

2016 Minerals Yearbook

COLOMBIA

THE MINERAL INDUSTRY OF COLOMBIA

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In 2016, Colombia's mineral sector was dominated by the coal, copper, emerald, gold, iron and steel, limestone, nickel, natural gas, petroleum, platinum, silver, and sulfur industries. Colombia's real gross domestic product (GDP) at constant 2010 prices increased by 2.0% compared with a 3.1% increase in 2015. Colombia was the leading coal producer in Latin America, producing 90.5 million metric tons (Mt) in 2016. The country accounted for about 80% of Latin America's total coal production, and about 10% of Latin America's total crude petroleum production in 2016. Colombia was also the only platinum-producing country in Latin America and was considered among the world's leading producers of emerald (Enerdata, 2017; International Gem Society, LLC, 2017; World Bank, The, 2017).

In 2016, the Government of Colombia continued the process of formalizing unlicensed artisanal and small-scale miners (ASM), with the goal of collecting taxes and requiring submissions of environmental impact studies, while the Government guarantees training and safety. The Government was aiming to formalize all unlicensed miners by 2032. The expansion of illegal mining in the country had negatively affected the environment, including river pollution and deforestation. A 2015 Colombian Government report estimated that unlicensed gold miners accounted for about 80% of all the gold produced in the country (Jamasmie, 2015a, b).

In 2016, the Government of Colombia officially banned all mining activities in its páramo regions, an area of the Andes Mountains covered with subalpine forests located mainly in northwestern South America. According to the Government, about 473 mining concessions covering about 126,000 hectares (ha) were affected by the ruling. The court determined that mining in the páramo could cause irreversible damage to fragile ecosystems. The area is the source of water for approximately 70% of the country's population. The majority of the concessions affected were coal concessions (262), of which 191 were operational. A total of 189 mining concessions in the region were in the exploration or predevelopment stage (El Colombiano, 2016).

Minerals in the National Economy

In 2016, the industrial manufacturing sector accounted for about 11.5% of the country's GDP; the construction sector, about 9.4%; and the mining and quarrying sector (including hydrocarbons), about 5.4% compared with 6.4% (revised) in 2015. In 2016, the value contributed to the GDP from mineral production (including hydrocarbons) was \$15.3 billion.¹ Production of mineral fuels was valued at about \$9.9 billion; production of coal was valued at \$3.1 billion; production of metallic minerals was valued at \$1.4 billion; and production

of nonmetallic minerals was valued at \$1.1 billion. In 2016, the total value of exports from Colombia decreased to about \$31 billion from \$35.7 billion in 2015. The value of the country's mineral products (excluding hydrocarbons) exports increased to \$6.8 billion from \$6.4 billion in 2015. Coal, which was the country's leading mineral product export, accounted for about \$4.6 billion, or 68% of total mineral exports in terms of value (Departamento Administrativo Nacional de Estadística, 2017a; Ministerio de Minas y Energía, 2017, p. 113).

In 2016, Colombia's foreign direct investment (FDI) inflows amounted to \$13.9 billion, which was an increase of about 19% compared with the \$11.7 billion in FDI inflows in 2015. FDI inflows to South America decreased by 9.3% compared with that of 2015. Based on preliminary data from the Central Bank of Colombia, about 17% of the country's FDI in 2016 was designated for the hydrocarbon sector. Investments towards the nonfuel mineral sector were insignificant compared with those in previous years, when, since 2011, it averaged about \$2 billion annually during the commodities boom cycle.

The largest investment transaction of the year was made by the Canadian firm Brookfield Renewable Partners, which purchased the hydroelectric company Isagén S.A. for \$3.5 billion, including the Government's 57.6% interest in that company (Banco Central de Colombia, 2017; Comisión Económica para América Latina y el Caribe, 2017, p. 41–42, 54).

Production

Notable increases in Colombia's mineral commodity production in 2016 compared with that of 2015 included the production of sea salt, by 178%; copper, by 55%; and emerald, by 10%. Decreases in mineral production included that of phosphate rock, by 53%; iron ore, by 21%; and crude petroleum, by 12%. Data on mineral production are in table 1.

Structure of the Mineral Industry

In 2011, the Government created the Agencia Nacional de Minería (ANM) [National Mining Agency] to help strengthen mining sector institutions in the country, with the aim of establishing a more efficient and transparent system to award mining licenses in the country. The right to explore and develop mines in Colombia was obtained through a mining concession contract awarded by the ANM. The primary responsibilities of the ANM (outlined in Decree 4134 of November 3, 2011) include managing Colombia's mineral resources and granting rights for exploration and mining, managing contracts and concessions, collecting and overseeing the transfer of royalties, coordinating mine safety, and developing and implementing strategies to promote the exploration for and mining of the country's mineral resources. Since its creation, the ANM has implemented numerous technological advances, including online platforms for the management of a mining concession

¹Where necessary values have been converted from Colombian pesos (COP) to U.S. dollars (US\$) at an annual average exchange rate of COP3002.01=US\$1.00 in 2016 and COP3166.5=US\$1.00 for 2015.

application system, mining inspections, and payments of mining royalties (Agencia Nacional de Minería, 2017a, b).

In 2016, the majority of mining operations were privately owned. Natural gas and petroleum facilities were Government owned. Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Copper.—Copper production in Colombia increased by 55% to 8,493 metric tons (t) in 2016. The increase was attributed to the processing of 36% more ore and a 14% increase in the mill-head grade. Atico Mining Corp.'s majority owned El Roble Mine was Colombia's only commercial copper mine in production in 2016. Atico completed the acquisition of 90% of Minera El Roble S.A. in 2013. The remaining 10% of the property continued to be owned by Minera El Roble. Located within Choco Department, the El Roble Mine consisted of an underground operation that produced copper and gold from copper concentrates at an annual production rate of about 246,000 metric tons per year (t/yr) of ore, using mechanized cut-and-fill stoping methods with waste rock or cemented rock as backfill. The El Roble operation consisted of eight mineral concessions covering a total of 6,679 ha. In 2016, concentrates from the El Roble Mine contained on average 20.5% copper and 8.5 grams per metric ton (g/t) gold (Atico Mining Corp., 2017a; 2017b, p. 3–4).

Gold.—In 2016, gold production in Colombia increased by 4.4% to 61,805 kilograms (kg). Gold production from Gran Colombia Gold Corp. of Canada's Segovia and Marmato operations was 3,927 kg and 729 kg, respectively. Gran Colombia was the country's leading underground gold and silver producer in 2016, with several underground mines and two processing plants in operation. The Segovia operation covered an area of approximately 9,000 ha in Antioquia Department. Since taking over the Segovia operation in 2010, Gran Colombia had undergone extensive modernization to introduce mechanization to improve production efficiency and safety and to reduce its all-in sustaining costs. Acquired in 2011, the Marmato project contained total estimated resources of approximately 8.1 Mt at an average grade of 3.4 g/t gold. Located in Caldas Department, the Marmato project had access to the national electricity grid. Mineros S.A., which is headquartered in Medellin, Antioquia Department, produced 3,280 kg of gold during the year (table 1; Gran Colombia Gold Corp., 2017; Mineros S.A., 2017, p. 7).

Nickel.—In 2016, Colombia's nickel production increased slightly from that of 2015 to 37,092 t. The country's nickel production originated solely from the Cerro Matoso Mine in Montelibano, Cordoba Department, in northern Colombia. In operation since 1982, Cerro Matoso was an open-cut lateritic nickel mine and ferronickel smelter that produced high-purity, low-carbon ferronickel granules. The mine, which had a production capacity of 50,000 t/yr and was the only active nickel operation in Colombia, was among the leading producers of ferronickel in the world. The ore mined was blended with ore from stockpiles; it was then dried in rotary kilns and smelted

in two electric arc furnaces to produce ferronickel (tables 1, 2; South32 Ltd., 2017, p. 67).

Industrial Minerals

Cement.—Cementos Argos Colombia S.A. (Argos) continued to be a leading producer of cement in the country. Argos had 60 concrete facilities, 7 cement plants, and 1 port in Colombia. In 2016, however, the tonnage of cement sold by Argos in Colombia decreased to 5.1 Mt, or by about 18% compared with that of 2015. The company employed 4,863 people during the year. In 2016, gray cement production from all companies in Colombia decreased by about 5.3% to 12.5 Mt, and shipments decreased by 5.1% to 12.1 Mt. Marketed cement shipments decreased by 1.6% to 6.3 Mt; shipments to concrete plants decreased by 6.6% to 2.8 Mt; shipments to construction and contracting businesses decreased by 7.4% to 2.5 Mt. All other shipments were received or consumed by manufacturers of fiber cement and prefabricated products (Cementos Argos S.A., 2017, p. 1, 3, 17; Departamento Administrativo Nacional de Estadística, 2017b).

Gemstones.—In 2016, Colombia's emerald production increased to 2,387 thousand carats, or by 10.2% compared with that of 2015. In 2015, Colombia's Ministry of Mines and Energy reported that Gemfields PLC of the United Kingdom would begin mining emerald at two projects located in Boyaca Province. The company entered into binding agreements with Colombia's Esmeracol S.A. to acquire a 70% controlling interest in the Coscuez Mine and a 75% controlling interest in an adjacent property of Spanish investor ISAM Europa SL. Gemfields, which was considered the leading producer of colored gemstones in the world, began exploration activities covering concessions of more than 20,000 ha in 2016 (table 1; Ministerio de Minas y Energía, 2015; Portafolio, 2016).

Mineral Fuels

Coal.—In 2016, Colombia's coal sector produced a record 90.5 Mt of coal. The Departments of Cesar and La Guajira produced 48.3 Mt and 32.7 Mt of coal, respectively, accounting for a combined total of about 90% of the coal produced in the country. The country's coal production was dominated by two major coal companies, Carbones del Cerrejón LLC. and Drummond Ltd. of the United States. Cerrejón was a joint venture of Anglo American plc of the United Kingdom (33.3%), BHP Billiton plc (33.3%), and Glencore plc of Switzerland (33.3%). In 2016, Cerrejón exported 32.4 Mt destined for Europe, the Mediterranean region, North America, Central America, and South America. Export volumes were slightly affected by heavy rains in La Guajira Department during the year (table 2; Cerrejon Carbon LLC, 2017; Sistema de Información Minero Colombiano, 2017).

Petroleum.—In 2016, production of petroleum in Colombia decreased to 322.4 million barrels, or by about 12.2% compared with that of 2015. Colombia's decreased level of petroleum production was primarily owing to low global petroleum prices. About 62.5% of the country's production came from oilfields operated by Ecopetrol S.A. Ecopetrol, which operated two

refineries and three ports in 2016. The country's proven crude petroleum reserves at yearend 2016 were 2 billion barrels, which was a 13% decrease compared with reserves in 2015. Nineteen active oil rigs were operating in Colombia in 2016 compared with 12 in 2015 (Ecopetrol S.A., 2017, p. 11, 33; Organization of the Petroleum Exporting Countries, 2017, p. 26–27, 32).

Outlook

Colombia's mineral industry plans to continue to address the significant challenges of road infrastructure and security and to seek to attract more FDI to take greater advantage of the sector's economic potential. In recent years, Colombia's economic and political stability has given it a competitive advantage over some other countries in Latin America. Coal is expected to continue its dominance in the country's exports in terms of value added. It is unclear, however, how a recent court decision regarding Article 37 of the 2001 mining code will affect current mining projects in Colombia. Article 37 prohibits regional and local authorities from using territorial zoning plans to exclude areas from mining, but the Constitutional Court's Decision No. 273 of May 25, 2016, declared Article 37 unconstitutional. The Government appears to remain committed to the sustainable development of its mineral industry (Norton Rose Fulbright, 2016, p. 11).

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TABLE 1
COLOMBIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²		2012	2013	2014	2015	2016
METALS						
Copper, mine production, Cu content		858	725	4,118	5,463	8,493
Gold, mine, Au content	kilograms	66,178	55,745	57,015	59,202	61,805
Iron ore, mine:						
Gross weight	thousand metric tons	392 ^r	710	676	902	716
Fe content	do.	486	426	406	541	430
Iron and steel:						
Pig iron	do.	345	307	234	240	225
Raw steel	do.	1,302 ^r	1,236 ^r	1,208 ^r	1,211	1,272
Nickel, ferronickel, Ni content		51,595 ^r	49,320 ^r	41,221	36,671	37,092
Platinum, mine, Pt content	kilograms	1,460	1,836	1,135	861	916
Silver, mine, Ag content	do.	19,368	13,968	11,498	10,155	10,427
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	10,925	11,252	12,384	13,153	12,495
Clay and shale, bentonite		8,500 ^c	9,056	9,000 ^c	9,000 ^c	9,000 ^c
Gemstones, emerald	thousand carats	1,211	2,627	1,967	2,167	2,387
Phosphate rock:						
Gross weight	thousand metric tons	30	41	30	91	43
P ₂ O ₅ content ^c	do.	9	8	15	15	15
Salt:						
Rock		308,547 ^r	319,184	340,263	338,804	345,637
Sea		211,720 ^r	113,226	105,577	78,634	218,557
Stone, crushed, limestone	thousand metric tons	13,548	13,954	15,374	16,312	15,333
Sulfur, native, S content		63,790	52,470	48,513	76,239 ^r	76,331
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	83,683	80,337	83,263	80,415	85,081
Metallurgical	do.	5,341	5,128	5,315	5,133	5,430
Coke, metallurgical	do.	2,147	2,270	2,345	2,164	2,043
Natural gas	million cubic meters	10,897 ^r	12,930 ^r	12,680 ^r	12,807 ^r	12,935
Petroleum, crude	thousand 42-gallon barrels	344,633	367,993	361,460	367,044	322,405

^cEstimated. ^rRevised. do. Ditto.

¹Table includes data available through January 12, 2018. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, feldspar, gypsum, magnesite, sand and gravel, secondary iron, semimanufactures, sulfur (as a byproduct of petroleum processing), thorium, and uranium may have been produced in Colombia, but available information was inadequate to make reliable estimates of output.

TABLE 2
COLOMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Cement	Cía. Colombiana de Clinker S.A. (Cementos Argos Colombia S.A., 100%)		Plant at Cartagena, Bolivar Department	1,250
Do.	Cementos del Caribe S.A. (Cementos Argos Colombia S.A., 74%)		Barranquilla, Atlantico Department	1,500
Do.	Cementos del Valle S.A. (Cementos Argos Colombia S.A., 70%)		Yumbo, Valle del Cauca Department	1,500
Do.	Cales y Cementos de Toluviejo S.A. (Cementos Argos Colombia S.A., 95%)		Toluviejo, Sucre Department	980
Do.	Cementos del Nare S.A. (Cementos Argos Colombia S.A., 100%)		Puerto Nare, Antioquia Department	210
Do.	Cementos El Cairo S.A. (Cementos Argos Colombia S.A., 100%)		Montebello, Antioquia Department	450
Do.	Cementos Paz del Río S.A. (Cementos Argos Colombia S.A., 62%)		Belencito, Boyaca Department	880
Do.	Cementos Ríoclaro S.A. (Cementos Argos Colombia S.A., 99%)		Sonson, Antioquia Department	1,400
Do.	Cementos Boyacá S.A. (LafargeHolcim Group, 100%)		Nobsa, Boyaca Department	1,500
Do.	CEMEX Colombia S.A. (CEMEX S.A.B. de C.V., 99.7%)		Bucaramanga, Santander Department; Buenos Aires, Tolima Department; Pamplona, Norte de Santander Department; La Calera, Cundinamarca Department	3,980
Coal	Carbones del Cerrejón LLC (Anglo American plc, 33.3%; BHP Billiton plc, 33.3%; Glencore plc, 33.3%)		Cerrejon Centro, Cerrejon Sur, Cerrejon Zona Norte, and Oreganal Mines, La Guajira Department	32,000
Do.	Drummond Ltd. (Drummond Co. Inc., 80%, and Itochu Corp., 20%)		La Loma Mine, Cesar Department	20,000
Do.	do.		El Descanso Mine, Cesar Department	12,000
Do.	Glencore plc, 100%		Calenturitas Mine, Cesar Department	16,000
Do.	do.		La Jagua Mine, Cesar Department	7,000
Do.	Pacific Coal Resources Ltd., 100%		La Caypa Mine, La Guajira Department	1,300
Do.	do.		Cerro Largo Mine, Cesar Department	600
Do.	Colombia Energy Resources, 100%		Ruku Mine, Boyaca Department	80
Do.	Continental Coal Ltd., 50%		Colombia Mine, Guainia Department	NA
Do.	Carbones San Fernando S.A., 100%		San Fernando Mine, Antioquia Department	330
Do.	Mineral & Rocks Corp., 100%		Boyacá Mine, Boyaca Department	50
Do.	Colombian Natural Resources, 100%		El Hatillo Mine, Cesar Department	3,600
Do.	Glencore plc, 100%		Prodeco Mine, Cesar Department	14,500
Do.	CarboCoque, 100%		Soacha Mine, Cundinamarca Province	3,000
Do.	Colombia Natural Resources, 100%		El Hatillo Mine, Cesar Province	1,800
Do.	Andean Coal (BVI) Ltd., 51%, and Carbid SAS, 49%,		Escalones Mine, Boyaca Department	NA
Copper	metric tons	Atico Mining Corp., 90%, and Minera El Roble S.A., 10%	El Roble Mine, El Carmen, Chocó Department	8,500
Gemstones, emerald		Fura de Colombia S.A. (Fura Gems Inc., 100%)	Coscuez Mine, Boyaca Department	NA
Gold	kilograms	Gran Colombia Gold Corp., 90%, and Investcol Ltd., 10%	Segovia Operations, Antioquia Department, 220 kilometers northeast of Medellin, including El Silencio Mine, Providencia Mine, and Sandra K Mine; Carla Mine, 10 kilometers southeast of Segovia operations	2,800
Do.	do.	do.	Marmato Mine, Caldas Department, 80 kilometers south of Medellin	850
Do.	do.	Mineros S.A., 100%	Antioquia Mine (Mina La Ye), Antioquia Department, 50 kilometers northwest of Medellín	4,200

See footnotes at end of table.

TABLE 2—Continued
COLOMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold—Continued	kilograms	Atico Mining Corp., 90%, and Minera El Roble S.A., 10%	El Roble Mine, El Carmen, Choco Department	300
Do.		NA	Rafael Mine, Antioquia Department	NA
Do.		Red Rock Resources Plc, 50%	El Mango Mine, Antioquia Department	NA
Do.		Private interest	Suarez Mine, Cauca Department	NA
Do.		Mineras Nacionales SA, 100%	Zona Baja Mine, Caldas Department	NA
Do.		Cordillera Gold, Ltd., 100%	Santa Paublina, Antioquia Department	NA
Iron and steel, steel		Diacon S.A. (Gerdau S.A.)	Tuta and Duitama, Boyaca; Cali, Valle del Cauca; Tocancipa, Cundinamarca; Muna, near Bogota	NA
Iron ore		Acerías Paz del Río S.A. (Votorantim Industrial, S.A., 82.42%)	El Uvo, Pírgua, and Ubalá Mines, Boyaca Department	2,000
Do.		Votorantim Industrial S.A., 82.42%	Paz del Río Mine, Boyaca Department	720,000
Natural gas	million cubic meters	Ecopetrol S.A. (Government, 100%)	North coast, La Guajira Department (national gasfields)	13,000
Nickel		Cerro Matoso S.A. (South32 Ltd., 99.98%, and mine workers, 0.02%)	Cerro Matoso Mine and ferronickel plant, Montelibano, Cordoba Department	50
Do.		do.	Montelibano refinery, Cordoba Department	50
Petroleum	thousand 42-gallon barrels	Ecopetrol S.A. (Government, 100%)	116 fields in various Departments	330,000
Silver	kilograms	Gran Colombia Gold Corp., 90%, and Investcol Ltd., 10%	Marmato Mine, Caldas Department, 80 kilometers south of Medellin	40,400

Do., do. Ditto. NA Not available.