6.0 million tons in 1986, and 15.0 million tons in 1989. The production target of 25 to 30 million tpy would equal about one-third of all seaborne steaming coal traded in 1982. In comparison Colombia exported 480,000 tons of coal in 1983, from total production of about 6 million tons.

Carbocol and Intercor signed an initial contract in December 1976 and began an exploration program and a feasibility study in 1977. In 1980 the companies decided to develop a mine. Although Intercor is the mine operator, a joint management committee coordinates and directs all activities. The exploitation phase of the contract is 23 years, and in 2008 full ownership of the project reverts to Carbocol. Costs are shared equally, and production is divided equally. However, Intercor currently pays a 15 percent royalty, which in effect raises Carbocol's share of output to 57.5 percent. The royalty could be increased to about 23 percent in the future, depending on costs and coal prices. The estimated cost of the project is \$3.2 billion, with mine development cost estimated at 40 percent of the total (8).

Using deepwater vessels, coal can be shipped from Colombia to a gulf port in the United States for \$4 to \$7 per ton. The coal may then be transloaded to shallow-draught vessels, or unloaded for land shipment. Although the additional handling increases costs, if Colombian coal can reach the gulf coast with a trans-

portation cost of under \$10 per ton, it can compete with coal produced in the Eastern United States. Some published tariffs for shipping coal from Appalachia to Florida by rail range from \$18 to \$22 per ton (2). Mining costs have not yet been established at the North Zone Mine but are likely to be less than at many Appalachian underground or relatively small surface mines in the United States.

High-volume, low-cost rail and port facilities are an important part of Carbocol's growth plans. Several agreements have been reached with foreign coal buyers. It would be difficult to meet these contracts to deliver a total of 3.5 million tpy without improved coal handling facilities. Among the contracts for North Zone coal are a 14-year, 2-million-tpy agreement with a Danish state utility (ESLAM); a 5½-year, 400,000-tpy contract with an Irish utility (ESB); a 10-year, 600,000-tpy commitment to Carboex, a Spanish coal marketing agent; and a 300,000- to 500,000-tpy contract with Israel's National Coal Company (15).

Carbocol's Marketing Plans

Colombia's current competition on the international coal market includes Australia, Canada, Poland, South Africa, and the United States. Others, notably China, intend to enter the international market. Given such competition, Carbocol's future is not assured. Carbocol's marketing strategy is based on the high quality and competitive cost of its product. As discussed earlier, Intercor is developing modern, efficient open-cast mines, is producing excellent coal with low sulfur and high heat content, and plans to haul it to a deepwater port on a short, low-cost rail line.

Europe is the principal marketing target for Colombian coal exports, but the U.S. gulf coast and the Caribbean region also offer considerable potential. Carbocol has projected Western European steam coal imports at 120 million tons in 1990. In 1983 European Economic Community steam coal imports (not counting intracommunity trade) were about 43 million tons. Carbocol's sales target is between 10 and 15 percent of the European import market by 1990, or about 15 million tons.

Carbocol's evaluation of the European steam coal market can be seen in table 2. As a low-cost producer, Carbocol expects to enjoy rapid growth in sales of steam coal to European buyers. Growing sales in Europe will be shared with other low-cost producers, notably South Africa. New or expanded coal mines also are planned in several countries (e.g., China) that may have lower mining costs than Colombia (9). Colombia, however, enjoys a considerable advantage over many of its potential competitors in proximity to key markets, for example; Bahia de Portete is about 4,300 nautical miles from Europe, compared with a distance between South Africa and Europe of roughly 7,300 nautical miles.

Some analysts have predicted that the world coal market will expand rapidly during the 1990's as existing oil-fired powerplants are replaced with new, presumably coal-fired, plants. This view of the future is shared by many coal-producing nations, and both South

Table 2

ESTIMATED STEAM COAL SHIPMENTS TO WESTERN EUROPE, 1985-90
(Million metric tons)

	<u>United States</u>	<u>South Africa</u>	<u>Poland</u>	<u>Colombia</u>	<u>Australia</u>	<u>Others</u>	<u>Total</u>
1985	20	26	17	4	6	13	86
1986	21	29	18	7	7	11	93
1987	23	33	20	10	7	9	102
1988	24	36	21	12	8	8	109
1989	25	40	23	15	9	6	118
1990	26	43	25	17	10	5	126

Source: Carbocol data in "Carbocol's International Marketing Plans," presented May 7-8, 1984, at the International Coal Trade Seminar, Washington, DC.

Africa and Australia plan to increase their coal exports. During the early 1980's South Africa's coal exports were about 26 to 29 million tpy. Exports of about 32 to 33 million tpy are expected in 1984 and 1985. Expansion of the Richards Bay coal terminal to 60 million tpy will allow South Africa to double its recent level of coal exports.

Despite the plans of coal producers, predictions of coal demand made within the last few years have been overly optimistic. Forecasts made in 1980 predicting world growth in coal demand of 200 to 300 percent by the year 2000 included demand increases for steam coal of at least 1,000 percent. A recent International Energy Agency report is more restrained, with steam coal use growing by about 65 percent from 1982 to 2000 among industrialized nations. An important period in most analyses of coal's future is the 1990's, when oil-fired power generators in Europe are due for replacement (3, 11). Italy has forecast a 300-percent increase in coal imports during that period as coal-fired stations are built to replace oil-burning stations (10). Italy's annual coal consumption, virtually all imported, was about 18 to 20 million long tons from 1981 through 1984. Coking coal consumption was about 9 million to 11 million tons, with the remainder steam coal (14). The potential steam coal market in Italy would then be about 25 to 30 million tpy. Despite slow growth in energy demand and competition from oil, and, at least in Europe, nuclear power, the future for steam coal sales in Europe appears promising.

The United States also is an attractive market for Colombian coal. Deliveries were made in 1983 to the Gulf ports of Mobile, AL, and New Orleans, LA. The Florida Power Corp. (Saint Petersburg, FL) has signed purchase contracts with two Colombian coal producers, Prodeco Productos de Colombia and Comercializadora Internacional del Oriente. Florida offers considerable market potential because Colombian coal has a transportation cost advantage over many Appalachian producers. Other Southeastern coal users such as Southern Company of Atlanta, GA, now importing 800,000 tpy of low-sulfur coal from South Africa, may find Colombian coal competitive (2).

High rail transportation costs pose a problem for U.S. coal producers. The 1980 Staggers Act deregulated railroad coal shipping costs, resulting in higher transportation costs for many U.S. producers (5). In terms of constant dollars, coal prices at the mine mouth fell 18 percent from 1976 through 1981, while constant-dollar rail rates increased 40 percent. The increase in haulage rates is attributed to many factors by the railroads, including the problems of operating unit trains and an initial underestimation of costs as coal exports increased sharply from 1979 through 1981. However, the effect of higher costs for U.S. producers is clear: On a comparable basis, f.o.b. steam thermal coal prices in mid-1983 were \$49 per ton for the United States, \$40 per ton for Australia, and \$36 per ton for South Africa (12).

Coal competes with other fuels. Despite a cost advantage of perhaps 50 percent over oil, the rapid growth in coal consumption that was predicted a few years ago has not yet materialized. Between 1980 and 1982, as oil prices rose, western industrial nations increased coal production about 3 percent. When the real price of oil declined, coal production dropped. During 1983, coal production among these producers fell almost 7 percent (3). If oil prices remain stable or decrease during the next few years, the near-term growth of coal consumption will be retarded.

Industrial development based on coal from the El Cerrejon region may be another possibility for Colombia. Colombia and Jamaica have recently signed a preliminary joint-venture agreement for the construction and operation of an aluminum smelter (6). The smelter, to be located in Colombia, would use coal as fuel. The project under study could use about 240,000 tpy of Jamaican alumina, with an estimated yield of about 140,000 tpy of aluminum. A powerplant and smelter of the size under consideration would use perhaps 1 million tpy of coal. Such a project would be a significant addition to Colombia's industrial base, and an important supplier in the Central American market, if low cost output is achieved. Currently, the aluminum industry has considerable unused capacity, with 1983 world consumption of about 15 million tons and

capacity of nearly 20 million tons. If a final agreement is reached, completion of the project would take about 6 years.

Coal was important to Colombia before large scale mine development started in the El Cerrejon region. About 75 percent of manufacturing value added is produced by coal-fired industries located at three large inland cities, Bogota, Medelline, and Cali. With few exceptions, the coal used in these areas is mined nearby

in relatively small mines that produce for domestic consumption. The El Cerrejon projects are the fruit of a national policy decision to enter the international coal market as a major coal merchant and to greatly increase the use of coal as a domestic energy source. Given the size of the El Cerrejon deposits, the high quality of the coal, the expected low mining costs, and an efficient, low-cost transportation system, Colombia may well become an important coal producer and exporter within the next decade.

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