



2016 Minerals Yearbook

BOLIVIA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF BOLIVIA

By Philip A. Szczesniak

The growth of the economy of Bolivia slowed in 2016 primarily owing to a decrease in the value of crude petroleum and natural gas exports. This decrease led to a real gross domestic product (GDP) growth rate of 4.1% in 2016 as reported by the International Monetary Fund (IMF), which was the lowest since 2010 and compares to an annual average of nearly 5.5% from 2011 to 2015. A sharp decrease in the value of crude petroleum and natural gas sector exports, which were affected by decreases in both export prices and quantities, was only partially offset by an increase in the value of mineral sector exports (Banco Central de Bolivia, 2017g; Economic Commission for Latin America and the Caribbean, 2017b, p. 35; International Monetary Fund, 2017).

In 2016, Bolivia was a globally important supplier of bulk ores and mineral concentrates. The country was among the leading countries in the world in the production of many minerals, including antimony, bismuth, lead, silver, tin, tungsten, and zinc. Gold and natural gas production were important contributors to the total value of Bolivia's exports. Other mineral commodities produced in Bolivia included (but were not limited to) barite, bentonite, boric acid, cement, copper, crude petroleum, gypsum, rock salt, and ulexite. Bolivia's reserves of antimony, which were estimated to be 310,000 metric tons (t), represented about 20% of total global reserves. Bolivia's estimated resources of lithium were 9 million metric tons (Mt) (Banco Central de Bolivia, 2017g; Guberman, 2017; Jaskula, 2017; Anderson, 2018; Bennett, 2018; Klochko, 2018a–c; Shedd, 2018; Thomas, 2018).

Minerals in the National Economy

The mining and quarrying industry was the weakest performing industry in Bolivia and showed a decrease of 0.5% in its GDP growth rate in 2016 (the industry decreased for the second consecutive year). The value added of the construction industry, on the other hand, increased significantly in 2016, by 7.8%. From 2010 to 2014, the value added of the mining and quarrying industry had increased at an average annual rate of 6.2% which was greater than the country's overall real GDP growth rate of 5.6% during that period. Despite the decrease in the sector's growth rate in 2016, which was owing mainly to a decrease in global commodity prices, mining and quarrying continued to be a major contributor to Bolivia's GDP, accounting for 12.9% of economic activity. Employment in the mining sector was estimated to be nearly 137,000 (preliminary) according to the Ministerio de Minería y Metalurgia (Economic Commission for Latin America and the Caribbean, 2017a).

In 2016, mining royalties (excluding hydrocarbons) totaled about \$145 million.¹ Mining royalties increased by about 18% compared with those received in 2015, owing primarily to

¹Where necessary, values have been converted from Bolivian bolivianos (BOB) to U.S. dollars (US\$) at an annual average exchange rate of BOB6.9=US\$1.00 for 2015 and 2016.

increases in production and prices. Royalties from hydrocarbons decreased by nearly 50%, and were estimated to be less than \$500 million. The Government had projected a sharp decrease in natural gas royalties in 2016 and 2017 to their lowest levels in 11 years as newer contracts were expected to reflect lower prices and volumes were likely to continue to decrease (Filomeno, 2016; Bolivia.com, 2017; Instituto Nacional de Estadística, 2017a).

Foreign direct investment (FDI) in Bolivia in 2016 decreased by 26% to \$410 million. The Economic Commission for Latin America and the Caribbean noted that Bolivia's FDI had fallen each year since reaching a 5-year high of \$1.8 billion in 2013. Despite this decrease, the Commission noted that there were several investment projects announced during the year that could reverse the trend, such as a \$500 million crude petroleum project (covering the next 5 years) by a consortium made up of Repsol S.A. of Spain and Royal Dutch Shell plc of the Netherlands, and a potential \$450 million steel project by Sinosteel Corp. of China (Economic Commission for Latin America and the Caribbean, 2017c, p. 35, 63).

Government Policies and Programs

The Ministerio de Minería y Metalurgia is the agency in charge of directing and developing the mining and metallurgical industries. The Agencia Nacional de Hidrocarburos is the agency in charge of regulating, monitoring, and supervising the entire hydrocarbon supply chain, including exploration, production, marketing, and consumption. Law 535–Ley de minería y metalurgia [Law of mining and metallurgy] was passed in 2014. This law prohibits direct joint ventures between cooperatives and private companies, allows for the establishment of mixed business enterprises with or through the state-owned Corporación Minera de Bolivia (COMIBOL), and allows cooperatives to renegotiate their existing contracts with private mining companies. Mining concessions are limited to 62,000 hectares (Jamasmie, 2014a, b; Agencia Nacional de Hidrocarburos, 2016, p. 9; Ministerio de Minería y Metalurgia, 2016, p. 5).

In August 2016, the Government issued new mining decrees (numbered DS2888 to DS2892) following violent protests that resulted in the deaths of the Deputy Interior Minister and five miners. Decree DS2888 prohibits the use of dynamite in protests. Decree DS2889 requires cooperatives to report their membership levels and the value and amount of production to the Administrative Mining Authority and the Cooperatives Tax and Control Authority. Decree DS2890 requires that mining concessions that are inactive be returned to the state. Decree DS2891 requires that joint ventures, leases, and subleases between cooperatives and private companies be returned to the state. Decree DS2892 requires that anyone employed by or providing services to cooperatives be protected by the general labor law (Andean Information Network, 2016).

Production

Asphalt production increased by 133% to 14,000 barrels compared with that of 2015 owing to increased refinery throughput. Rock salt production increased by 105% to 4,534 t, likely owing to activities related to lithium development in the Salar de Uyuni. Other mineral commodities that showed significant production increases in 2016 were gypsum, by 82%; bismuth, 42%; gasoline, 28%; copper, 23%; ulexite, 23%; lead, 19%; arsenic trioxide, 16%; silver, 15%; kerosene, 11%; and zinc, 10%. On the other hand, tantalum production decreased to zero and lead decreased 91% to 41 t compared with that of 2015. The decrease in lead production was owing to technical problems at COMIBOL's Karachipampa smelter. Other mineral commodities that had significant production decreases in 2016 were barite, by 64%; gemstones, ametrine, 62%, and amethyst, 37%; bentonite, 49%; antimony, 31%; tungsten, 24%; refined antimony, 19% (estimated); tin, 13%; and aviation fuel, 11% (table 1).

Structure of the Mineral Industry

COMIBOL's partially or wholly owned mines included the Coro Coro copper mine (jointly owned by Korea Resource Corp. of the Republic of Korea, 53%, and COMIBOL through Empresa Minera Corocobre S.A., 47%); the Huanuni tin mine (COMIBOL, 100%); the Bolivar lead, silver, tin, and zinc mine [a joint venture between COMIBOL, 55.45%, and Sociedad Minera Illapa S.A. (a wholly owned subsidiary of Glencore plc of Switzerland), 45.55%]; and the Colquiri silver, tin, and zinc mine (COMIBOL through Empresa Minera Colquiri, 100%).

Sumitomo Corp. of Japan's wholly owned subsidiary, Empresa Minera San Cristóbal S.A., operated the San Cristobal lead, silver, and zinc mine, which is located at Potosi. Glencore plc controlled the Sinchi Wayra group of mines, which included the Asientos, Caballo Blanco, Colquechaquita, Comsure, Poopo, San Lorenzo, and Tres Amigos Mines and produced mainly tin and zinc (with some lead and silver). Table 2 is a list of the country's major mineral industry facilities, their capacities, and their locations (Glencore plc, 2017, p. 197; Sumitomo Corp., 2017, p. 159).

Mineral Trade

The total value of exports from Bolivia decreased by 19% in 2016 to \$7.0 billion from \$8.7 billion in 2015. Hydrocarbon exports decreased by 46% to \$2.1 billion from \$4.0 billion and accounted for 31% of the total. Both natural gas and petroleum were exported, but natural gas exports of \$2.0 billion accounted for most of the value of mineral fuel exports. The value of nonfuel mineral exports increased by 7% to \$3.1 billion from \$2.9 billion in 2015 and accounted for 44% of the total value of exported goods. In 2016, Bolivia's leading nonfuel mineral commodity exports were, in terms of value, gold, silver, and zinc which had a combined total value of \$2.5 billion; nonfuel mineral exports accounted for about 9% of the country's GDP. Other important nonfuel mineral commodities that were exported included antimony, copper, iron, lead, tin, and tungsten (Banco Central de Bolivia, 2017c, f, g).

The greatest percentage increase in value among nonfuel mineral exports in 2016 was for lead, which increased by 20% to about \$160 million from \$134 million in 2015. Other exported nonfuel mineral commodities for which there were increases in value in 2016 included zinc, which increased by 14% to \$983 million; tin, by 13% to \$301 million; silver, by 10% to \$160 million; and nonmonetary gold, by 3% to \$770 million. On the other hand, the value of antimony exports decreased by 41% to \$17 million; tungsten, by 35% to \$14 million; and the aggregate value of other minerals, such as barite, cadmium, calcite, gypsum, iron, and salt, decreased by 28% to \$86 million. In 2016, the United States was the leading destination, in terms of value, for nonfuel mineral exports, accounting for 24% of the total from Bolivia, followed by China (15%), Japan (13%), and the Republic of Korea (12%), which combined accounted for 64% of the total (Banco Central de Bolivia, 2017a, c, g).

The amount of most of the nonfuel mineral exports also increased or remained the same. The greatest percentage increase, in terms of amount, was that of lead exports, which increased by 17% to 87,200 t followed by zinc, by 9% to 482,300 t; tin, by 4% to 17,100 t; and silver, by 3% to 1,345,000 kilograms (kg). Gold exports decreased by nearly 4% to 19,300 kg. Reported exports of several mineral commodities exceeded reported production; available information was inadequate to determine whether this was the result of drawdowns in inventories or other factors (Banco Central de Bolivia, 2017b, g).

The largest percentage decrease in value of hydrocarbon exports in 2016 was that of crude petroleum, which decreased by 65% to \$70 million from \$201 million in 2015. The value of natural gas exports decreased by 47% to \$2.0 billion from \$3.8 billion in 2015. The value of other hydrocarbon exports increased by 161% to \$34 million. In 2015 (the latest year for which data available), Brazil was the leading destination, in terms of value, for hydrocarbon exports from Bolivia, followed by Argentina; together, these two countries accounted for 94% of the total of \$4.0 billion. Bolivia also exported hydrocarbons to the United States; the value of these exports was less than \$50 million (Banco Central de Bolivia, 2017c, g).

In terms of trade with the United States, Bolivia's total exports to the United States were valued at almost \$1 billion in 2016, of which mineral and mineral-related commodities were valued at about \$750 million. Nonmonetary gold was valued at \$493 million; tin, \$107 million; and other precious metals, \$93 million; other noteworthy mineral and mineral-related commodities included steelmaking materials valued at \$19 million; crude petroleum, \$13 million; copper, \$9 million; fuel oil, \$6 million; sulfur and nonmetallic minerals, \$5 million; and bauxite and aluminum, \$1 million (Banco Central de Bolivia, 2017c; U.S. Census Bureau, 2017b).

In 2016, the total value of goods imported to Bolivia decreased by 12% to \$7.9 billion. The decrease was driven primarily by a decline in the importation of capital goods for agriculture, industrial manufacturing, and transportation, the aggregate value of which decreased by 19% to \$2.6 billion from \$3.2 billion in 2015. The leading countries of origin of imports to Bolivia were China (20%), Brazil (18%), Argentina (10%),

and the United States (10%), which combined accounted for 58% of the total value (Banco Central de Bolivia, 2017d, e).

Bolivia's imports from the United States, as reported by the U.S. Census Bureau, were valued at \$657 million in 2016, of which mineral and mineral-related commodities were valued at about \$70 million. The top four mineral-related commodities were petroleum products valued at \$25 million; fuel oil, \$20 million; nonmonetary gold, \$9 million; and finished metal shapes, \$8 million. Noteworthy others included aluminum and alumina valued at \$5 million, and iron and steel products (other), \$2 million (U.S. Census Bureau, 2017a).

Commodity Review

Metals

Copper, Gold, and Silver.—Orvana Minerals Corp. of Canada through its subsidiary Empresa Minera Paititi S.A. operated the Don Mario open pit gold-copper-silver mine, which is located in Santa Cruz Department in southeastern Bolivia. In fiscal year 2016 (October 1, 2015, to September 30, 2016), the mine's gold production increased by 11% to 656 kg owing to higher grades and increased recoveries related primarily to the initiation of production at the mine's lower mineralized zone (LMZ); copper production decreased by 36% to 4,763 t and silver production decreased by 12% to 11,867 kg owing to lower grades. During 2015, Orvana Minerals carried out a geotechnical and geologic review of an older resource block of the LMZ in an effort to extend the life of the mine. At the end of September 2016, the Don Mario Mine's measured and indicated reserves were a reported 1.334 Mt at average grades of 2.77 grams per metric ton (g/t) gold, 0.43% copper, and 5.63 g/t of silver (Orvana Minerals Corp., 2016, p. 4, 7, 17, 19).

Coeur Mining Inc. of the United States held mining rights to the San Bartolomé open pit silver mine through agreements with COMIBOL and several mining cooperatives; the mine is located in Potosi Department in southern Bolivia. The mine and associated milling operation have been in production by Empresa Minera Manquiri S.A. (a wholly owned subsidiary of Coeur Mining) since 2008. In 2016, production of silver at the San Bartolomé Mine increased by 1% to 170,101 kg despite a water shortage from a nationwide drought; this total accounted for nearly 13% of Bolivia's total silver mine output of 1,353,202 kg in 2016. As of December 31, 2016, proven reserves of silver at the mine were reported to be 5.6 Mt at an average grade of 103 g/t silver, or more than 570,000 kg of silver (Coeur Mining Inc., 2017, p. 8, 29, 30).

Pan American Silver Corp. of Canada operated the San Vicente underground silver-zinc mine located in Potosi Department in southern Bolivia. Pan American Silver controlled 95% of the mine in a joint venture with COMIBOL, and the remaining 5% was held by Trafigura Beheer B.V. of Switzerland. In 2016, the San Vicente Mine had a record level of silver production—137,882 kg—owing to higher grades and throughput; this was an increase of 8% and accounted for nearly 10% of Bolivia's total silver mine output. As of December 31, 2016, proven reserves of silver at the San Vicente Mine were reported to be 2.0 Mt at an average grade of

464 g/t silver, or more than 900,000 kg of silver (Pan American Silver Corp., 2017, p. 21, 33, 73).

Tin.—Bolivia's mined tin production in 2016 decreased for the first time since 2013; the annual decrease was 13% to 17,460 t compared with 20,135 t in 2015. The sharp decrease was owing to a drought and delayed investment. Mined tin produced by state-run companies decreased by 17% to about 10,690 t; production by cooperatives decreased by 20% to about 2,580 t, and that by private mines increased by 2% to 4,190 t (IM-mining.com, 2017).

Bolivia's state-owned refined tin company, Empresa Minera Huanuni, reported that its Vinto tin smelter produced 13,111 t of refined tin in 2016, which was an 8.3% increase from the 12,106 t produced in 2015. The increase in refined tin production was owing to an increase in throughput, as more material was processed domestically; this total ranked Empresa Minera Huanuni as the sixth-ranked refined tin producer in the world and second in South America behind Minsur S.A. of Peru. A new blast furnace at the Vinto tin smelter that was commissioned in early 2015 increased the smelter's production capacity to 18,000 metric tons per year (t/yr) of refined tin. In addition, COMIBOL was also reportedly considering a potential \$345 million investment that would expand capacity even further to 62,000 t/yr of refined tin. Minsur reported that Operaciones Metalúrgicas S.A. of Bolivia was also a leading producer of refined tin in Bolivia in 2016, with a production total of about 3,700 t. Overall, Bolivia produced 16,810 t of refined tin in 2016, which accounted for about one-third of the total production of refined tin in South America of nearly 45,000 t as reported by Minsur (Minsur S.A., 2016, p. 4; 2017, p. 5; MiningConnection.com, 2017).

Industrial Minerals

Lithium and Potash.—In 2016, Bolivia continued to make progress in developing its emerging lithium industry. The country planned to invest nearly \$1 billion by 2019 to build a lithium battery plant, lithium hydroxide and magnesium hydroxide units, and a cathodes plant at the Salar de Uyuni salt flats. The Gerencia Nacional de Recursos Evaporíticos (GNRE) was the Government agency responsible for managing the industrialization of production of the evaporite resources at the Salar de Uyuni. In August, 10 t of lithium carbonate that was produced from a pilot plant in Uyuni was shipped to China; this was the first shipment of lithium carbonate from Bolivia by GNRE and represented the start of what the Government hoped would soon become a major source of income for Bolivia. In 2015, GNRE signed an agreement with K-UTEC AG Salt Technologies of Germany for an engineering study to be completed by the end of 2016 for the design of a lithium carbonate plant that could process up to 30,000 t/yr of lithium carbonate. Upon completion of the study, Bolivia's Government planned to call for bids for construction of an industrial-scale plant with a target completion date by the end of 2018. Also in 2015, GNRE signed an agreement with China CAMC Engineering Ltd. of China to construct and commission a potassium salts industrial plant to be completed by the end of 2017. With an investment of about \$200 million, the plant was

expected to have two production lines, each with a capacity to produce 350,000 t/yr of potassium salts. The U.S. Geological Survey estimated that Bolivia’s identified lithium resources were 9 Mt (Emery, 2015, 2018; Gerencia Nacional de Recursos Evaporíticos, 2016, p. 15–18; 2017, p. 9; Jamasmie, 2016; Jaskula, 2017).

Mineral Fuels

Natural Gas.—Total S.A. of France announced in August 2016 that it had started production of natural gas at its Incahuasi gasfield (phase I), which is located in the Aquio and Ipati blocks about 280 kilometers south of Santa Cruz. The Incahuasi gasfield was initially discovered in 2004 and, in 2013, development of phase I began with an investment of \$1.2 billion; production was expected to reach up to 6.9 million cubic meters per day of natural gas. Total held a 50% ownership in the field with OAO Gazprom, 20%; Tecpetrol S.A. of Uruguay, 20%; and Yacimientos Petrolíferos Fiscales Bolivianos (YPFB) of Bolivia, 10%. In addition, Total noted that development of phase II of the Incahuasi gasfield was under consideration and would likely be launched in early 2017. Phase II was expected to cost \$980 million to develop and, upon completion, would produce 6.5 million cubic meters per day of natural gas. The project was expected to take 4 years to complete. In 2016, Total had seven licenses in Bolivia, which included three production licenses at Block XX Tarija Oeste, San Alberto, and San Antonio; two licenses in the development phase at Aquio and Ipati; and two exploration-phase licenses at Azero and Rio Hondo (Paredes, 2015; Place, 2016; Total S.A., 2017, p. 21).

In 2016, Bolivia produced 21,336 million cubic meters of natural gas, or about 59 million cubic meters per day, representing a 4% decrease from that of 2015. YPFB, which was Bolivia’s state-owned natural gas and crude petroleum company, was created in 2006. In addition to those mentioned above, several other international companies worked with YPFB in the exploration, production, and distribution of natural gas in Bolivia, especially Petrobras, Repsol S.A., British Gas, BP p.l.c. of the United Kingdom, and Exxon Mobil Corp. of the United States. Most of the natural gas production and reserves in Bolivia are located within Tarija Department. Bolivia is an important supplier of natural gas to Argentina and Brazil (U.S. Energy Information Administration, 2015; Instituto Nacional de Estadística, 2017b).

Outlook

An essential component of the economy in Bolivia during the next several years was expected to be a recovery in FDI, especially in the crude petroleum and natural gas sectors, and a recovery in the value and amount of exports, which helped increase the growth in real GDP to more than 5% several years ago. In addition, the continued development of the country’s lithium reserves, especially from the Government’s planned investment of up to \$1 billion in the lithium industry by 2019, could provide a boost to the economy. Bolivia’s GDP growth slowed to 4.1% in 2016 as reported by the International Monetary Fund and was forecasted to remain at or slightly below that level through 2020 (International Monetary Fund, 2017).

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TABLE 1
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2012	2013	2014	2015	2016	
METALS						
Antimony:						
Mine production, Sb content	5,081	5,052	4,186	3,843	2,669	
Refinery production:						
Metal, gross weight ³	370	351	400 ^e	370 ^e	300 ^e	
Trioxide, Sb content ³	3,974	3,942	4,000	3,700	3,000 ^e	
Arsenic, primary, oxide content, arsenic trioxide ³	103	120	52	33 ^r	38	
Bismuth:						
Ore and concentrate	NA	NA	11	20	28	
Refinery production	NA	NA	24	--	8	
Copper, Cu content:						
Mine production, concentrate	8,653	7,549	10,746	9,497	8,718	
Metal, primary	904	1,271	1,810	1,789 ^r	2,199	
Gold, Au content:						
Mine production ⁴	kilograms	7,047	18,127	24,803 ^r	12,810 ^r	12,811
Refinery production, metal	do.	1,681	1,266	1,200 ^e	600 ^e	600 ^e
Lead:						
Mine production, Pb content	81,095	82,131	78,509 ^r	75,273	89,510	
Refinery production, primary	250 ^e	330 ^e	300 ^e	459 ^r	41	
Silver, Ag content:						
Mine production ⁵	kilograms	1,207,158	1,287,200	1,398,163 ^r	1,306,098 ^r	1,353,202
Smelter production, primary	do.	185,571	187,559	212,396 ^r	169,782 ^r	194,443
Tantalum, mine production, tantalite concentrate:						
Gross weight	do.	43,000 ^r	47,000 ^r	22,947	1,276 ^r	--
Ta content ^e	do.	10,600	11,500	5,640	314	--
Tin:						
Mine production, Sn content	19,702	19,287	19,791	20,135	17,460	
Smelter production, primary	14,626	14,862	15,439	15,464 ^r	16,810	
Tungsten, mine production, concentrate, W content	1,247	1,253	1,252 ^r	1,460	1,110	
Zinc, mine production, Zn content	389,911	407,332	474,988 ^r	442,154	486,955	
INDUSTRIAL MINERALS						
Barite						
21,157	30,863	23,240 ^r	46,732 ^r	16,632		
Boron:						
Boric acid						
14,892	15,045	16,388 ^r	17,713 ^r	17,239		
Ulexite						
127,638	149,818	151,799	148,738	182,685		
Cement:						
Clinker						
thousand metric tons	1,867	1,700 ^e	1,700 ^e	1,700 ^e	1,750 ^e	
Hydraulic	do.	2,714	3,061	3,337	3,468 ^r	3,601
Clay and shale, bentonite						
745	182	886	1,023 ^r	525		
Gemstones:						
Amethyst, rough						
kilograms	97,255	182,424	188,704	242,641 ^r	152,154	
Ametrine, rough						
do.	81,122	1,751	856	824 ^r	315	
Gypsum, crude						
645	1,223	1,464	650 ^r	1,182		
Salt, rock						
2,461	2,262	2,835 ^r	2,216 ^r	4,534		
Stone, size and shape unspecified:						
Limestone						
200	200	NA	NA	NA		
Marble						
265	27	NA	NA	NA		
Slate						
141	112	NA	NA	NA		
MINERAL FUELS AND RELATED MATERIALS						
Natural gas liquids						
thousand 42-gallon barrels	3,931	4,303	4,500 ^e	4,460 ^{e,r}	4,290 ^e	
Natural gas:						
Gross						
million cubic meters	18,706	21,272	22,386	22,174 ^r	21,336	
Marketable						
do.	18,475	21,021	22,188	21,998 ^r	21,144	
Petroleum:						
Crude						
thousand 42-gallon barrels	15,086	17,334	18,639	17,910 ^r	16,570	

See footnotes at end of table.

TABLE 1—Continued
BOLIVIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2012	2013	2014	2015	2016	
Petroleum:—Continued						
Refinery production:						
Asphalt	thousand 42-gallon barrels	12	12	10	6	14
Distillate fuel oil, including diesel	do.	4,590	5,192	5,419	6,110	5,629
Gasoline:						
Aviation	do.	45	41	49	38	34
Motor	do.	5,924	6,707	6,826	6,886	8,836
Jet fuel	do.	1,052	1,301	1,413	1,500	1,483
Kerosene	do.	121	107	118	124	138
Liquefied petroleum gas	do.	282	361	300 ^e	300 ^e	300 ^e
Lubricants:						
Automotive	do.	156	165	167	163	164
Greases	do.	3	3	2	2	2
Total	do.	12,185	13,889	14,304	15,129	16,600

^eEstimated. ^rRevised. do. Ditto. NA Not available. -- Zero.

¹Table includes data available through December 11, 2017. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits; may not add to totals shown.

²In addition to the commodities listed, indium, iron ore, manganese and a variety of industrial minerals (clays, crushed and broken stone, dimension stone, lime, sand and gravel, native sulfur, and quartz) may have been produced in Bolivia, but available information was inadequate to make reliable estimates of output. Minor amounts of lithium carbonate were produced at a pilot plant in Uyuni in 2016.

³Exported production.

⁴May include production of metallic gold.

⁵May include production of metallic silver.

TABLE 2
BOLIVIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Antimony	Empresa Minera Unificada S.A. (private, 100%)	Caracota, Chilcobija, and Espiritu Santo Mines, Potosi Department	1,100
Do.	Small-scale mining operations and cooperatives (private, 100%)	San Jose Mine, Oruro Department; mines in Caracota District, Nor Chichas, Quijarro, and Sud Chichas Provinces, Potosi Department	4,500
Do.	Amalgamated Gold and Silver Inc., 70%, and Raptor Ventures LLC (Planet Resource Recovery Inc., 100%), 30%	San Antonio de Turiri Mine, Potosi Department	30,000
Antimony, metal (regulus)	Empresa Metalúrgica Vinto (Government, 100%)	Vinto antimony plant, Carretera Vinto, Oruro Department	6,000
Antimony, metal	Operaciones Metalúrgicas S.A. (private, 100%)	Huajara Industrial Park, East Oruro, Oruro Department	3,000
Do.	Fundestaño de Oruro S.A. (Empresa Minera Unificada S.A., 100%)	City of Oruro, Oruro Department	1,100
Antimony trioxide	Empresa Minera Bernal Hermanos S.A. (private, 100%)	Palala smelter, Tupiza, Potosi Department	1,900
Bismuth	Cooperativa Minera Locatarios Tasna Ltda.	Tasna Mine, near Oruro, Oruro Department	200
Bismuth, refined	Corporación Minera de Bolivia (COMIBOL) (Government, 100%)	Telamayu bismuth refinery, Telamayu, Potosi Department	350
Do.	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	90
Cement	thousand metric tons	Sociedad Boliviana de Cemento S.A. (Consorcio Cementero del Sur S.A., 47.02%, and other private, 52.98%)	1,800
Do.	do.	Fábrica Nacional de Cemento S.A. (Chuquisaca Provincial Government, 33.34%; Municipal Government of Sucre, 33.33%; Universidad San Francisco Xavier de Chuquisaca, 33.33%)	1,100
Do.	do.	Cooperativa Boliviana de Cemento Ltda.	825
Do.	do.	ITACAMBA Cemento S.A.	200
Copper	Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp. joint venture with Corporación Minera de Bolivia, 95%, and Trafigura Beheer B.V., 5%)	San Vicente Mine, Potosi Department	700
Do.	Empresa Minera Corocobre S.A. [Korea Resources Corp., 53%, and Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 47%]	Coro Coro Mine, La Paz Department	3,600
Do.	Small-scale mining operations and cooperatives (private, 100%)	Mining operations in Chuquisaca, La Paz, Oruro, and Potosi Departments	650
Gemstones, ametrine	Minerales y Metales del Oriente S.R.L.	Anahi Mine, Santa Cruz Department	NA
Gold	kilograms	Empresa Minera Paititi S.A. {Orvana Minerals Corp. [Fabulosa Mines Ltd. (Minera S.A., 100%), 52.5%, and other private, 47.5%], 100%}	2,300
Do.	do.	Threegold Resources Inc. (private, 100%)	150
Do.	do.	Grupo Minero La Roca S.A. (private, 100%)	200
Do.	do.	Mining Cooperatives (private, 100%)	4,350
Do.	do.	Empresa Minera Inti Raymi S.A. (Compañía Procesadora de Minerales S.A., 88%, Zeland Mines S.A., 12%)	1,000
Indium, run of mine	Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 55.45%, and Sociedad Minera Illapa S.A. (Glencore plc, 100%), 45.55%	Bolivar and Porco Mines, Oruro and Potosi Departments	35
Do.	Sinchi Wayra S.A. (Glencore plc, 100%)	Asientos, Caballo Blanco, Colquechaquita, Comsur, Poopo, San Lorenzo, and Tres Amigos Mines, Potosi Department	35

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Indium, run of mine— Continued			
Do.	Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp. joint venture with Corporación Minera de Bolivia, 95%, and Trafigura Beheer B.V., 5%)	San Vicente Mine, Potosi Department	15
Do.	Empresa Minera Colquiri [Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 100%]	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	5
Lead	Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 55.45%, and Sociedad Minera Illapa S.A. (Glencore plc, 100%), 45.55%	Bolivar and Porco Mines, Oruro and Potosi Departments	1,000
Do.	Sinchi Wayra S.A. (Glencore plc, 100%)	Asientos, Caballo Blanco, Colquechaquita, Comsur, Poopo, San Lorenzo, and Tres Amigos Mines, Potosi Department	7,000
Do.	Empresa Minera San Cristóbal S.A. (Sumitomo Corp., 100%)	San Cristobal Mine, Potosi Department	82,000
Do.	Corporación Minera de Bolivia (COMIBOL) (Government, 100%)	Cerro Rico Mine, Potosi Department, and in areas immediately surrounding the San Cristobal Mine	10,200
Do.	Empresa Minera Santa Lucia Ltda.	Santa Lucia lead-silver-zinc mine, Potosi Department	200
Do.	Compañía Minera PAS (Bolivia) S.A. [Pan American Silver Corp. joint venture with Corporación Minera de Bolivia (COMIBOL), 95%, and Trafigura Beheer B.V., 5%]	San Vicente Mine, Potosi Department	300
Lead, metal	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	120
Do.	Empresa Metalúrgica de Karachipampa [Corporación Minera de Bolivia (COMIBOL) (Government, 100%)]	Karachipampa lead and silver smelter and zinc refinery, Potosi Department	51,000
Natural gas	million cubic meters	Operated by Empresa Petrolera Andina S.A. (YPFB Andina S.A. [Government, 100%], 51.08%, and Repsol, S.A., 48.92%), and owned by Empresa Petrolera Andina, S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	2,700
Do.	do.	Operated by Petróleo Brasileiro S.A. (Petrobras) (Government, 32.2%, and private, 67.8%), and owned by Empresa Petrolera Andina S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	7,200
Do.	do.	Operated by Petróleo Brasileiro S.A. (Petrobras) (Brazilian Government, 32.2%, and private, 67.8%), and operation license owned by Total S.A., 41%; Petróleo Brasileiro S.A., 30%; BG Group plc., 25%; YPFB Chaco S.A., 4%	NA
Do.	do.	Operated and owned by YPFB Chaco S.A. (Government, 100%)	2,200
Do.	do.	Operated by Repsol YPF, S.A., and owned by BG Group plc., 37.5%; Repsol YPF S.A., 37.5%; Pan American Energy LLC (BP p.l.c., 60%, and BRIDAS Corp., 40%), 25%	1,300
Do.	do.	Operated and owned by BG Group plc., 100%	630
Do.	do.	Operated by Pluspetrol Bolivia Corporation S.A. (Pluspetrol S.A., 100%)	520
Do.	do.	Operated by Vintage Petroleum Boliviana Ltda. (Occidental Petroleum Corp., 100%)	350

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Petroleum thousand 42-gallon barrels	Operated by Empresa Petrolera Andina S.A. (YPFB Andina S.A. [Government, 100%], 51.08%, and Repsol YPF, S.A., 48.92%) and owned by Empresa Petrolera Andina, S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Los Sauces, Rio Grande, Sirari, Vibora, and Yapacani fields, Santa Cruz Department	2,100
Do.	do. Operated by Petróleo Brasileiro S.A. (Petrobras) (Government, 32.2%, and private, 67.8%), and owned by Empresa Petrolera Andina S.A., 50%; Petróleo Brasileiro S.A., 35%; Total S.A., 15%	Sábalo field, San Antonio Block; San Alberto field and Block, Tarija Department	7,500
Do.	do. Operated and owned by YPFB Chaco S.A. (Government, 100%)	Vuelta Grande field, Chuquisaca Department; Bulo Bulo, Carrasco and Kanata fields, on the border of Cochabamba and Santa Cruz Departments	2,900
Do.	do. Operated by Repsol YPF, S.A., and owned by BG Group plc., 37.5%; Repsol YPF S.A., 37.5%; Pan American Energy LLC (BP p.l.c., 60%, and BRIDAS Corp., 40%), 25%	Margarita-Huacaya field, Caipipendi Block, Tarija Department; Paloma field, Mamore Block, Cochabamba and Santa Cruz Departments	5,000
Do.	do. Operated and owned by BG Group plc., 100%	La Vertiente, Escondido and Taiguati fields, La Vertiente Block; Los Suris field and Block, all in Tarija Department	610
Do.	do. Operated by Pluspetrol Bolivia Corporation S.A. (Pluspetrol S.A., 100%)	Bermejo and Madrejonas fields, Tarija Department; Tacobo field, Santa Cruz Department	160
Do.	do. Operated by Vintage Petroleum Boliviana Ltda. (Occidental Petroleum Corp., 100%)	Chaco Sur and Nupuco fields, Tarija Department; Naranjillos field, Santa Cruz Department	140
Silver	Empresa Minera San Cristóbal S.A. (Sumitomo Corp., 100%)	San Cristobal Mine, Potosi Department	526
Do.	Empresa Minera Manquiri S.A. (Coeur Mining Inc., 100%)	San Bartolomé Mine and plant, by Cerro Rico, near Potosi, Potosi Department	233
Do.	Small-scale mining operations and cooperatives (private, 100%)	Candelaria Mine and other mines, Cerro Rico deposit, as well as in areas immediately surrounding the San Bartolomé Mine, Oruro and Potosi Departments	280
Do.	Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 55.45%, and Sociedad Minera Illapa S.A. (Glencore plc, 100%), 45.55%	Bolivar and Porco Mines, Oruro and Potosi Departments	19
Do.	Sinchi Wayra S.A. (Glencore plc, 100%)	Asientos, Caballo Blanco, Colquechaquita, Comsur, Poopo, San Lorenzo, and Tres Amigos Mines, Potosi Department	93
Do.	Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp. joint venture with Corporación Minera de Bolivia, 95%, and Trafigura Beheer B.V., 5%)	San Vicente Mine, Potosi Department	14
Do.	Empresa Minera Santa Lucia Ltda.	Santa Lucia lead, silver, and zinc mine, Potosi Department	30
Do.	Empresa Minera Paititi S.A. {Orvana Minerals Corp. [Fabulosa Mines Ltd. (Minera S.A., 100%), 52.5%, and other private, 47.5%], 100%}	Don Mario Mine, Chiquitos Province, Santa Cruz Department	26
Do.	Empresa Minera Inti Raymi S.A. (Compañía Procesadora de Minerales S.A., 88% and Zeland Mines S.A., 12%)	Kori Chaca open pit mine and Kori Kollo leaching plant, near Oruro	25
Do.	Empresa Minera Huanuni [Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 100%]	Cerro Rico Mine, Potosi Department	NA
Do.	Empresa Minera Colquiri [Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 100%]	Colquiri silver, tin, and zinc mine, Inquisivi Province, La Paz Department	NA
Do.	Empresa Metalúrgica de Karachipampa (Corporación Minera de Bolivia, 100%)	Karachipampa lead-silver smelter and zinc refinery, Potosi Department	310

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Silver—Continued			
Do.	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	2
Tin	Empresa Minera Huanuni [Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 100%]	Huanuni Mine, Dalence Province, Oruro Department	10,000
Do.	Empresa Minera Colquiri [Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 100%]	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	18,000
Do.	Empresa Minera Barrosquira Ltda. (private, 100%)	Caracoles Mine, Inquisivi Province, La Paz Department	500
Do.	Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 55.45%, and Sociedad Minera Illapa S.A. (Glencore plc, 100%), 45.55%	Bolivar and Porco Mines, Oruro and Potosi Departments	NA
Tin, refined	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	18,000
Do.	Operaciones Metalúrgicas S.A. (private, 100%)	Huajara Industrial Park, east Oruro, Oruro Department	3,360
Tin-lead alloys	Empresa Metalúrgica Vinto (Government, 100%)	Vinto smelting complex, Carretera Vinto, Oruro Department	200
Tungsten, W content	Empresa Minera Himalaya [Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 100%]	Himalaya Mine, Murillo Province, La Paz Department	NA
Do.	Small-scale mining operations and cooperatives (private, 100%)	Bolsa Negra, Enramada, and Reconquistada Mines, near the former International Mining Co.'s Chojilla Mine, Sud Yungas Province; Chambilaya and Chicote Grande Mines, Inquisivi Province; Mercedes, San Antonio, and Ucumarini Mines, Larecaja Province, La Paz Department	1,200
Zinc	Empresa Minera San Cristóbal S.A. (Sumitomo Corp., 100%)	San Cristobal Mine, southwestern Bolivia	270,000
Do.	Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 55.45%, and Sociedad Minera Illapa S.A. (Glencore plc, 100%), 45.55%	Bolivar and Porco Mines, Oruro and Potosi Departments	36,000
Do.	Sinchi Wayra S.A. (Glencore plc, 100%)	Asientos, Caballo Blanco, Colquechaquita, Comsur, Poopo, San Lorenzo, and Tres Amigos mines, Potosi Department	120,000
Do.	Corporación Minera de Bolivia (COMIBOL) (Government, 100%)	Cerro Rico Mine, Potosi Department, and in areas immediately surrounding the San Cristobal Mine	85,000
Do.	Empresa Minera Colquiri [Corporación Minera de Bolivia (COMIBOL) (Government, 100%), 100%]	Colquiri tin and zinc mine, Inquisivi Province, La Paz Department	2,700
Do.	Empresa Minera Santa Lucia Ltda.	Santa Lucia lead and silver-zinc mine, Potosi Department	12,000
Do.	Compañía Minera PAS (Bolivia) S.A. (Pan American Silver Corp. joint venture with Corporación Minera de Bolivia, 95%, and Trafigura Beheer B.V., 5%)	San Vicente Mine, Potosi Department	8,000

^cEstimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.