

2016 Minerals Yearbook

PERU

THE MINERAL INDUSTRY OF PERU

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Peru continued to be among the world's leading producers of many nonfuel minerals and base metals. In 2016, the country was estimated to rank second among the world's leading producers of silver (accounted for 17% of world production), copper (12% of world production), and zinc (11% of world production); fourth among the world's leading producers of molybdenum (9% of world production) and lead (7% of world production); fifth among the world's leading producers of tin (7% of world production); and sixth among the world's leading producers of gold (5% of world production). According to the Ministerio de Energía y Minas (MEM), Peru continued to be Latin America's leading producer of gold, lead, and zinc; the second-ranked producer of cadmium, copper, molybdenum, phosphate rock, and silver; and the third-ranked producer of tin. The country's world rankings for reserves of mineral commodities were as follows: first for silver; third for copper, molybdenum, and zinc; fourth for lead; and seventh for gold (Brininstool, 2017; Bennett, 2017, 2018; George, 2017, 2018; Guberman, 2017; Ministerio de Energía y Minas, 2017b, p. 27, 31; Tolcin, 2017; Anderson, 2018; Crangle, 2018; Flanagan, 2018; Klochko, 2018; Polyak, 2018; Thomas, 2018).

In 2016, Peru's real gross domestic product (GDP) growth rate was 3.9% compared with 3.3% in 2015. In 2016, the major sectors that contributed to Peru's GDP were services (49%), mining and hydrocarbons (14%), and manufacturing (13%). The GDP growth was driven mainly by a 16% increase in the country's mining and hydrocarbons sector. Growth in the mining and hydrocarbons sector was attributed to a 40% increase in copper output in 2016 as a result of the commissioning of the Las Bambas Mine operated by Minera Las Bambas S.A. and to the expansion of the Cerro Verde Mine operated by Sociedad Minera Cerro Verde S.A.A. (Minera Cerro Verde) (Banco Central de Reserva del Perú, 2017a, p. 7, 23; 2017b; 2017c, p. 39–42).

Minerals in the National Economy

The mining sector continued to be one of the strategic sectors of development and economic growth in the country. The production of such metallic minerals as copper, gold, iron, lead, molybdenum, silver, tin, and zinc increased by about 21% in 2016, driven mainly by increases in the production of copper (40%) and molybdenum (28%). The value of output of the hydrocarbons sector decreased by 5.0% during the year, however, owing mainly to a decrease in crude petroleum production (by 30%) resulting from the rupture of the Nor Peruano oil pipeline (Banco Central de Reserva del Perú, 2017a, p. 7, 25).

Peru's mining activity was broadly distributed among 24 of its 25 Regions. Direct employment in the mining sector decreased by nearly 2% to 174,126 in 2016 from 177,524 in 2015. Of these 174,126 workers, about 15% worked in the Arequipa Region; 10% each worked in the Junin and La Libertad Regions; 9% worked in the Cajamarca Region; 8% worked in the

Lima Region; 7% each worked in the Ancash and Pasco Regions; and 6% worked in the Apurimac Region (Ministerio de Energía y Minas, 2017b, p. 26, 96, 121–122).

According to the Banco Central de Reserva del Perú, private investment [including foreign direct investment (FDI)] in Peru decreased by 5.7% in 2016; this was the largest decrease observed since the 2009 economic crisis in which private investment decreased by 9.1%. The decrease in 2016 was driven mainly by a 44% decrease in mining investment—to \$4.3 billion in 2016 from \$7.6 billion in 2015—following the commissioning of major mining projects during the year. Investment in infrastructure accounted for about 25% of total mining investment, followed by investment in mining operations (22%) and mining equipment and exploration (9% each). Investment in mining during the next 5 years, which was expected to include 47 projects at various stages of exploration and (or) development, was projected to total \$47 billion. About 53% (\$25 billion) of this investment was for projects at the exploration stage, about 34% (\$16 billion) was for projects with approved environmental impact assessments and projects at the construction stage, about 11% (\$5 billion) was for expansion projects, and about 1% (\$591 million) was for projects at the evaluation stage. About 22% of the estimated investment was from China (\$10 billion); 19%, from Canada (\$9 billion); 13% each, from the United Kingdom and the United States (\$6.0 billion each); 9% each, from Mexico and Peru (\$4 billion each); 7%, from Australia (\$3 billion); 3%, from Brazil (\$1 billion); and 1%, from Japan (\$490 million). Copper projects accounted for about 61% of the total investment in mining, followed by polymetallics (15%), iron ore (11%), and gold and phosphates (4% each). Among the mining companies investing in the country, Southern Peru Copper Corp. was ranked first in the amount invested; in 2016, the company invested \$582 million. During the year, Southern Peru Copper continued with the development of the Tia Maria project in the Arequipa Region, the expansion of the Toquepala Mine in the Tacna Region, and the exploration program at Los Chancas in the Apurimac Region. Compañía Minera Antapaccay S.A. (Antapaccay) ranked second among the mining companies investing in the country. Antapaccay invested \$542 million in the expansion of the Antapaccay project in the Cusco Region. Cusco received 16% of Peru's mining investments, followed by La Libertad Region (12%) and the Tacna Region (9%) (Banco Central de Reserva del Perú, 2017a, p. 15, 17; Ministerio de Energía y Minas, 2017b, p. 96, 102, 105, 107, 109).

Government Policies and Programs

Peru's mining sector is regulated by the Ley General de Minería, Decreto Supremo No. 014–92–EM [General Mining Law, Supreme Decree No. 014–92–EM]. The MEM is the Government agency responsible for the administration and regulation of the energy and mining sector. The Instituto Geológico Minero y Metalúrgico of the MEM is the authority

responsible for all legal matters related to geoscience research and for the management of land and mining concessions. The Dirección General de Minería (DGM) of the MEM has the responsibility to address all legal matters related to mining sector policy. The Dirección General de Asuntos Ambientales of the MEM has the responsibility to address environmental problems that result from energy and mining activities and is mandated to implement environmental laws and regulations. Perupetro S.A. (PERUPETRO), created by law No. 26221, Ley Organica de Hidrocarburos [Organic Law of Hydrocarbons], is responsible for promoting investments in hydrocarbons exploration and mining in Peru. PERUPETRO is also responsible for negotiating, signing, and monitoring contracts and technical agreements for the exploration and mining of hydrocarbons in the country. Petroleos del Peru S.A. (PETROPERU), which is a state-owned company, is responsible for the transportation, refining, distribution, and sale of fuels and other derivatives of petroleum. PETROPERU owned most of the refineries in the country (Instituto Geológico Minero y Metalúrgico, 2017; Ministerio de Energía y Minas, 2017b, p. 14, 16; 2017c–e; Perupetro S.A., 2017b; Petroleos del Peru S.A., 2021).

Production

In 2016, artisanal gold increased by 106% to 25,085 kilograms (kg) from 12,175 kg in 2015 owing to an increase in artisanal mining production and the expansion of the collection of statistical information mainly in the regions of Arequipa, Piura, and Puno. Copper concentrates production increased by 40% to about 2.3 million metric tons (Mt) from 1.6 Mt (revised), and molybdenum, by 28% to 25,757 metric tons (t) from 20,153 t. The increase in copper and molybdenum production was attributed to the commissioning of Las Bambas Mine and the expansion of the Cerro Verde Mine. The industrial minerals for which output increased by more than 10% were onyx (72%) and kyanite (an estimated 14%). Among mineral fuels and related materials, increases in production included that of residual fuel oils (increased by 125%), natural gas liquids (48%), gasoline (24%), liquefied petroleum gas (16%), and gross natural gas (12%). In 2016, direct-reduced iron production decreased by 85% to 11,000 t from 72,000 t (revised) in 2015. Industrial minerals for which production decreased by more than 10% included boron (decreased by 94%), barite (72%), marble and talc (57% each), kaolin (56%), travertine (46%), gypsum (41%), pyrophyllite (32%), limestone (24%), stone (construction) (13%), silica (12%), diatomite (11%), and bentonite (10%). Mineral fuels and related materials for which production decreased were led by crude petroleum (decreased by 30%) and lubricants (26%). The 30% decrease in crude petroleum was attributed mainly to a rupture of the Nor Peruano oil pipeline, which resulted in the closure of Block 192 (owned by Pacific Stratus Energy del Peru S.A.) and Block 67 (jointly owned by Perenco of the United Kingdom and PetroVietnam Exploration Production Corp. of Vietnam), and the temporary shutdown of Block 8 [owned by Pluspetrol Norte S.A. (Pluspetrol)]. The shutdown of Block 8 that took place between September and December was owing to protests in the community of Saramurillo, Loreto Region, following the rupture of the Nor Peruano oil pipeline; the communities

were demanding environmental remediation in the affected areas. Lead refinery production at La Oroya continued to be suspended, and a liquidation process for La Oroya metallurgical complex was underway in 2016. La Oroya was operated by Doe Run Peru S.R.L. Operations at Minera Tungsten Malaga del Peru S.A., which was the only producer of tungsten in the country, were placed on care-and-maintenance status. Data on mineral production are in table 1 (tables 1, 2; Garcia, 2016; Banco Central de Reserva del Perú, 2017a, p. 25; Ministerio de Energía y Minas, 2017b, p. 40–43, 49; Perupetro S.A., 2017a, p. 24–25, 34, 53).

Structure of the Mineral Industry

The majority of the mining operations in Peru were privately owned. In 2016, the country's leading copper companies included Compañía Minera Antamina S.A. (Antamina), Antapaccay, Cerro Verde, Las Bambas, and Southern Copper Corp. The country's leading silver producers included Antamina, Compañía de Minas Buenaventura S.A.A., Compañía Minera Ares S.A.C., Minera Chinalco Perú S.A., and Volcan Compañía Minera S.A.A. (Volcan), and the leading zinc producers included Antamina, Compañía Minera Milpo S.A. (Milpo), and Volcan. Shougang Corp. of China, through its subsidiary Shougang Hierro Perú S.A.A. (Shougang Hierro Perú), continued to be Peru's sole iron ore producer, and Minsur S.A. was the sole producer of tin. Molybdenum was produced as a byproduct of copper production by Antamina, Cerro Verde, Minera Chinalco (Toromocho), and Southern Copper (Cuajone and Toquepala units) (Ministerio de Energía y Minas, 2017b, p. 43, 59, 67, 80, 82). Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2016, the value of Peru's total exports amounted to about \$36.8 billion compared with \$34.2 billion in 2015, which was an increase of 8%. Peru's mineral exports, which included metallic and nonmetallic minerals, iron and steel, fabricated metal products and jewelry, accounted for about \$23.8 billion, or 65% of total export revenues, in 2016 compared with almost \$21.1 billion, or about 62% of the total export revenues, in 2015. In 2016, metallic products, which included copper, gold, iron ore, lead, molybdenum, silver, tin, zinc, and others, accounted for about \$21.7 billion, or 59% of the total exports, and the petroleum and natural gas sector accounted for about \$2.2 billion, or 6%. Copper accounted for 47% of Peru's metallic products exports, followed by gold (34%) lead (8%), and zinc (7%). The country's leading metallic export partners were, in order of value, China (which received 34% of Peru's metallic products exports), Switzerland (12%), the United States (10%), Canada (6%), and Japan and the Republic of Korea (5% each) (Ministerio de Energía y Minas, 2017b, p. 33–35).

Copper exports in 2016 totaled 2.5 Mt and were valued at about \$10.2 billion compared with 1.8 Mt valued at about \$8.2 billion in 2015; this was an increase in value of 24% compared with that of 2015 and was owing to an increase in the quantity of exports by about 40%. Peru's leading copper export partners were, in order of value, China (which received about 61% of the country's copper exports), Japan (8%), and

Brazil and the Republic of Korea (4% each). The country's gold exports amounted to about 181,000 kg valued at \$7.3 billion compared with about 175,000 kg valued at about \$6.53 billion in 2015; the increase in the export value was owing to an increase in the price of gold to \$1,248 per troy ounce in 2016 from \$1,160 per troy ounce in 2015. Peru's leading gold export partners were, in order of export value, Switzerland (which received about 35% of Peru's gold exports), the United States (24%), Canada (14%), and India and United Arab Emirates (6% each) (Ministerio de Energía y Minas, 2017b, p. 45, 53).

Exports of lead amounted to 941,000 t in 2016 compared with 934,000 t in 2015 and were valued at \$1.7 billion in 2016 compared with \$1.5 billion in 2015; the increase was attributed to an increase in the price of lead to \$0.85 per pound in 2016 from \$0.81 per pound in 2015. Peru's leading lead export partners were, in order of export value, China (which received about 34% of the country's lead exports), the Republic of Korea (23%), Canada (18%), and Belgium (8%). Exports of molybdenum amounted to 24,400 t valued at about \$273 million in 2016 compared with 17,800 t valued at about \$220 million in 2015. Peru's leading molybdenum export partners were China, the Netherlands, and the United States, which together received about 88% of the country's lead exports. Exports of silver amounted to about 221,457 kg valued at \$120 million in 2016 compared with about 277,132 kg valued at about \$138 million in 2015; prices increased to \$17.14 per troy ounce in 2016 from \$15.68 per troy ounce in 2015. The leading silver export partners were, in order of export value, the United States (which received about 70% of Peru's silver exports), Brazil (14%), and Canada (11%) (Ministerio de Energía y Minas, 2017b, p. 69, 77, 85).

Peru's tin exports in 2016 totaled to 19,400 t and were valued at almost \$344 million compared with 20,100 t valued at more than \$342 million in 2015. In 2016, the United States and the Netherlands together received 59% of the country's tin exports. Zinc exports in 2016 totaled 1.1 Mt and were valued at about \$1.5 billion, which was a slight decrease in tonnage and value from 2015; prices increased to \$0.95 per pound in 2016 from \$0.87 per pound in 2015. Peru's leading zinc exports partners were, in order of value, the Republic of Korea (which received about 17% of the country's zinc exports), China and Spain (15% each), Belgium and Brazil (10% each), and Australia and Japan (7% each). Iron ore exports amounted to 11.4 Mt valued at \$344 million in 2016 compared with 11.6 Mt valued at \$350 million in 2015. China continued to be the leading export partner, accounting for 97% of Peru's iron ore exports (Ministerio de Energía y Minas, 2017b, p. 56–57, 61, 65, 69, 72–73, 81–83).

Nonmetallic mineral exports, which excludes fuel minerals, were valued at about \$640 million in 2016 compared with \$698 million in 2016. The decrease in value was attributed to lower exports of phosphate rock and limestone. In 2016, the United States received about 30% of the country's nonmetallic minerals exports, followed by Brazil and Chile (13% each), and India (10%) (Ministerio de Energía y Minas, 2017b, p. 92–93).

Peru's exports to the United States were valued at about \$6.3 billion in 2016 compared with about \$5.1 billion in 2015. Of this amount, nonmonetary gold accounted for about \$1.6 billion (or 26% of the country's total exports to the United States, by value); petroleum products accounted for

about \$320 million; copper, about \$144 million; zinc, about \$134 million; tin, about \$121 million; and crude petroleum, about \$30 million. Imports from the United States were valued at about \$8.0 billion in 2016 compared with about \$8.7 billion in 2015; these included about \$1.2 billion in fuel oil, about \$550 million in other petroleum products, and about \$186 in excavating machinery (U.S. Census Bureau, 2017a, b).

Commodity Review

Metals

Copper.—In 2016, Peru's leading copper companies were, in order of output, Cerro Verde (which accounted for about 22% of the country's total copper production), Antamina (19%), Las Bambas (14%), Southern Copper (13%), and Antapaccay (9%). The Arequipa Region was ranked first among the country's copper-producing regions in 2016, accounting for about 22% of the amount produced, followed by the Ancash (19%), Cusco (15%), and Apurímac (14%) Regions. The Arequipa Region replaced the Ancash Region as the leading copper-producing region in 2016 owing to the completion of the Cerro Verde expansion project (Ministerio de Energía y Minas, 2017b, p. 41).

Minera Chinalco operated the Toromocho open pit mine, which is located in the Morococha District, Junín Region. In 2016, the company accounted for about 7% of the country's total copper production. According to the MEM, Minera Chinalco announced the rescheduling of its plan to invest an additional \$1.4 billion to further expand the mine's capacity by an additional 25,000 t of copper by 2019. Hudbay Minerals Inc. of Canada, through its subsidiary HudBay Peru S.A.C., owned 100% interest in the Constancia Mine, located in Chumbivilcas Province, Cusco Region, and included the Constancia and the Pampacancha deposits. The company began production at Constancia in 2015 and accounted for about 6% of the country's total copper production in 2016. Total proven and probable reserves at Constancia and Pampacancha were reported as 584.2 Mt at average grades of 0.30% copper, 0.0093% [reported as 93 grams per metric ton (g/t)] molybdenum, 0.054 g/t gold, and 2.91 g/t silver. The company planned to produce between 100,000 and 115,000 t of copper in 2017 and to begin mining the Pampacancha deposit by 2018 (Hudbay Minerals Inc., 2017a, p. 10–11; 2017b; Ministerio de Energía y Minas, 2017b, p. 41, 110; 114; Minera Chinalco Peru S.A., 2017a, b).

Las Bambas, which began commercial production in July, was located in Cotabambas, Apurímac Region, and produced 330,227 t of copper concentrate in 2016. La Bambas was expected to produce between 420,000 t and 460,000 t of copper concentrate in 2017. Southern Copper continued with its expansion project at Toquepala (\$1.2 billion), located in the Tacna Region. The company expected to increase its production capacity to 100,000 metric tons per year (t/yr) of copper and to 3,100 t/yr of molybdenum (Ministerio de Energía y Minas, 2017b, p. 110; MMG Ltd., 2017).

Gold and Silver.—Peru's leading gold producers, in terms of output, were Minera Yanacocha S.R.L., which accounted for about 14% of the country's total gold production, Minera Barrick Misquichilca S.A. (11%), and Consorcio Minero Horizonte S.A. (5%). Gold production from La Libertad Region

accounted for about 29% of the country's total gold production, followed by the Cajamarca (24%), Arequipa and Madre de Dios (12%), and the Ayacucho Region (7%) Regions. In 2016, the increase in total gold production was attributed to increased production from artisanal mining, which included estimates from the Arequipa, Madre de Dios, Piura, and Puno Regions. According to the MEM, the increase in artisanal production from Arequipa, Puno, and Piura began to be accounted for in February. Part of the increase in production was due to the expansion in the coverage of statistical information collected during the year. In 2016, production of gold at large- and medium-scale operations accounted for about 76% of the total production. The leading silver producers were, in terms of output, Antamina and Buenaventura, each of which accounted for about 16% of the country's total silver production, followed by Compañía Minera Ares S.A.C., 10%, and Volcan, 8%. The Junin Region was ranked first among the country's silver-producing regions and accounted for about 20% of the amount produced, followed by the Lima and Ancash (18% each) and Pasco (15%) Regions (Ministerio de Energía y Minas, 2017b, p. 49, 52, 65).

In 2016, Hochschild Mining plc of the United Kingdom completed its first full year of production at the Inmaculada gold-silver underground mine located in the Ayacucho Region. In 2016, the Inmaculada Mine produced 4,613 kg of gold and 139 t of silver. As of December 31, total proven and probable mineral reserves at Inmaculada were reported as 5.8 Mt at average grades of 161 g/t silver and 4.3 g/t gold (Hochschild Mining plc, 2017, p. 18, 139–140).

Minera Yanacocha owned the Yanacocha Mine, which is located approximately 375 kilometers (km) north of Lima and 30 km north of the city of Cajamarca, and the Conga copper-gold project, which is located about 25 km northeast of Yanacocha. Minera Yanacocha was a joint venture among Newmont Mining Corp. of the United States (51.35%), Buenaventura (43.75%), and the International Finance Corp. (5.0%). Construction activities at Conga had remained suspended since 2011 after violent protests by residents in the northern region of Cajamarca. In 2016, representatives of the joint venture reported that they did not anticipate being able to develop Conga for the foreseeable future. Conga, with an investment cost of \$4.8 million, had the potential to produce about 54,000 t/yr of copper and 21,200 kilograms per year of gold (Newmont Mining Corp., 2017, p. 21; Ministerio de Energía y Minas, 2017b, p. 110).

Iron Ore.—Shougang Hierro Perú produced iron ore at the Marcona open pit mine, which is located in Marcona District, Ica Region. As of 2015, proven and probable reserves at the Marcona Mine were reported as 2.2 billion metric tons of iron ore. The company continued with the expansion project at Marcona at an investment cost of about \$1.5 billion. The expansion project was expected to be completed by late 2018 and to add an additional capacity of about 3.5 million metric tons per year (Mt/yr) of iron ore. Planned investments for iron ore included investment of \$1.5 billion in Pampa de Pongo, which is located in the Arequipa Region and owned by Jinzhao Mining Peru S.A. The project was expected to have a production capacity of about 15 Mt/yr of iron ore and to be completed by 2021

(Ministerio de Energía y Minas, 2017b, p. 110; Shougang Hierro Perú S.A.A., 2017, p. 5–6).

Lead and Zinc.—The country's leading lead producers were Compañía Minera Raura S.A. and Volcan, which accounted for about 8% each of the country's total lead production in 2016, followed by Buenaventura (7%). The Pasco Region accounted for about 28% of the country's total lead production followed by the Lima (19%), Junin (16%), and Ancash (10%) Regions. In 2016, production of lead by large- and medium-scale producers accounted for about 98% of the Peru's total lead production (Ministerio de Energía y Minas, 2017b, p. 73, 76).

In 2016, Antamina (which accounted for about 20% of the country's total zinc production) was the country's leading zinc producer, followed by Milpo and Volcan (14% each). The leading zinc-producing regions were, in order of output, the Ancash and Junin (which produced about 23% each of the country's zinc production), Pasco (20%), Ica (13%) and Lima (10%) Regions. The production of zinc decreased by 6% in 2016, which was mainly attributed to decreased production at Empresa Minera Los Quenuales S.A. (by 72%) and Antamina (by 12%). During the year, the Empresa Minera Los Quenuales, which was a subsidiary of Glencore plc of Switzerland, suspended operations at the Iscaycruz Mine, which is located in the Lima Region (Banco Central de Reserva del Perú, 2017a, p. 25; Glencore plc, 2017, p. 65; Ministerio de Energía y Minas, 2017b, p. 57, 59–60, 73).

Tin.—Production of tin had been steadily decreasing since 2009. The decrease was attributed to the depletion of reserves at the San Rafael Mine, which is located in the Puno Region. In 2016, tin production decreased by 3.7% compared with that of 2015. As of December 2016, total proven and probable reserves were estimated to be 6.9 Mt at an average grade of 1.6% tin. Concentrates from San Rafael were processed at the company's tin smelter and refinery in Pisco, Ica Region (Ministerio de Energía y Minas, 2017b, p. 83; Minsur S.A., 2017, p. 34–37).

Industrial Minerals

Phosphate Rock.—Compañía Minera Miski Mayo S.R.L. operated the Bayovar open pit mine, which is located in Sechura, Piura Region, and had the capacity to produce about 3.96 Mt/yr. The company was a joint venture among Vale S.A. of Brazil (40% interest), Mosaic Co. of the United States (35% interest), and Mitsui & Co., Ltd. of Japan (25% interest). In 2016, total proven and probable reserves at Bayovar were reported as 247.2 Mt at an average grade of 15.8% of phosphorus pentoxide (P_2O_5) compared with 402 Mt at an average grade of 15.4% P_2O_5 in 2015. Plans to increase production capacity at the Bayovar Mine to 5.8 Mt/yr were underway at an investment cost of about \$520 million. The expansion was expected to be completed in 2017 (Ministerio de Energía y Minas 2017b, p. 110, 114; Vale S.A., 2017, p. 78–79).

Focus Ventures Ltd. of Canada, through its subsidiary Agrifos Peru S.A.C., owned a 70% interest in the Juan Paulo Quay S.A.C., which was the titleholder of the Bayovar 12 phosphate mining concession. Bayovar 12 was located about 70 km from the city of Piura in northern Peru, adjacent to Vale's Bayovar Mine. An updated prefeasibility study for Bayovar was

announced in January. Total mineral reserves at Bayovar 12 were reported as 58.8 Mt of run-of-mine ore (dry) at average grade of 12.94% P_2O_5 . The study also reported that, at full capacity, Bayovar had the potential to produce 1.0 Mt/yr (dry basis) of phosphate rock fertilizers during a mine life of 20 years (Focus Ventures Ltd., 2017, p. 49–51).

Mineral Fuels

Coal, Natural Gas, and Petroleum.—Coal was produced mainly in the Regions of Ancash, Cajamarca, La Libertad, and Lima. Total production increased by about 6% in 2016; anthracite accounted for 56% of this production. Natural gas was produced mainly in the Zones of Nor-Oeste, Selva, and Zocalo. The Selva Zone, which included Selva Norte, Selva Central, and Selva Sur, accounted for 97% of the total natural gas production in Peru. Pluspetrol owned Block 88 and Block 56, which produced 52% and 33% of the country's total natural gas, respectively. The leading crude petroleum producing zones were Nor-Oeste, Zocalo, and Selva Norte, which accounted for 52%, 28%, and 14%, respectively, of the country's total crude petroleum production. The country's leading crude petroleum producers were, in order of volume of output, China National Petroleum Corp. (CNPC) Peru S.A. [Block X, 3.9 million barrels (Mbb)], SAVIA Peru S.A. (Block Z–2B, 3.1 Mbb), and Pluspetrol (Block 8, 1.6 Mbb). During the year, a total of 44 wells were drilled, all of which were development wells. Of the 44 wells, 42 were located in Nor-Oeste Zone (Banco Central de Reserva del Perú, 2017a, p. 25; Ministerio de Energía y Minas, 2017a, p. 16; 2017b, p. 89; Perupetro S.A., 2017a, p. 24–25, 34, 53).

Reserves and Resources

Table 3 lists Peru's reserves of major minerals.

Outlook

Peru's GDP is expected to increase by 2.5% in 2017 (the growth rate was 3.9% in 2016). The lower growth is attributed to the slowdown of the mining and hydrocarbons sector's GDP, which is projected to increase by 3.2% in 2017, after a recorded growth of 16.3% in 2016 owing to the startup of Las Bambas and Cerro Verde in 2015. The contribution of metallic minerals to the GDP is projected to increase by 4.2% owing to expected increases mainly in the production of copper at Las Bambas and Toromocho and molybdenum at Cerro Verde, Las Bambas, and Toromocho. Gold production is projected to decrease by 1.2% owing to the natural depletion of ore deposits in Minera Yanacocha and Minera Barrick Misquichilca and an expected decrease in gold production in the Madre de Dios Region. Hydrocarbon sector production is projected to decrease by 2.4% owing mainly to expected decreases in the production of liquefied natural gas and natural gas. Between 2017 and 2019, private investment (including FDI) in the mining sector is expected to account for about 36% (\$9.2 million) of the total private investment in the country, followed by investment in infrastructure (19%) and the hydrocarbon sector (10%). Significant private investments in the mining sector between 2017 and 2019 are likely to include the expansions of the Marcona,

the Toquepala, and the Toromocho operations (Banco Central de Reserva del Perú, 2017d, p. 47, 52, 54–55; 2018, p. 53, 55).

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TABLE 1
PERU: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2012	2013	2014	2015	2016
METALS					
Cadmium, refinery, metal	684	695	769	757	820
Copper:					
Mine, Cu content	1,197,569 ^r	1,285,983 ^r	1,293,842 ^r	1,627,727 ^r	2,280,005
Smelter, primary	290,088	412,966	314,615	327,909	309,469
Refinery					
Primary					
Electrowon	101,174	89,658	83,800	73,091	73,854
Other	210,119	271,792	263,597	279,869	257,470
Total	311,293	361,450	347,397	352,960	331,324
Gold, mine, Au content: ³					
Mine, concentrates kilograms	150,132	136,088	132,230	134,648 ^r	127,921
Artisanal do.	11,412	15,398	7,867	12,175	25,085
Total ³ do.	161,544	151,486	140,097	146,823 ^r	153,006
Indium, refinery, primary ^c do.	11,100 ^r	11,100 ^r	14,000 ^r	10,000 ^r	10,000
Iron and steel: ⁴					
Direct-reduced iron	98,000	93,000	88,000	72,000 ^r	11,000
Steel:					
Raw steel thousand metric tons	981	1,069	1,078	1,082 ^r	1,168
Products, hot-rolled do.	1,205 ^r	1,358 ^r	1,434 ^r	1,335 ^r	1,400 ^e
Iron ore, mine:					
Gross weight do.	10,132	10,126	10,731	10,908	11,418
Fe content do.	7,123 ^r	6,788	7,193	7,321	7,663
Lead:					
Mine, Pb content	248,659	266,263	277,153	315,525 ^r	314,422
Refinery, primary	--	467	142	1,494 ^r	--
Mercury, Hg content ⁵	17	45	40	35	35
Molybdenum, mine, Mo content	16,790	18,140	17,018	20,153	25,757
Selenium, refinery, Se content ^e kilograms	54,000	42,000	40,000	40,000	40,000
Silver:					
Mine, Ag content do.	3,480,857 ^r	3,674,283 ^r	3,768,147 ^r	4,101,568 ^r	4,374,913
Refinery, primary	159	163	183	190	192
Tin:					
Mine, Sn content	26,105	23,688	23,105	19,511	18,789
Smelter, primary	24,811	24,181	24,462	20,396	19,390
Tungsten, mine, concentrate, W content	276 ^r	28 ^r	61 ^r	110 ^r	--
Zinc:					
Mine, Zn content	1,280,949	1,350,874	1,315,215	1,421,218 ^r	1,334,327
Smelter, primary	319,280	346,362	336,454	335,422	341,518
INDUSTRIAL MINERALS					
Barite	79,451	52,491	106,071	28,407	7,953
Boron, ulexite	104,072	224,454	239,725	578,910 ^r	33,792
Cement, hydraulic thousand metric tons	9,500 ^e	10,527	10,676	10,410	10,094
Clay:					
Bentonite	22,977	47,743	37,375	21,341	19,246
Common clay	1,098,267	1,291,939	1,273,154	1,419,778	1,310,252
Kaolin	34,585	32,249	19,964	43,521	19,262
Diatomite	93,996	124,917	151,398	120,672	107,265
Feldspar	26,359	22,695	18,019	16,979	16,630
Gypsum, mine	390,705	297,527	543,856	438,025	257,423
Kyanite and related minerals, andalusite ⁶	--	20,000	30,000	35,000	40,000 ^e
Lime ^c	220,000	225,000	240,000	240,000 ^r	240,000
Mica	99	156	109	115	111
Nitrogen, ammonia, N content	12,000	12,000	13,000	--	--

See footnotes at end of table.

TABLE 1—Continued
PERU: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2012	2013	2014	2015	2016
INDUSTRIAL MINERALS—Continued					
Phosphate rock:					
Gross weight ⁷ thousand metric tons	3,209	3,546	3,801	3,881 ^r	3,853
P ₂ O ₅ content do.	985 ^r	1,075	1,155	1,180	1,156
Salt, all types	1,199,585	1,205,435	1,175,157	1,471,131	1,450,415
Stone, sand and gravel construction:					
Sand and gravel, sand do.	1,292	891	1,213	1,532 ^r	1,671
Stone:					
Crushed:					
Chalk	321,711	322,000 ^e	322,000 ^e	322,000 ^e	322,000 ^e
Limestone thousand metric tons	16,306	16,650	21,986	24,662	18,646
Quartzite	88,500 ^e	74,081	47,491	84,854	74,634
Other, unspecified thousand metric tons	5,343	7,227	9,993	9,222 ^r	8,044
Dimension:					
Marble	16,335	225	557	707	304
Onyx	3,578	11,873	370	158	271
Slate	33,948	97,630	77,847	65,593	65,553
Travertine	149,202	245,875	394,478	277,976 ^r	149,294
Talc and related minerals:					
Pyrophyllite	30,399	31,678	17,859	26,209	17,872
Talc	31,559	32,899	28,847	26,758 ^r	11,507
MINERAL FUELS AND RELATED MATERIALS					
Coal, mine:					
Anthracite	123,771	88,985	97,889	143,208	147,993
Bituminous	102,587	99,606	131,323	108,580	118,215
Total	226,358	188,591	229,212	251,788	266,208
Natural gas:					
Gross million cubic meters	11,859	12,192	12,923	12,494	14,001
Marketable ⁸ do.	11,850 ^r	11,633 ^r	12,926 ^r	13,512 ^r	14,454
Natural gas liquids thousand 42-gallon barrels	31,596	38,187	37,767	33,360	49,445
Petroleum:					
Crude do.	24,396	22,956	25,296	21,173	14,773
Refinery:					
Asphalt do.	1,504	1,424	1,710	1,480	1,610
Distillate fuel oil do.	28,798	26,414	28,336	24,100	23,754
Gasoline do.	13,773	12,580	13,349	9,754	12,085
Jet fuel do.	5,851	5,408	5,835	4,840	4,402
Liquefied petroleum gas do.	2,196	1,983	2,151	2,190	2,551
Lubricants do.	250	253	227	260	193
Residual fuel oil do.	7,104	7,836	8,741	10,680	24,032
Total do.	59,476	55,898	60,349	53,304	68,627

^eEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through July 11, 2017. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²Source: Ministerio de Energía y Minas del Perú.

³Includes documented production from placer artisanal production.

⁴Source: World Steel Association.

⁵Byproduct mercury.

⁶Estimated based on export data.

⁷Source: Vale S.A.

⁸Source: Organization of Petroleum Exporting Countries (OPEC).

TABLE 2
PERU: 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 ^e
Antimony	metric tons	Doe Run Perú S.R.L. (Doe Run Co., 100%)	Smelter at La Oroya, ¹ Junin Region	700
Bismuth	do.	do.	Refinery at La Oroya, ¹ Junin Region	1,000
Boron		Inkabor S.A.C.	San Juan de Tarucani, Arequipa Region	NA
Cadmium		Votorantim Metais - Cajamarquilla S.A. (Grupo Votorantim Metais S.A., 99%, and employees, 1%)	Refinery at Cajamarquilla, Lima Region	800
Cement		Caliza Cementos Inca S.A. (private, 100%)	Cajamarquilla plant, Lima Region	400
Do.		Cementos Pacasmayo S.A.A. (private, 100%)	Pacasmayo plant, La Libertad Region	2,900
Do.		Cementos Selva S.A. (Cementos Pacasmayo S.A.A.)	Rioja plant, San Martin Region	440
Do.		Cementos Sur S.A. (private, 100%)	Arequipa plant, Arequipa Region	340
Do.		Union Andina de Cementos S.A.A. (private, 100%)	Atocongo plant, Lima Region	5,500
Do.		do.	Condorcocha plant, Junin Region	2,100
Do.		Yura S.A. (private, 100%)	Yura plant, Arequipa Region	3,000
Clay, bentonite		Minera Doña Herminia S.A.	Amatape, Piura Region	NA
Copper		Compañía Minera Antamina S.A. (BHP Billiton plc, 33.75%; Glencore plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Ancash Region	500
Do.		Compañía Minera Condestable S.A. (Southern Peaks Mining LP, 98.7%)	Condestable Mine, Lima Region	25
Do.		Compañía Minera Milpo S.A. (Votorantim Metais - Cajamarquilla S.A., 49.89%)	El Porvenir Mine, Pasco Region; Cerro Lindo Mine, Ica Region	40
Do.		Doe Run Peru S.R.L. (Doe Run Co., 100%)	Cobriza Mine, Huancavelica Region	20
Do.		do.	Smelter at La Oroya, ¹ Junin Region	70
Do.		do.	Refinery at La Oroya, ¹ Junin Region	80
Do.		Empresa Minera Los Quenuales S.A. (Glencore plc, 97.6%)	Yauliyacu Mine, ² Lima Region	7
Do.		Compañía Minera Antapaccay S.A. (Glencore plc, 100%)	Antapaccay Mine, Cusco Region	220
Do.		Gold Fields La Cima S.A. (Gold Fields Ltd., 99.53%)	Cerro Corona Mine, Cajamarca Region	40
Do.		HudBay Peru S.A.C (Hudbay Minerals Inc., 100%)	Constancia Mine, Cusco Region	130
Do.		Minera Chinalco Perú S.A. [Aluminum Corporation of China (CHINALCO), 100%]	Toromocho open pit, Morococha District, Junin Region	275
Do.		Minera Las Bambas S.A. MMG Ltd., 62.5%; GUOXIN International Investment Corp. Ltd., 22.5%; CITIC Metal Co., Ltd., 15%)	Las Bambas Mine, Cotabambas, Apurimac Region	460
Do.		Southern Copper Corp. (Grupo Mexico S.A.B. de C.V., 84.6%)	Cuajone Mine, Moquegua Region; Toquepala Mine, Tacna Region	320
Do.		do.	Smelter at Ilo, Moquegua Region	360
Do.		do.	Refinery at Ilo, Moquegua Region	280
Do.		Sociedad Minera Cerro Verde S.A.A. (Freeport-McMoRan Inc., 53.56%; Sumitomo Metal Mining Co. Ltd., 21%; Compañía de Minas Buenaventura S.A.A., 19.58%; others, 5.86%)	Cerro Verde Mine, Arequipa Region	500
Do.		Sociedad Minera El Brocal S.A.A. (private, 100%)	Tajo Norte Mine, Pasco Region	50
Gold	kilograms	Arasi S.A.C. (private 100%)	La Rescatada Mine, Lampa, Puno Region	3,000
Do.	do.	Aruntani S.A.C. (private, 100%)	Tucari Mine, Moquegua Region	5,000
Do.	do.	Compañía de Minas Buenaventura S.A.A. (private, 100%)	Orcopampa Mine, Arequipa Region; and Breapampa Mine, Ayacucho Region	8,500
Do.	do.	Compañía Minera Aurífera Santa Rosa S.A. (private, 100%)	Santa Rosa Mine, Arequipa Region	5,000
Do.	do.	Compañía Minera Caraveli S.A., 100%	Caraveli Mine, Arequipa Region	1,100
Do.	do.	Compañía Minera Coimolache S.A. (Compañía de Minas Buenaventura S.A.A., 40%; Southern Copper Corp, 44%; ESPRO SAC, 16%)	Tantahuatay Mine, Hualgayoc, Carajamarca Region	4,000
Do.	do.	Compañía Minera Poderosa S.A. (private, 100%)	Poderosa, La Libertad Region	4,000
Do.	do.	Consorcio Minero Horizonte S.A. (private, 100%)	Parcoy, La Libertad Region	6,000

See footnotes at end of table.

TABLE 2—Continued
PERU: 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 ^e
Gold—Continued kilograms	Gold Fields La Cima S.A. (Gold Fields Ltd., 99.53%)	Cerro Corona, Cajamarca Region	6,000
Do. do.	Hochschild Mining plc, 100%	Inmaculada Mine, Acaycucho Region	3,500
Do. do.	La Arena S.A. (Tahoe Resources Inc., 100%)	La Arena Mine, Sanchez Carrion, La Libertad Region	6,200
Do. do.	Minera Aurífera Retamas S.A. (private, 100%)	Retamas Mine, La Libertad Region	5,000
Do. do.	Minera Barrick Misquichilca S.A. (Barrick Gold Corp., 100%)	Lagunas Norte Mine, La Libertad Region	17,000
Do. do.	Minera La Zanja S.R.L. (Compañía de Minas Buenaventura S.A.A., 53.06%, and Newmont Mining Corp., 46.94%)	La Zanja Mine, Cajamarca Region	4,000
Do. do.	Minera Yanacocha S.R.L. (Newmont Mining Corp., 51.35%; Compañía de Minas Buenaventura S.A.A., 43.65%; International Finance Corp., 5%)	Yanacocha Mine, Cajamarca Region	130,000
Iron and steel:			
Iron ore	Shougang Hierro Perú S.A.A. (Shougang Corp., 98.52%)	Marcona Mine, Ica Region	11,500
Steel	Empresa Siderurgica del Peru S.A.A. (Gerdau S.A.)	Chimbote, Ancash Region	650
Do.	Empresa Laminadora del Pacífico S.A. (Acero Arequipa S.A., 100%)	Pisco, Ica Region	360
Kyanite and related minerals, andalusite	Andalucita S.A. (private, 100%)	Paita, Piura Region	60
Lead	Compañía de Minas Buenaventura S.A.A. (private, 100%)	Julcani Mine, Huancavelica Region; and Mallay and Uchucchacua, Lima Region	50
Do.	Compañía Minera Antamina S.A. (CMA) (BHP Billiton plc, 33.75%; Glencore plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Ancash Region	5
Do.	Compañía Minera Atacocha S.A. (Grupo Milpo, 88.19%)	Atacocha Mine, Pasco Region	15
Do.	Compañía Minera Casapalca S.A. (private, 100%)	Huarochi, Lima Region	6
Do.	Compañía Minera Milpo S.A. (Votorantim Metais - Cajamarquilla S.A., 49.89%)	El Porvenir Mine, Pasco Region and Cerro Lindo Mine, Ica Region	33
Do.	Compañía Minera Raura S.A. (private, 100%)	Raura, Lima Region	15
Do.	Compañía Minera San Ignacio de Morococha S.A. (private, 100%)	San Vicente Mine, Junin Region	4
Do.	Compañía Minera Santa Luisa S.A. (private, 100%)	Huanzála Mine, Junin Region	9
Do.	Doe Run Peru S.R.L. (Doe Run Co., 100%)	Smelter at La Oroya, ¹ Junin Region	150
Do.	do.	Refinery at La Oroya, ¹ Junin Region	125
Do.	Empresa Administradora Chungar S.A.C. (Volcan Compañía Minera S.A.A., 100%)	Animon Mine, Pasco Region	30
Do.	Empresa Minera Los Quenuales S.A. (Glencore plc, 97.6%)	Yauliyacu Mine, ² Lima Region	13
Do.	Sociedad Minera Corona S.A. (Sierra Metals Inc., 82%)	Yauricocha Mine, Yauyos, Lima Region	20
Do.	Sociedad Minera El Brocal S.A.A. (Compañía de Minas Buenaventura S.A.A., 54.07%)	Tajo Norte Mine, Pasco Region	22
Do.	Volcan Compañía Minera S.A.A. (private, 100%)	Cerro de Pasco Mine, Pasco Region; Andaychagua, Carahuacra, San Cristobal, and Ticlio Mines, Junin Region	48
Molybdenum	Compañía Minera Antamina S.A. (BHP Billiton plc, 33.75%; Glencore plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Huari, Ancash Region	7
Do.	Minera Chinalco Perú S.A. [Aluminum Corporation of China (CHINALCO), 100%]	Toromocho open pit, Morococha District, Junin Region	10
Do.	Sociedad Minera Cerro Verde S.A.A. (Freeport-McMoRan Copper and Gold Inc., 53.56%; Sumitomo Metal Mining Co. Ltd., 21%; Compañía de Minas Buenaventura S.A.A., 19.58%; others, 5.86%)	Cerro Verde Mine, Arequipa Region	10

See footnotes at end of table.

TABLE 2—Continued
PERU: 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 ^e
Molybdenum—Continued		Southern Copper Corp. (Grupo Mexico S.A.B. de C.V., 84.6%)	Cuajone Mine, Moquegua Region; Toquepala Mine, Tacna Region	12
Natural gas	thousand cubic meters per day	Pluspetrol Peru Corp. (Pluspetrol S.A.)	Blocks 56 and 88, Ucayali Basin	33,000
Do.	do.	Repsol YPF, 53.84%	Block 57, Ucayali-Madre de Dios Basin	3,800
Petroleum, crude	42-gallon barrels per day	China National Petroleum Corp.	Block X, Talara Basin	10,800
Do.	do.	Pluspetrol Norte S.A. (Pluspetrol S.A., 60%)	Block 8, Marañon Basin	4,400
Do.	do.	Savia Peru S.A., 100%	Block Z-2B, Punta Laguna	8,400
Do.	do.	Pacific Stratus Energy del Peru S.A. (Pacific Exploration and Production)	Block 192, Marañon Basin	1,100
Do.	do.	Perenco, 50%, and PetroVietnam Exploration Production Corp., 50%	Block 67, Marañon Basin	400
Petroleum products	do.	Refinería La Pampilla S.A. (Repsol YPF, 51.03%)	La Pampilla refinery, Lima Region	102,000
Do.	do.	Petroperú S.A.	Talara refinery, Piura Region	65,000
Do.	do.	do.	Conchan refinery, Lima Region	15,500
Do.	do.	do.	Iquitos refinery, Loreto Region	12,000
Do.	do.	do.	Pucallpa refinery, Ucayali Region	3,300
Do.	do.	do.	El Milagro refinery, Amazonas Region	2,000
Do.	do.	Pluspetrol S.A.	Shiviyacu refinery, Loreto Region	5,000
Phosphate rock		Compañía Minera Miski Mayo S.R.L. (Vale S.A. 40%; Mosaic Co., 35%; Mitsui & Co., Ltd., 25%)	Bayovar Mine, Piura Region	3,960
Silver	metric tons	Empresa Minera Los Quenuales S.A. (Glencore plc, 97.6%)	Yauliyacu Mine, ² Lima Region	100
Do.	do.	Empresa Administradora Chungar S.A.C. (Volcan Compañía Minera S.A.A., 100%)	Animon Mine, Pasco Region	200
Do.	do.	Compañía Minera Ares S.A.C. (Holchschild Mining Plc, 100%)	Arcata Mine, Arequipa Region; Pallancata Mine, Ayacucho Region	200
Do.	do.	Compañía de Minas Buenaventura S.A.A. (private, 100%)	Julcani Mine, Huancavelica Region; Mallay and Uchuacchacua Mines, Lima Region; Breapampa Mine, Ayacucho Region; Orcopampa Mine, Arequipa Region	700
Do.	do.	Volcan Compañía Minera S.A.A. (private, 100%)	Cerro de Pasco Mine, Pasco Region; Andaychagua, Carahuacra, San Cristobal, and Ticlio Mines, Junin Region	300
Do.	do.	Compañía Minera Milpo S.A. (Votorantim Metais - Cajamarquilla S.A., 49.89%)	El Porvenir Mine, Pasco Region; Cerro Lindo Mine, Ica Region	150
Do.	do.	Compañía Minera Antamina S.A. (BHP Billiton plc, 33.75%; Glencore plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Huari, Ancash Region	650
Do.	do.	Minera Chinalco Perú S.A. [Aluminum Corporation of China (CHINALCO), 100%]	Toromocho open pit, Morococha District, Junin Region	140
Do.	do.	Hochschild Mining plc, 100%	Inmaculada Mine, Acaycucho Region	120
Do.	do.	Pan American Silver Corp., 100%	Huaron Mine, Pasco Region	100
Do.	do.	Doe Run Perú S.R.L. (Doe Run Co., 100%)	Refinery at La Oroya, ¹ Junin Region	1,100
Do.	do.	Southern Copper Corp. (SPCC) (Grupo Mexico S.A.B. de C.V., 84.6%)	Ilo smelting and refining, Moquegua Region	150
Tellurium	do.	Doe Run Perú S.R.L. (Doe Run Co., 100%)	Refinery at La Oroya, ¹ Junin Region	12
Tin	do.	Minsur S.A. (private 100%)	San Rafael Mine and plant, Puno Region	30,000
Do.	do.	do.	Pisco smelting and refining, Ica Region	45,000
Tungsten	do.	Malaga Inc.	Pasto Bueno Mine, ³ Ancash Region	NA

See footnotes at end of table.

TABLE 2—Continued
PERU: 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 ^e
Zinc	Compañía de Minas Buenaventura S.A.A. (private, 100%)	Mallay and Uchucchacua Mines, Lima Region	25
Do.	Compañía Minera Antamina S.A. (CMA) (BHP Billiton plc, 33.75%; Glencore plc, 33.75%; Teck Cominco Ltd., 22.5%; Mitsubishi Corp., 10%)	Antamina Mine, Ancash Region	300
Do.	Compañía Minera Atacocha S.A. (Grupo Milpo, 88.19%)	Atacocha Mine, Pasco Region	50
Do.	Compañía Minera Casapalca S.A. (private, 100%)	Huarocho, Lima Region	40
Do.	Compañía Minera Milpo S.A. (Votorantim Metais - Cajamarquilla S.A., 49.89%)	El Porvenir Mine, Pasco Region; Cerro Lindo Mine, Ica Region	210
Do.	Compañía Minera Raura S.A. (private, 100%)	Raura, Lima Region	40
Do.	Compañía Minera San Ignacio de Morococha S.A. (private, 100%)	San Vicente Mine, Junin Region	40
Do.	Doe Run Perú S.R.L. (Doe Run Co., 100%)	Refinery at La Oroya, ¹ Junin Region	80
Do.	Empresa Administradora Chungar S.A.C. (Volcan Compañía Minera S.A.A., 100%)	Animon Mine, Pasco Region	112
Do.	Empresa Minera Los Quenuales S.A. (Glencore plc, 97.6%)	Yauliyacu Mine, Lima Region	120
Do.	Minera Chinalco Perú S.A. [Aluminum Corporation of China (CHINALCO), 100%]	Toromocho open pit, Morococha District, Junin Region	26
Do.	Sociedad Minera El Brocal S.A.A. (Compañía de Minas Buenaventura S.A.A., 54.07%)	Tajo Norte Mine, Pasco Region	90
Do.	Sociedad Minera Corona S.A. (Sierra Metals Inc., 81.80%)	Yauricocha Mine, Lima Region	25
Do.	Volcan Compañía Minera S.A.A. (private, 100%)	Cerro de Pasco Mine, Pasco Region; Andaychagua, Carahuacra, San Cristobal, and Tielio Mines, Junin Region	225
Do.	Votorantim Metais - Cajamarquilla S.A. (Grupo Votorantim Metais S.A., 99%, and employees, 1%)	Refinery at Cajamarquilla, Lima Region	320

¹Operations were suspended and the company's liquidation process was extended to 2017.

²Iscaycruz operations suspended in 2016.

³Placed on care-and-maintenance status.

TABLE 3
PERU: RESERVES OF MAJOR MINERALS IN 2016^{1, 2}

(Thousand metric tons unless otherwise specified)

Commodity	Reserves
Coal, all types	1,250,000 ^e
Copper	81,219
Gold	metric tons 2,254
Iron ore	1,425,000
Lead	6,053
Molybdenum	2,185
Natural gas	trillion cubic meters 510 ³
Natural gas liquids	million barrels 902 ³
Petroleum, crude	do. 690 ³
Phosphate rock	360,000
Salt	100,000 ^e
Silver	metric tons 93,100
Sulfur	150,000 ^e
Tin	105
Uranium	100 ^{e, 4}
Zinc	28,536

^eEstimated; estimated data are rounded to no more than three significant digits.

¹ Proven and probable reserves.

²Sources: Ministerio de Energía y Minas del Perú: Anuario Minero, 2016. Proven and probable reserves in 2015 (the latest year for which data were available).

³Source: Ministerio de Energía y Minas del Perú: Libro Anual de Reservas de Hidrocarburos, 2016.

⁴Recoverable at prices of \$100 or less per kilogram of uranium.