

# THE MINERAL INDUSTRY OF COLOMBIA

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In 1996, the Colombian gross domestic product grew by 2.1%, a lower growth than in each of the previous 4 years when increases exceeded 5%. Inflation for the year was 21%, which was higher than in 1995. According to Colombia's Departamento Administrativo Nacional de Estadística, preliminary data indicates that in 1996, mining and quarrying increased 7.6%, in constant dollars, from that of 1995 while construction increased only modestly.

Mineral production contributed significantly to Colombia's economy although its mineral sector was modest by world standards. The country's efforts to expand its mineral sector continued to be negatively affected by security concerns as petroleum and mineral extraction facilities and personnel continued to be targets of terrorist attacks (Mining Annual Review, in press). In 1996, Colombia's main oil pipeline from Coveñas to Caño Limón was dynamited 47 times (Accessed October 2, 1997, on the World Wide Web at URL [http://biz.yahoo.com/finance/97/09/27/oxy\\_y0024\\_1.html](http://biz.yahoo.com/finance/97/09/27/oxy_y0024_1.html)).

Total foreign direct investment in Colombia in 1996 was \$3.6 billion<sup>1</sup> (Washington Times, 1997c). Foreign investment in the petroleum sector was about 30% of the total. During the year, U.S. direct investment was about 48%.

## Government Policies and Programs

Under the Constitution of 1991, the state is granted ownership of the subsoil and nonrenewable resources. The state is also obligated to preserve Colombia's natural resources and protect its environment (INGEOMINAS-UPME, 1997, p. 6). The Colombian constitution permits the expropriation of assets without indemnization. The mining code (Decree 2655 of 1988) covers the prospecting, exploration, exploitation, development, beneficiation, transformation, transport, and marketing of minerals. Under the law, the Ministry of Mines and Energy grants permission to explore, exploit, and develop mineral resources through the appropriate title or right.

Foreign investment is dictated by law 9 of 1991 (INGEOMINAS-UPME, 1997, p. 8). The law covers the issue of equal treatment for foreign and domestic investors with access to all sectors except those considered vital to National security and defense and toxic waste disposal; it addresses the foreign exchange statute, which allows free remittance of profit and capital, protection of investors from adverse changes in exchange guarantees, except temporarily when Colombia's

international reserves are less than 3 months of imports; and grants the responsibility of foreign investment to the Consejo Nacional de Política Económica y Social.

In 1996, the Government of Colombia continued to publicize its interest in encouraging foreign investment in the mining sector and in reducing its role as a producer of minerals by selling its interest in several of the mining companies. A new mining code, being considered by congress at yearend, would eliminate the need for multiple permits by combining the exploration and exploitation into one single permit, with an extension for exploration to 5 years and for exploitation for up to 50 years. The code would eliminate the requirement of yielding capital goods and equipment to the Government at the expiration of the mining contract.

## Production

Colombia ranked 28th in value of mineral production in 1994 (Ministère de l'Industrie, de la Poste et des Télécommunications, 1996, p. 179), but was not among the top 30 leading mineral producers in 1995, the last year for which information is available (Ministère de l'Economie, des Finances et de l'Industrie, 1997, p. 181). Coal, nickel, and petroleum are the most important minerals to the Colombian economy. According to data received by the U.S. Geological Survey through country questionnaires, other official sources, or estimates, in 1996, Colombia ranked ninth in the mine production of nickel, and although its ranking in coal and petroleum were lower, the contribution of those commodities to the economy in form of foreign exchange is very significant.

Colombia is also known as a leading producer of emeralds and in the past has been an important producer of gold. Although the country's production of gold has decreased, it continues to be an important source of Government revenue. In 1996, Colombia ranked 16th in world mine production of gold, with about 1% of total output. In addition, Colombia produces a number of other mineral commodities and products in modest amounts, including copper, iron ore, lead, manganese, platinum, and zinc; and a number of industrial minerals, including cement.

In 1996, Colombia was the sole producer of platinum in Latin America. It was the fifth largest producer of gold after Peru, Brazil, Chile, and Mexico. Colombia was the fifth leading producer of crude petroleum in the region, after Venezuela, Mexico, Brazil, and Argentina.

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<sup>1</sup>Where necessary, values have been converted from Colombian pesos (Col\$) to U.S. dollars at the average rate of Col\$1,036.69=US\$1.00.

## Trade

Colombia's value of exports totaled about \$10.6 billion in 1996 (International Monetary Fund, 1997). Crude petroleum and petroleum products accounted for almost 27% of all exports. Coal exports accounted for 10% of the value of total exports. Colombia's value of imports was \$13.6 billion (Washington Times, 1997b). The United States continued to be Colombia's main trading partner. Total trade between the two countries was \$9.8 billion.

## Structure of the Mineral Industry

Ownership of the mineral industry in Colombia is mixed. The Government participates directly in the production of minerals through several companies associated with the Ministry of Mines and Energy. The Government company, Minerales de Colombia S.A. (MINERALCO), manages, develops, and promotes the exploitation of minerals, except coal, petroleum, and radioactive minerals (INGEOMINAS-UPME, 1997, p. 12). The Empresa Colombiana de Carbón Ltda., another Government-owned company under the Ministry of Mines and Energy, has the responsibility to manage the country's coal resources and promote coal production (INGEOMINAS-UPME, 1997, p. 13). The Empresa Colombiana de Petróleos (ECOPETROL) negotiates all petroleum contracts with the private sector on behalf of the Government. It participates in the production of petroleum and natural gas directly and in association with the private sector.

## Commodity Review

### Metals

**Gold.**—Production of gold totaled 22,064 kilograms. Most of the gold in Colombia is produced by small- and medium-size mining entities. Only about 10% to 20% of the output is produced by large mining companies. The largest producer of gold in Colombia is *Mineros de Antioquia S.A.*, exploits gold from the alluvial deposits in the Nechi River and its affluent, the Tigui River. The company's main export destinations are the United States, Switzerland, and North Korea (Minas Hoy, 1995b, p. 58)

**Nickel.**—Mine production of nickel from *Compañía Cerro Matoso S.A.* (Cerro Matoso), the only nickel producer in Colombia, was 27,700 metric tons. Production of ferronickel was 22,934 tons. In late 1996, the Instituto de Fomento Industrial, the Government entity with a minority interest in the nickel producer Cerro Matoso, indicated that the sale of the Government's share of the company (47.7%) would be postponed until early 1997 (Mining Journal, 1996). The Government expected the sale to bring \$100 million. About 90% of Colombia's nickel reserves are being exploited by Cerro Matoso (INGEOMINAS-UPME, 1997, p. 29). For the 12 months ending June 30, 1996, run-of-mine production averaged 2.9% nickel, one of the highest lateritic ore grades in the world

(GENCOR Ltd., 1996, p. 35). The majority owner, GENCOR Ltd., of South Africa, was interested in acquiring the property to increase its market share of nickel. GENCOR hoped that the Government would extend the mining concession beyond its expiration date of 2007.

**Platinum.**—Colombian production of platinum in 1996 was 669 kilograms, a 31% decrease from that of 1995. Although Colombia produced less than 1% of the total platinum, it ranked sixth among the 10 world producers. The leading producing Department was Chocó, followed by Antioquia although smaller quantities were produced in the Departments of Bolívar, Cauca, Córdoba, Nariño, and Valle. The Chocó Department has been producing platinum since the 16th century (Loebenstein, 1985) and Colombia was the only producer of platinum until the beginning of the 20th century (Garces González, 1995, p. 276). All platinum production in Colombia is from placer deposits sometimes associated with the production of gold.

### Industrial Minerals

The production center best known for the quality of its emeralds in Colombia is Muzo-Quipama in Boyacá Department, but other deposits are also exploited in the municipalities of Chivor, Coscuez, Peñas Blancas also in Boyacá and in Ubalá, Gachalá, and Yacopí in the Cundinamarca Department (INGEOMINAS-UPME, 1997, p. 28). In 1996, production totaled 7.2 million carats, a 13.4% increase from 1995. The main emerald producers in Colombia are *Técnicas Minerales Ltda.*, *Compañía Colombiana de Explotaciones Mineras*, *Sociedad de Esmeraldas y Minas S.A.* and *Compañía Esmeraldas de Chivor S.A.*, 80% owned by Chivor Emerald Corp. Ltd. and formerly *Empresa Chivoreña de Minas S.A.*, a private company founded and licensed in 1990 to produce emeralds from Oriente Mine through a contract with MINERALCO.

Chivor Emerald Corporation Ltd. continued its emerald exploration and development work in the Chivor district in central Colombia in 1996. The Oriente Mine is Chivor's main property. The contract also covers the Jagua 1 and Jagua 2 properties (Chivor Emerald Corporation Ltd. 1996). In addition, the company has 19 exploration license areas covering about 80% of the emerald belt. The areas cover 38.9 square kilometers (Chivor Emerald Corporation Ltd., 1997). With the investment by Chivor, Colombia began to modernize its emerald industry, which has been operated by rudimentary methods (Minas Hoy, 1995a, p. 43).

### Mineral Fuels

**Coal.**—Colombian coal deposits are the most extensive in Latin America (Weaver, 1993, p. 30). Production of coal in 1996 totaled 30.1 million tons, a 15.5% increase from that of 1995. The largest coal producing regions are La Guajira and César Departments, together producing 80% of the country's output. The largest producer, with an output of 14.4 million tons or almost 48% of the country's production, was the

Cerrejón Norte Mine in La Guajira Department, a joint venture between Carbones de Colombia S.A. (CARBOCOL) and Exxon through its subsidiary, International Colombian Resources Corp. The second largest producer was the Drummond Ltd. (Pribbenow Mine) in César Department with a 4-million-ton output. The third largest producer was the Cerrejón Centro Mine, also in La Guajira Department, owned by Prodeco, a subsidiary of Glencore International.

The Government continued with its plans to privatize its 50% interest in Cerrejón Norte, but the sale had not materialized at yearend. The Cerrejón Norte's reserves total 3 billion tons (Accessed October 1, 1997, on the World Wide Web at URL <http://www.carbocol.gov.co/mine.htm>), with 1.6 billion tons of proven reserves (Washington Times, 1997d, p. 11). Export revenue from Cerrejón Norte in 1996 totaled \$573 million. Expansion of the Cerrejón Norte Mine seems to be on hold until privatization of CARBOCOL.

The Cerrejón Centro Mine produced 2.9 million tons of coal in 1996. Prodeco continued with its plans to expand production to 10 million tons by 2002 (Gellici, 1997, p. 5). During the year, the company acquired new equipment and was shifting away from contract mining (Mining Magazine, 1996). The company, which also operates a privately owned coal export terminal in Santa Marta, began development of a new mine, Calenturitas, in the César Department. Prodeco signed a 30-year mining agreement for Calenturitas in 1989. Production from Calenturitas is expected to reach 3 million tons in 1998.

Colombia's consumption of coal is modest and a large percentage of its production is exported. In 1996, 81% of the production was exported. Of this total, 60% was from the Cerrejón Norte Mine. Europe was the main recipient of Colombian coal in 1996. It received almost three-quarters of the 24 million tons of coal exported by Colombia. The United States received about one-fifth of Colombian coal exports and Latin America; the Far East received the remainder.

**Natural Gas and Petroleum.**—The Government-owned company, ECOPEPETROL, is responsible for the exploration and production of natural gas and petroleum crude in Colombia. ECOPEPETROL explores and produces natural gas and petroleum independently, as well as in association with the private sector. In addition, a small percentage of hydrocarbons is produced by the private sector in concessions awarded by the Government.

In 1996, 15 new association contracts between ECOPEPETROL and the private sector were approved, 14 of which were signed (Empresa Colombiana de Petróleos, 1997). At yearend, 97 contracts were operative in the hydrocarbon sector.

Total production of crude petroleum was almost 229 million barrels. Most of the output, 79%, was from association contracts, including ECOPEPETROL's share of the association contracts. ECOPEPETROL produced 18.5% individually and the remainder (2.5%) was produced by concessions held by the private sector.

Colombia's Government plans to increase crude petroleum output significantly, to 1 million barrels per day by the end of the century (Washington Times, 1997a).

## Infrastructure

Colombia has 107,200 kilometers of highways, of which 12,600 kilometers are paved (Central Intelligence Agency, World Factbook page on Colombia, Accessed September 29, 1997, on the World Wide Web at URL <http://www.odci.gov/cia/publications/nsolo/factbook/co.htm>). The Government development plan for 1995-98 calls for a \$7.5 billion investment for construction, maintenance, and repair of the existing network (Washington Times, 1997c). The country has 14,300 kilometers of waterways navigable by river boats. Pipelines extend 3,585 kilometers for crude oil, 1,350 kilometers for petroleum products, 830 kilometers for natural gas, and 125 kilometers for natural gas liquids. Colombia has nine ports. The four main ports are in Barranquilla, Buenaventura, Cartagena, Santa Marta.

One of the major problems associated with the development of Colombia's mineral industry is the lack of infrastructure. Efforts by the Government and the private sector to improve the country's infrastructure continued in 1996. During the year, private investment in Colombia's infrastructure totaled \$2.2 billion. Of that, \$1.8 billion was in the mining and energy sectors (Washington Times, 1997e). In 1997-98, the Government expects the private sector to invest \$5.5 billion in 23 projects for roads, railroads, airports, water and sewage, and power generation and distribution. An estimated 40% of the total is expected from foreign investment.

## Outlook

Colombia's efforts to privatize, modernize, and expand its mineral sector are contingent upon its ability to reduce terrorist activity that continues to target the mineral and petroleum sectors, and upon its progress in infrastructure investment and development. The country's ambitious expansion plans in its coal and petroleum sectors, the two most important mineral-related activities to the economy, will depend also on infrastructure development.

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## Major Sources of Information

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TABLE 1  
COLOMBIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996 e/
<b>METALS</b>					
Bauxite e/	1,750	1,700	1,700	1,700	1,700
Copper, mine output, Cu content	3,940	--	11,894	11,398	11,000
Gold kilograms	32,117	27,471	20,762	21,160	22,064 2/
<b>Iron and steel:</b>					
Iron ore and concentrate thousand tons	674	545	610	734	606 2/
Pig iron do.	308	238	244	282	288 2/
Steel, crude do.	657	687	693 r/	714 r/	677 2/
Semimanufactures, hot-rolled do.	590 e/	636	642	692	650
<b>Lead:</b>					
Mine output, Pb content	620	447	290	300 e/	300
Refined (secondary) e/	3,600	3,600	3,500	3,500	3,500
Manganese, mine output, Mn content	600 e/	800	220	1,000	1,000
<b>Nickel:</b>					
Mine output, Ni content	23,347	22,831	26,141	24,194	27,700
Ferronickel, Ni content	20,195	20,181	20,833	24,565	22,934 2/
Platinum-group metals kilograms	1,956	1,722	1,084	973	669 2/
Silver do.	8,292	7,328	5,899	5,913	10,243 2/
Zinc, mine output, Zn content	277	279	275 e/	275 e/	275
<b>INDUSTRIAL MINERALS</b>					
<b>Asbestos:</b>					
Mine output	170,000	--	--	--	--
Fiber	7,900	--	--	--	--
Barite	9,380	4,840	7,000	21,300	20,000
Cement, hydraulic thousand tons	6,810	7,930	9,322	9,624	8,590 2/
<b>Clays:</b>					
Bentonite	3,260	--	1,018	9,000	9,000
Common clay and kaolin thousand tons	2,050	2,097	6,700	7,300	7,300
Diatomite e/	4,360 2/	4,400	4,000	4,000	4,000
Feldspar	78,400	60,458	76,188	58,100	60,000
Fluorite	959	1,800	800	720	700
Gemstones: Emerald 3/ thousand carats	2,314 r/	5,150	7,202	6,306 r/	7,151 2/
Gypsum thousand tons	671	439	450	450 e/	450
Lime, hydrated and quicklime e/ do.	1,300	1,300	1,300	1,300	1,300
Magnesite	18,840	8,816	10,747	10,500	10,500
Mica e/	54 2/	55	55	55	55
Nitrogen, N content of ammonia e/	86,300	98,500	111,600 r/	98,900 r/	101,500 2/
Phosphate rock	31,500	44,994	48,107	50,000	50,000
<b>Salt:</b>					
Rock thousand tons	230	231	315 e/	315 e/	423 2/
Marine do.	317	169	250 e/	250 e/	153 2/
Total do.	547	400	565 e/	565 e/	576 2/
Sodium compounds, n.e.s., sodium carbonate e/	121,000	121,000	121,000	121,000	121,000
<b>Stone and sand:</b>					
Calcite e/	6,320 2/	6,500	6,500	6,500	6,500
Dolomite e/ thousand tons	46 2/	45	45	45	45
Limestone do.	16,000 e/	15,701	14,000	19,248	19,000
Marble e/	34,600 2/	34,500	35,000	35,000	35,000
Sand excluding metal-bearing e/	860,000	850,000	850,000	900,000	900,000
<b>Sulfur:</b>					
Native (from ore)	39,200	51,396	53,357	60,000	65,000 2/
Byproduct, from petroleum e/	9,200	12,200	12,200	15,000	16,000 2/
Total	48,400	63,596	65,557	75,000	81,000 2/
Talc, soapstone, pyrophyllite	13,300	19,550	18,000	19,248	19,000
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Carbon black e/	23,600 2/	23,800	24,000	24,000	24,000
Coal thousand tons	23,800	21,223	22,665	26,020	30,065 2/
Coke, all types do.	450 e/	632	562	600 e/	600
<b>Gas, natural:</b>					
Gross million cubic meters	5,200 e/	5,334	5,423	7,674	8,000
Marketed do.	4,450 e/	4,360	4,430	5,000 e/	5,200
Natural gas liquids e/ thousand 42-gallon barrels	2,300	2,300	2,500	2,500	2,500

See footnotes at end of table.

TABLE 1--Continued  
COLOMBIA: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996 e/	
<b>MINERAL FUELS AND RELATED MATERIALS--Continued</b>						
<b>Petroleum:</b>						
Crude	thousand 42-gallon barrels	160,600	165,762	166,096	213,397	228,589 2/
<b>Refinery products:</b>						
Liquefied petroleum gas	do.	4,373	4,080	6,203	7,010	6,974
<b>Gasoline:</b>						
Aviation	do.	288	209	182	250	136 2/
Motor	do.	31,245	30,703	30,072	26,459	38,320 2/
Jet fuel	do.	4,660	4,835	5,328	5,662	6,036 2/
Kerosene	do.	2,026 r/	1,754 r/	1,437	1,342	1,523 2/
Distillate fuel oil	do.	17,042	19,207	20,612	21,969	24,518 2/
Lubricants	do.	438	329	372	372	400
Residual fuel oil	do.	24,461	21,049	19,886	20,039	19,361 2/
Asphalt and bitumen	do.	1,559	1,852	2,865	2,964	3,000
Refinery fuel and losses and unspecified products e/	do.	1,281	4,263	3,017	7,476	1,939
Total	do.	87,373	88,281 r/	89,974	93,543	102,207

e/ Estimated. r/ Revised.

1/ Includes data available through Oct. 1, 1997.

2/ Reported figure.

3/ Based on registered exports by the Banco de la República.

TABLE 2  
COLOMBIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Carbon black	Cabot Colombiana S.A. (private, 100%)	Cartagena, Bolívar Department (plant)	NA	
Do.	Productos Petroquímicos S.A. (private, 100%)	Cali, Valle del Cauca Department (two plants)	12	
Cement	Cía. Colombia de Clinker S.A. (Colclinker) (private, 100%)	Cartagena, Bolívar Department (plant)	1,100	
Do.	Cementos del Caribe S.A. (private, 100%)	Barranquilla, Atlántico Department	1,000	
Do.	Cementos del Valle S.A. (private, 100%)	Yumbo, Valle del Cauca Department	1,200	
Do.	Cementos Río Claro S.A. (private, 100%)	Puerto Trifuno, Antioquia Department	1,000	
Coal	Carbones de Colombia S.A. (CARBOCOL) (Government, 50%) and International Colombia Resources Corp. (Intercor) (EXXON, 50%)	El Cerrejón Norte Mine, La Guajira Department	15,000	
Do.	Drummond, Ltd. (Drummond Co., 100%)	Drummond Mine, César Department	4,000	
Do.	Prodeco (private, 100%)	Cerrejón Centro, La Guajira Department and Calenturitas in César Department	4,000	
Do.	Acerías Paz del Río S.A. (private, 100%)	Paz del Río, Boyacá Department (mine)	600	
Copper	El Roble Exploración y Explotación S.A. (Minas El Roble, 51%; Nittetsu Mining, 44.1%; and C Itoh, 4.9%)	El Roble Mine, El Carmen, Chocó Department	4	
Emerald	Minerales de Colombia S.A. (MINERALCO) (Government, 100%)	Chivor, Coscuez, Muzó, and Quípama Mines, Boyacá Department	NA	
Gold	kilograms	Frontino Gold Mines Ltd. (private, 100%)	El Silencio Mine, Segovia, Antioquia Department	1,500
Do.	do.	Fisher-Watt Gold Co. (private, 100%)	Oronorte Mine, Segovia, Antioquia Department	500
Do.	do.	Mineros de Antioquia S.A. (private, 100%)	Río Nechí, near El Bagre, Antioquia Department (mines)	2,000
Do.	do.	Small miners (Cooperatives and individual prospectors)	Río Nechi, Antioquia Department (mines)	NA
Iron ore	Acerías Paz del Río S.A.	Paz del Río, Boyacá Department (mine)	800	
Kaolin	Cerámicas del Valle Ltda., (private, 100%)	Yumbo, Valle del Cauca Department (mine)	NA	

See footnotes at end of table.

TABLE 2--Continued  
 COLOMBIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Natural gas	million cubic meters	Empresa Colombiana de Petróleos (ECOPETROL) (Government, 100%)	North coast, La Guajira Department (national gasfields)	3,500
Do.	do.	International Petroleum Colombia, Ltd. (International Petroleum Corp., 100%)	Barrancabermeja locale, Antioquia and Santander Departments	1,200
Nickel		Cerro Matoso S.A. (GENCOR Ltd, 52.3%, Instituto de Fomento Industrial, 47.7%)	Cerro Matoso Mine, Montelíbano, Córdoba Department	23
Nitrogen		Abonos de Colombia (private, 100%)	Cartagena, Bolívar Department (plant)	100
Do.		Monomeros Colombo-Venezolanos S.A. (private, 100%)	Barranquilla, Atlántico Department (plant)	85
Petroleum	thousand 42-gallon barrels	ECOPETROL	16 fields in various departments	70,000
Do.	do.	Houston Oil Colombiana S.A. (HOCOL) (Royal Dutch Shell, 100%)	14 fields in various departments	36,500
Petroleum products	do.	ECOPETROL	Barrancabermeja Refinery, Santander Department	71,400
Do.	do.	Do.	Cartagena Refinery, Bolívar Department	25,806
Do.	do.	Do.	Tibú, Norte de Santander Department	1,825
Do.	do.	Do.	Orito, Putumayo Department	875
Phosphate		Fosfatos de Colombia S.A. (private, 100%)	Neiva, Huila Department	30
Do.		Fosfatos Boyacá, S.A. (Government, 100%)	Iza, Boyacá Department	20
Platinum		Small miners (cooperatives and individual prospectors)	Río San Juan, Chocó Department	NA
Salt, marine		Instituto de Fomento Industrial (IFI) (Government, 100%)	Manaure Salina, La Guajira Department	700
Salt, rock		Concesión Salinas (Government, 100%)	Zipaquirá, Cundinamarca Department	500
Silver	kilograms	Frontino Gold Mines Ltd.	El Silencio Mine, Segovia, Antioquia Department	2,500
Do.	do.	Small miners (Individual prospectors and cooperatives)	Río Nechí, Antioquia Department (mines)	2,000
Steel, intergrated plant		Acerías Paz del Río S.A.	Belencito, Boyacá Department	400
Steel, semiintergrated plants		Siderúrgica del Caribe (private, 100%)	Cartagena, Bolívar Department	NA
Do.		Siderúrgica del Boyacá S.A. (private, 100%)	Bogotá, Federal District	NA
Do.		Siderúrgica del Medellín S.A. (private, 100%)	Medellín, Antioquia Department	NA
Do.		Siderúrgica del Muña S.A. (private, 100%)	Chusacá, Federal District	NA
Do.		Siderúrgica del Pacífico S.A. (private, 100%)	Cali, Valle del Cauca Department	NA
Sulfur		Industrias Purace S.A. (private, 100%)	El Vinagre Mine, Cauca Department	60
Do.		ECOPETROL	Barrancabermeja, Santander Department	29

NA Not available.