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The Mineral Industry of Argentina

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Note: In this chapter, information for 2017 is followed by information for 2018.

In 2017, Argentina was the world's 21st largest economy and the 2d largest in South America. The Argentinian economy recovered during the year with a 2.8% growth of the real gross domestic product (GDP); the country's nominal GDP was $643 billion. Argentina's national Government and Provincial governors signed a Federal mining agreement to harmonize taxes and regulations in order to attract foreign direct investment (FDI) to the country's mineral sector. The agreement, which still needed approval from Congress, called for the creation of a new national mining information database and a unified mining register, as well as a new regime on royalties to be paid to individual Provinces. The agreement would set a 3% ceiling on royalties that mining companies pay to Provinces. A proposed second provincial tax, capped at 1.5%, would be allocated to fund mining infrastructure in the country. The new agreement was expected to create about 125,000 new mining jobs across the country (Presidencia de la Nación, 2017; SNL Metals & Mining, 2018a).

The mineral sector of Argentina continued to be dominated by the production of aluminum, boron, cadmium, copper, crude petroleum, gold, iron and steel, lead, lithium, molybdenum, natural gas, silver, and zinc. In 2017, Argentina was estimated to be the world's fourth leading producer of lithium (not including United States production), accounting for 8% of world production, after Australia (58%), Chile (21%), and China (10%); and a major producer of boron. Argentina was not a globally significant producer of mineral fuels in 2017, although it is estimated to have the second largest shale gas reserves in the world (EY, 2017, p. 17; Crangle, 2019; Jaskula, 2019).

Minerals in the National Economy

In 2017, the value added to the nominal GDP by the mining and quarrying sector (including hydrocarbons) was about 3.0%, or $19.1 billion. The country's manufacturing sector accounted for 13% of the total GDP, and the construction sector, 4.1%. The mining and quarrying sector employed more than 81,000 workers. Large-scale mining companies accounted for 83% of the total number of people employed in mining and quarrying. About 72% of those employed in the sector held direct jobs in the petroleum and natural gas industries (Comisión Económica para América Latina y el Caribe, 2018a; Ministerio de Trabajo, Empleo y Seguridad Social, 2018).

In 2017, Argentina's overall FDI inflows increased significantly to $11.5 billion compared with $3.3 billion (revised) in 2016 owing in part to a larger volume of reinvested earnings. China's Shandong Gold Mining acquired a 50% interest in the Veladero gold and silver mine from Barrick Gold Corp. of Canada for a total investment of $960 million. The Veladero Mine was located in the Province of San Juan. In the lithium sector, China's largest integrated lithium producer, GFL International Co. Ltd., a wholly owned subsidiary of Jiangxi Ganfeng Lithium Co. Ltd. (Ganfeng Lithium), completed an investment agreement with Lithium Americas Corp. to provide as much as $172 million in financing for the Cauchari-Olaroz lithium brine project. The project, which was located in the Province of Jujuy, was being developed by Lithium Americas through a joint venture with Chilean lithium miner Sociedad Química y Minera de Chile S.A. (SQM). Ganfeng Lithium became Lithium America's largest shareholder (Comisión Económica para América Latina y el Caribe, 2018b, p. 30, 50; Lithium Americas Corp., 2017a).

Latin America continued to be a significant target for nonferrous metallic mineral exploration in 2017. Argentina's mineral exploration budget increased by 14% to almost $160 million, making it the fifth-ranked country in exploration expenditure in Latin America. Argentina followed Chile ($607 million), Peru ($515 million), Mexico ($500 million), and Brazil ($260 million) in exploration expenditures. In 2017, Argentina's mining industry's budget for lithium exploration totaled $19 million or 12% of the total global lithium budget of $157 million. Latin America had the largest global lithium budget of $42.7 million, which was 41% higher than in 2016 (SNL Metals & Mining, 2018b, c).

Government Policies and Programs

The legislative framework for the mineral sector in Argentina is provided by the Mining Code Law No. 1919 of 1886. The mining law is based upon the principle that all mineral deposits are owned by the Government. Argentina's Secretaría de Minería de la Nación [Mining Secretariat] is responsible for proposing and implementing Federal mining policies. The Servicio Geológico Minero Argentino [Geological and Mining Service of Argentina] (SEGEMAR) is the scientific and technical organization responsible for the generation and dissemination of geologic, technical, mining, and environmental information, which facilitates the sustainable development of the country's natural resources. The mining code creates the legal framework for agreements between the Government and mining companies through the issuance of exploration permits or mining concessions. Mining rights are given in perpetuity if the annual tax is paid and investments are made for each stage of the mining activity. The country is divided into 23 Provinces grouped into 5 Regions. Provinces have their own enforcement authorities that control mining activities within their respective geographic boundaries (Ministerio de Energía y Minería, 2017a, p. 11, 14, 40; Ministerio de Justicia y Derechos Humanos, 2017).

Argentina's Dirección Nacional Minería [National Mining Directorate (DNM)] oversees the administration, development, and promotion of mining and mining investment. The DNM is one of the departments administered by the

Ministerio de Planificación Federal, Inversion Pública y Servicios [Ministry of Federal Planning, Public Investment and Services]. The Dirección Nacional de Planificación Estratégica Regional [National Directorate of Regional Strategic Planning] and the SEGEMAR are under the authority of the Mining Secretariat of the DNM. The Cámara Argentina de Empresarios Mineros [Argentine Chamber of Mining Companies] (CAEM) is a mineral industry association that advocates for development of the mineral industry. El Grupo de Empresas Mineras Exploradoras de la República Argentina [The Association of Exploration Mining Companies of the Republic of Argentina (GEMERA)], whose members are exploration companies, is a business association that is part of the CAEM. GEMERA partners with Provincial mining associations to address local and national mining issues (Ministerio de Energía y Minería, 2017a; Ministerio de Justicia y Derechos Humanos, 2017).

Production

In 2017, production decreases included those of iron ore (gross weight and Fe content), which decreased by 73% compared with that of 2016; mercury, by 60%; copper, by 59%; and molybdenum, by 37%. Decreases in the output of industrial minerals included dimension flagstone, by 85%; serpentine, by 75%; rhodochrosite, by 68%; gemstones (other, unspecified), by 65%; barite, by 52%; feldspar, by 43%; dolomite, by 34%; lithium chloride, by 30%; talc, by 26%; kaolin, by 24%; bentonite, by 16%; gypsum, by 18%; and boron, by 12%. Decreases in mineral fuels production included peat, by 18%; bituminous coal, by 7%; and crude petroleum, by 6%. Production increases included those of granite, by 254%; DRI, by 59%; lead, by 43%; diatomite, by 23%; raw steel, by 12%; and perlite, by 11%. Data on mineral production are in table 1.

Structure of the Mineral Industry

In 2017, the mineral industry in Argentina was composed of domestic and foreign private and public companies. In Argentina, there were no restrictions regarding the foreign investment and ownership of companies engaged in the exploration and extraction of mineral resources. Minera Alumbrera Ltd., which was a joint venture of Glencore plc of Switzerland (50% interest), Goldcorp Inc. of Canada (37.5%), and Yamana Gold Inc. of Canada (12.5%), continued to be Argentina's sole copper producer [it had a production capacity of about 140,000 metric tons per year (t/yr) of copper] and was among the leading gold producers in the country (it had a production capacity of 12,000 t/yr of gold). Other leading gold producers included the Veladero Gold Mine (solely owned by Barrick Gold) and the Casposo Gold Mine (solely owned by Austral Gold Ltd. of Australia). The country's lithium producers included the Salar del Hombre Muerto Mine (solely owned by FMC Corp. of the United States), which had a production capacity of 23,000 t/yr, and the Salar de Olaroz Mine [a joint venture among Orocobre Ltd., of Australia (66.5%), Toyota Tsusho Corp., of Japan (25%), and Jujuy Energía y Minería Sociedad del Estado (8.5%)], which had a production capacity of 17,500 t/yr. Table 2 is a list of major mineral industry facilities.

Mineral Trade

In 2017, Argentina's total free on board (f.o.b.) value of exports increased slightly to $58.4 billion. The value of Argentina's imports in 2016, as reported in terms of cost, insurance, and freight (c.i.f.) arrangements, increased by about 20% to $66.9 billion. Exports classified as mineral products (including base metals and manufactured articles thereof) totaled $4.2 billion in 2017 ($3.7 billion in 2016) and accounted for 7.1% of the country's total exported goods, compared with 6.5% in 2016. Of that total, about 40% or $1.7 billion, was base metals and manufactured articles thereof; 38%, or $1.6 billion, was mineral fuels, mineral oils and distillation products, bituminous substances, and mineral waxes; 18%, or $735.3 million, was ore, slag, and ash; and the remaining 2%, or $85.7 million, was other mineral products, including cement, salt, stone, and sulfur. In 2017, Argentina imported $9.7 billion worth of mineral products (including common metals and manufactures) compared with $7.7 billion in 2016, which accounted for 14.6% of the country's total imported goods. Of that total, 57%, or $5.5 billion, was mineral fuels, mineral oils and distillation products, bituminous substances, and mineral waxes; and 37% was base metals and manufactured articles thereof. Base metals and manufactured articles thereof exported and imported between Argentina and other countries included aluminum, copper, iron and steel, lead, nickel, tin, zinc, and other base metals (Instituto Nacional de Estadistica y Censos, 2018, p. 10–12).

In 2017, Argentina's leading export partners were Brazil (16%), the United States (8%), and China (7%). Exports to the United States were valued at $4.7 billion in 2017 compared with $4.6 billion in 2016. Of this value, coal and related fuels accounted for $738.5 million; aluminum, $514.2 million; and gold and other precious metals, $159.5 million. In 2017, Argentina's leading import partners were Brazil (27%), China (18%), and the United States (11%). Imports from the United States were valued at $9.6 billion compared with $8.5 billion in 2016. Of this value, petroleum products accounted for $535 million; drilling and oil field equipment, $62 million; and iron and steel, $27 million (Instituto Nacional de Estadistica y Censos, 2018, p. 4; U.S. Census Bureau, 2019a, b).

In 2017, Argentina's total lithium exports, by value, increased to $225 million, from $191 million in 2016, and $90 million in 2015. The country's leading lithium export partners during the year were Japan (38%), the United States (25%) China (20%), and the Republic of Korea (11%). Other importing countries and localities (6%) included Australia, Belgium, Bolivia, Colombia, Hong Kong, Peru, and Taiwan. From 2011 through 2015, Argentina's lithium exports, by value, were sent to the United States (55%), China (28%), and Japan (8%). Argentina's Energy Ministry expected lithium exports to increase to $800 million in the near future (Ministerio de Energía y Minería, 2017b, p. 20; 2018a).

Commodity Review

Metals

Aluminum.—In 2017, Aluar Aluminio Argentino S.A.I.C. (Aluar) continued to be Argentina's sole primary aluminum producer. The company's primary aluminum production decreased by 2.2% to 403,192 metric tons (t) during its production year, which ended on June 30, 2017. About 70% of Aluar's production was exported to Brazil, Germany, Japan, the United States, and other countries. The company, which produced aluminum alloys, billets, pure ingot, semimanufactures, and wire rods, exported its aluminum from Puerto Madryn, located in the Province of Chubut. Aluar exported an average of 170,000 t/yr to the United States. Aluminum exports to the United States were expected to remain relatively constant owing mostly to demand from the auto and construction industries. Aluar had the capacity to produce 460,000 t/yr of aluminum and, in 2017, employed about 2,200 people (table 1; Rizzi, 2017; Aluar Aluminio Argentino S.A.I.C., 2018).

Copper.—Minera Alumbrera Ltd., Argentina's sole copper producer, began the process of closing the Alumbrera open pit mine owing to the depletion of copper resources. After a 33% increase in copper production in 2016, the Alumbrera Mine produced almost 60% less in 2017. The mine was, however, expected to maintain modest levels of production for the next 10 years from its underground operations. Alumbrera, which is a copper, gold, and molybdenum deposit, exported $472 million worth of mineral products during the year, which was a decrease of 31.2% compared with that of 2016. Alumbrera's mineral products represented almost 13% of the value of Argentina's total mineral exports during the year. The mine's copper production was mainly exported to Bulgaria, Finland, Germany, Japan, and Spain (Minera Alumbrera, 2018, p. 4, 65).

As copper production declined at the Alumbrera Mine, several large-scale copper projects in the country were in development and expected to offset the copper production decline at Alumbrera. Recently released Government reports in the country showed that Glencore's El Pachón Mine could produce 280,000 t/yr; First Quantum's Taca Taca Mine, 244,000 t/yr; and Yamana Gold's Agua Rica Mine, 135,000 t/yr. More than 10,000 direct jobs were expected to be generated in Argentina's metal mining sector once projects were fully operational (Superneau, 2017; Ministerio de Energía y Minería, 2017c, p. 8, 33).

Gold.—In 2017, gold production in Argentina increased by 7% to 60,956 kilograms (kg) compared with 56,998 kg in 2016. Of that amount, about 48%, or 29,450 kg, was produced in Santa Cruz Province located in the southern part of the country. Since 2013, annual gold production in the country had averaged almost 58,000 kg. Gold exploration spending in Argentina during the year was about $100 million, accounting for 62% of the country's total nonferrous metallic mineral exploration budget. Of that amount, about $28 million was spent by Goldcorp and $24.8 million was spent by Yamana Gold, which together accounted for more than one-half of the country's total gold exploration budget (table 1; Ministerio de Energía y Minería, 2018b; S&P Global Market Intelligence, 2018).

Barrick Gold, which was one of the world's leading gold companies, announced a $990 million deal to sell a 50% stake in its Veladero Mine in San Juan Province to Shandong Gold of China. As part of the deal, Barrick Gold and Shandong would share expertise in mining technology and provide each other access to their respective supplier networks, service providers, investors, and capital providers. Under the agreement, Shandong would also assess whether to join Barrick Gold in a potential partnership to develop the Pascua-Lama operations, located on the border between Argentina and Chile. The Pascua-Lama project, which contained 663 t (reported as 21.3 million ounces) of measured and indicated gold resources, had been put on hold since 2013 owing to environmental issues. In 2017, gold production at the Veladero Mine decreased by 21% to 13,437 kg of gold compared with 16,920 kg in 2016 owing largely to the divestment of 50% of the mine and to the mining of lower grade ore (Barrick Gold Corp., 2018, p. 10, 33, 57, 68).

At Goldcorp's wholly owned Cerro Negro Mine, which is located in Santa Cruz Province, 14,059 kg of gold was produced in 2017, which was the mine's second full year of production; this was an increase of 25% compared with production in 2016. The increase was partly due to the company's rampup of mining operations and the successful execution of its productivity improvement plan. The improvement plan, which was implemented in late 2016, focused on improving maintenance, operator skills, and supply-chain processes. The mine was expected to continue processing about 4,000 tons per day of ore during the second half of 2018 (Goldcorp Inc., 2018, p. 14, 29, 33–34).

Silver.—In 2017, silver production in Argentina totaled 997,961 kg, which was a decrease of 5% compared with production in 2016. Of that amount, 65%, or 645,118 kg, was produced in the southern part of the country in Santa Cruz Province. Silver production in Argentina included 200,555 kg from the San José Mine operated by Minera Santa Cruz [a jointly owned operation of Hochschild Mining plc (51%) and McEwen Mining Inc. (49%)]; 192,482 kg from the Cerro Vanguardia Mine [jointly owned by AngloGold Ashanti Ltd. of South Africa (92.5%) and the state mining company of the Santa Cruz Province, FOMICRUZ S.E. (7.5%)]; and 192,126 kg from the Pirquitas Mine [a jointly owned operation of SSR Mining Inc. (75%) and Golden Arrow Resources Corp. (25%)] (tables 1, 2; AngloGold Ashanti Ltd., 2018; Hochschild Mining plc, 2018; Ministerio de Energía y Minería, 2018b; SSR Mining Inc., 2018, p. 9).

Zinc.—In 2017, AR Zinc S.A., a subsidiary of Glencore, operated the Aguilar Mine and AR smelter. Zinc production from the Aguilar Mine located in the Jujuy Province was not publicly available. However, based on Provincial production data, the mine was estimated to have produced more than 23,000 t of zinc during the year (Ministerio de Energía y Minería, 2018b).

Industrial Minerals

The production of industrial minerals in Argentina was viewed by the Government as an economic pillar of the country. More than $180 million was invested in the sector in 2017. In 2017, the Provinces of Buenos Aires and Cordoba continued to be Argentina's primary sources of industrial minerals (Ministerio de Energía y Minería, 2017d; Panomara Minero, 2018).

Boron.—The Andean belt of South America, where Argentina is located, had some of the largest economically viable deposits

of borates in the world, primarily in the Provinces of Jujuy and Salta. In 2017, the Province of Jujuy produced 7,938 t of borate compounds and the Province of Salta produced 121,980 t. Argentina's primary borate deposits were Sijes and Tincalayu, which were mined by Ulex S.A. and Borax Argentina S.A., respectively. Borax Argentina, however, was the only South American-based boron producer with a wide range of refined products and mineral products. Borax Argentina produced boric acid, borate minerals, and refined products. Boric acid was produced from the acidification of hydroboracite tailings. The borate minerals produced were colemanite, hydroborocite, and ulexite. The refined products consisted of borax anhydrous, borax decahydrate, and borax pentahydrate. The company expected to complete a feasibility study in 2017 to evaluate a potential expansion of the Tincalayu refined borates operation from its current production capacity of 30,000 t/yr to between 100,000 and 120,000 t/yr (table 2; Ministerio de Energía y Minería, 2018b; Orocobre Ltd., 2018).

Lithium.—In 2017, Argentina's lithium carbonate production increased by 9% to 26,559 t from 24,409 t in 2016; production of lithium chloride decreased by 30% to 4,501 t from 6,498 in 2016. The country had a total production capacity of 40,500 t/yr of lithium. Argentina's lithium production was sourced from the Salar de Olaroz Mine in Jujuy Province and the Salar del Hombre Muerto Mine in Salta Province. There were 12 ongoing lithium projects in Argentina that were expected to increase the country's production to more than 330,000 t/yr and to create approximately 3,400 direct jobs by 2022. The country's most significant lithium projects under construction were Lithium America Corp. of Canada's Cauchari-Olaroz project, located in the Province of Jujuy, and Enirgi Group's Salar del Rincón project, located in the Province of Salta (tables 1, 2; Ministerio de Energía y Minería, 2018c, p. 24, 29, 31).

Minera Exar, a 50–50 joint venture between Lithium Americas and SQM, was developing the Cauchari-Olaroz lithium brine project in Argentina. Construction at the Cauchari-Olaroz project, which would have an estimated production capacity of 25,000 t/yr, remained on track to be completed in late 2019 or early 2020. Direct employment during the construction period was expected to total more than 1,000 people. Minera Exar employed a little more than 100 people during the year. In June, Lithium Americas announced a $172 million agreement with China's Jiangxi Ganfeng Lithium Co., Ltd. (Ganfeng Lithium) to help fund the Cauchari-Olaroz lithium brine project. Ganfeng Lithium was the largest integrated lithium producer in China (Lithium Americas Corp., 2017a, b).

Located in the Province of Salta, Rincon Ltd. continued to develop its Salar del Rincón project with new proprietary lithium extraction technology. The company installed lithium precipitation and carbonation circuits to address high magnesium levels at the salar to produce battery-grade lithium carbonate or lithium hydroxide directly from raw, unconcentrated brine. This new technology would not depend on the traditional process of using evaporation ponds. The $650 million project was expected to produce 25,000 t/yr when the first plant was fully operational. The project had measured and indicated resources of 8.3 million metric tons (Mt) of lithium carbonate, and construction was scheduled to begin in mid-2019 (Rincon Ltd., 2018, p. 7–8, 10, 12).

Mineral Fuels

Petroleum and Natural Gas.—In 2017, crude petroleum production in Argentina continued to decrease. The country had experienced a downward trend in crude petroleum production in recent years owing partly to lack of investment in exploration and development. Production during the year decreased to 175 million barrels (Mbbl), or by 6.2% compared with that of 2016. About 54 companies in Argentina were involved in the production of petroleum in 2017. Yacimientos Petrolíferos Fiscales S.A. (YPF) and Pan American Energy LLC accounted for approximately 65% of the total petroleum production in 2017. Natural gas production remained about the same in 2017 as in 2016. YPF and Pan American Energy accounted for 73% of the total natural gas production in 2017. A total of 1,019 wells were drilled in Argentina in 2017, of which 542 were petroleum production wells and 275 were natural gas production wells. Most wells drilled during the year belonged to YPF and Pan American Energy (Sucursal Argentina) (table 1; Instituto Argentino del Petroleo y del Gas, 2018a, b).

MINERAL INDUSTRY HIGHLIGHTS IN 2018

Minerals in the National Economy

In 2018, Argentina was estimated to be the world's fourth-ranked producer of lithium (not including United States production), accounting for 7% of world production after Australia (62%), Chile (18%) and China (7%). The country was also among the leading producers of boron, as was Bolivia, Chile, Kazakhstan, and Turkey. Argentina was not a globally significant producer of mineral fuels in 2018, although it was one of only four countries in the world to commercially develop shale gas, along with Canada, China, and the United States (Crangle, 2020; Jaskula, 2020; U.S. Energy Information Administration, 2016).

In 2018, Argentina's real GDP decreased by 2.5%, and the country's nominal GDP was $520 billion. The value added to the nominal GDP by the mining and quarrying sector, including hydrocarbons, was 3.8% or $19.8 billion, which was a slight increase compared with that of 2017. The country's manufacturing sector accounted for 12.7% of the total GDP, and the construction sector, 4.1%. The mining and quarrying sector, including hydrocarbons, employed about 84,000 workers in 2018. Large-scale mining companies accounted for 83% of the total number of people employed in mining and quarrying (Comisión Económica para América Latina y el Caribe, 2019; Ministerio de Trabajo, Empleo y Seguridad Social, 2018; SNL Metals & Mining, 2018a).

In 2018, Argentina's total f.o.b. value of exports increased to $61.6 billion from $58.6 (revised) in 2017. The value of Argentina's imports in 2018, as reported in c.i.f. terms, decreased slightly to $65.4 billion from $66.9 billion in 2017. In 2018, the country's mineral exports totaled about $6 billion, which accounted for 9.7% of the country's total exported goods, compared with 7.1% in 2017. Of that value, gold accounted

for 37%, or $2.2 billion; iron and steel and related articles, 18%, or $1.1 billion; aluminum and related articles, 16%, or $938 million; lithium, 4.7%, or $282 million (an increase of 26%); and copper concentrates, $159 million (a decrease of 61%) (Cámara Argentina de Empresarios Mineros, 2019, p. 10; Instituto Nacional de Estadistica y Censos, 2019, p. 13–16).

In 2018, Argentina's leading export partners were Brazil (18%), and China and the United States (7% each). Exports to the United States were valued at 4.8 billion in 2018 compared with $4.7 billion in 2017. Of this value, aluminum accounted for $417.2 million and gold and other precious metals accounted for $302.5 million. In 2018, Argentina's leading import partners were Brazil (24%), China (18%), and the United States (12%). Imports from the United States were valued at $9.9 billion compared with $9.6 billion in 2017. Of this value, petroleum products accounted for $672 million; drilling and oil field equipment, $229 million; and iron and steel, $31 million (Instituto Nacional de Estadistica y Censos, 2019, p. 4; U.S. Census Bureau, 2019a, b).

Production

In 2018, copper production decreased by 48% to 17,435 t from 33,303 t in 2017 owing to the continued depletion of copper resources at the Alumbrera Mine. Other production decreases included shell (calcareous), by 71%; kaolin, by 70%; bentonite, by 57%; serpentine, by 52%; boron, by 45%; molybdenum, by 44%; fluorspar, by 42%; gypsum, by 39%; dimension stone, by 38%; feldspar, by 36%; peat, by 33%; lead, by 30%; cadmium, 23%; and refined petroleum, by 5%. Production increases in 2018 as compared with production in 2017 included direct-reduced iron, by 47%; rhodochrosite, by 46%; talc, by 41%; dolomite, by 31%; barite, by 21%; raw steel and lithium carbonate, by 12% each; and lithium chloride by 11%. Data on mineral production are in table 1.

Commodity Review

Metals

Gold.—In 2018, Canada's Yamana Gold poured its first gold and silver dore at its Cerro Moro Mine, which is located in Santa Cruz Province. Construction of Cerro Moro, a high-grade, low-cost gold and silver operation, began in 2015. Cerro Moro produced 2,886 kg of gold and 128,118 kg of silver from its underground and open pit mines. As of December 31, 2018, proven and probable reserves were estimated to be 1.8 Mt with an average grade of 652.6 grams per metric ton (g/t) silver and 11.61 g/t gold. The gold-silver mine was expected to produce more than 4,000 kg of gold and 187,000 kg of silver in 2019. In 2018, gold production in Argentina decreased by about 4% to 58,375 kg from 60,956 kg in 2017 (table 1; Yamana Gold Inc., 2019).

Industrial Minerals

Lithium.—In 2018, Argentina held an estimated 14% of global lithium reserves, which were located within what is known as the world's lithium triangle—an area covering Argentina, Bolivia, and Chile that had been estimated to host more than 50% of the world's identified lithium resources. Argentina's lithium deposits were located in the northwest part of the country in the Provinces of Catamarca, Jujuy, and Salta. Argentina had about 873,000 hectares identified for the extraction of lithium with numerous projects totaling $2 billion in investment. The Cauchari-Olaroz and Salar del Rincón lithium brine projects remained under construction during the year. In 2018, Argentina's lithium carbonate production increased by 12% to 29,707 t compared with 26,559 t in 2017; production of lithium chloride increased by 11% to 5,005 t compared with 4,501 t in 2017 (table 1; Jaskula, 2019; Mining, 2018).

Outlook

Argentina's National Congress is expected to continue considering a proposed Federal mining agreement and new regulatory framework to harmonize taxes and regulations for mining development at the national level. If approved, Argentina will be poised to take advantage of slightly improved global mineral commodity prices and bring new mineral supplies to market as the Government looks to harmonize Provincial regulations and improve clarity for investors and stakeholders. An increased emphasis on the development of responsible mining is also expected to be a priority for the Government of Argentina in the near term. It is estimated that there is approximately $400 billion worth of untapped mineral resources in Argentina (EY, 2017, p. 15; Ministerio de Justicia y Derechos Humanos, 2018).

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TABLE 1
ARGENTINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2014	2015	2016	2017	2018
METALS						
Aluminum, metal, primary[3]		441,597	433,478	412,283	403,192	419,435
Cadmium:						
Mine, Cd content		115 e	107	91	96	74
Refinery, primary, metal		30 e	30 e	-- r	--	--
Copper:						
Mine, Cu content		97,566 r	61,766	81,902	33,303	17,435
Refinery, secondary[e]		16,000 r	16,000 r	16,000 r	16,000	16,000
Ferroalloys, ferrosilicon[e]		17,000	12,700	12,000	13,000	13,000
Gold, mine, Au content	kilograms	60,162	61,310	56,998	60,956	58,375
Iron ore, mine:						
Gross weight	thousand metric tons	197	197	94	25	25 e
Fe content	do.	118	118	56	15	15 e
Iron and steel:						
Direct-reduced iron	do.	1,663	1,252	773	1,231	1,810
Pig iron	do.	2,766	2,685	2,141	2,171	2,184
Raw steel	do.	5,488	5,028	4,126	4,624	5,162
Lead:						
Mine, Pb content		29,911	29,834	28,016	40,135	28,260
Refinery:[e]						
Primary		12,000	8,000	8,000 r	10,000	14,000
Secondary		28,000	33,000	33,000 r	35,000	26,000
Mercury, Hg content		52	59	135	54	50 e
Molybdenum, mine, Mo content		1,910 r	1,736 r	2,048 r	1,297	728
Silver, mine, Ag content	kilograms	989,950	1,175,760	1,055,700	997,961	1,023,800
Zinc:						
Mine, Zn content		28,038	30,498	22,792	23,392	22,050
Smelter:						
Primary		29,122	30,000 e	-- r	--	--
Secondary, remelt		2,300	2,400	2,000 e	-- e	--
INDUSTRIAL MINERALS						
Barite		16,265	12,917	12,389	5,977	7,225
Boron		395,058	246,683	148,390	129,918	71,212
Celestite		700	700 e	700 e	700 e	700 e
Cement, hydraulic	thousand metric tons	11,408	12,193 r	10,899 r	11,960	11,842

See footnotes at end of table.

TABLE 1—Continued
ARGENTINA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2014	2015	2016	2017	2018
INDUSTRIAL MINERALS—Continued						
Clay:						
Bentonite		280,407	229,715	145,723	121,735	52,044
Common clay		9,058,397	9,489,529 r	9,209,313 r	6,726,653	5,486,139
Kaolin		45,892	62,214	26,198	19,940	6,000
Diatomite		52,039	60,951	57,113	70,419	70,000 e
Feldspar, mine		162,854	186,974	155,217	88,465	56,500
Fluorspar		39,433	65,282	14,222	13,696	7,924
Gemstones:						
Rhodochrosite	kilograms	58,889	79,405	48,152	15,443	22,534
Other, unspecified	do.	7,330	11,781	15,863	5,548	5,000 e
Gypsum, mine		1,560,960	1,314,655	1,558,390	1,275,608	774,079
Lithium:						
Lithium carbonate		11,698	21,111	24,409	26,559	29,707
Lithium chloride		7,370	5,848	6,468	4,501	5,005
Mica		575	583	564	189	120
Perlite		22,680	23,282	17,905	19,924	18,794
Pumice and related materials		7,320	7,110	7,000	7,000 e	2,310
Salt, common		1,537,478	1,400,762	1,812,191	1,929,065	1,078,287
Silica, mine		658,673	673,253	1,098,056	949,313	950,000 e
Stone, sand and gravel, construction:						
Sand and gravel:						
Construction		42,748,291	43,531,705	37,149,385	39,902,023	22,975,589
Gravel		29,963,911	28,014,042 r	18,578,513 r	17,560,089	16,221,770
Stone:						
Crushed:						
Basalt		1,826,751	2,120,290	1,639,955	2,766,811	2,000,000 e
Dolomite, calcareous		1,280,570	1,616,428	2,730,786	1,790,178	2,351,264
Granite, block		30,808	39,353	11,768	41,680	40,000 e
Limestone, calcareous		20,220,775	21,543,473	19,798,241	20,649,475	19,797,787
Serpentine		346,800	361,800	210,000	52,000	25,000
Shell, calcareous		573,749	590,962	608,691	610,000	177,976
Unspecified, other		29,518,229	29,600,000 e	29,800,000 e	30,000,000 e	30,000,000 e
Dimension, flagstone		142,749	121,524	92,458	14,327	8,904
Other, size and shape unspecified, calcareous:						
Calcite		196,789	358,067	406,461	425,000	280,000
Marble, onyx, travertine		187,108 r	194,072 r	192,422 r	190,000 e	190,000 e
Sulfur compounds, sulfates:						
Magnesium, epsomite		1,934	1,973	1,909	1,900 e	--
Talc		41,260 r	27,386 r	11,262 r	8,335	11,728
Vermiculite		90	90	60	--	-- e
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous	thousand metric tons	174	49	41	38	38 e
Coke, metallurgical	do.	840	769 r	631 r	672	670 e
Natural gas	million cubic meters	41,484	42,895	44,988	44,595	47,020
Peat, horticultural use, turba		5,109	1,436	2,400	1,960	1,310
Petroleum:						
Crude	thousand 42-gallon barrels	194,253	194,290	186,639 r	175,017	178,631
Refinery	do.	191,151	195,494	175,565 r	179,580	170,455

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

[1]Table includes data available through January 13, 2020. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

[2]In addition to the commodities listed, ammonia, antimony, asbestos, pozzolan, strontium, and urea may have been produced, but available information was inadequate to make reliable estimates of output.

[3]Production is on a fiscal year basis, ending on June 30 of the year listed.

TABLE 2
ARGENTINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Aluar Aluminio Argentino S.A.I.C. [private, 77%; Government, 10%; National Social Security Administration, 13%]	Abasto, Buenos Aires Province, and Puerto Madryn, Chubut Province	460.
Boron		Borax Argentina S.A. (Orocobre Ltd., 100%)	El Porvenir Mine and plant, Jujuy Province; Sijes, Tincalayu Mines and plants, and Campo Quijano refinery, Salta Province	250.
Do.		Procesadora de Boratos Argentinos S.A. (Ferro Corp.)	Loma Blanca Mine, Jujuy Province, and plant at Palpala, Jujuy Province	36.
Do.		Ulex S.A. (private, 100%)	Sol de Mañana Mine, Salta Province	2.
Cadmium	metric tons	Glencore plc, 100%	AR Zinc smelter, Santa Fe Province	72.
Cement		Cementos Loma Negra C.I.A.S.A. (private, 100%)	Buenos Aires, Catamarca, Cordoba, Corrientes, Jujuy, Neuquen, and San Juan Provinces	8,700.
Do.		Cementos Avellaneda S.A. (Corporación Uniland S.A. and C. Molins International S.A.)	La Calera plant, San Luis Province, and Olavarria plant, Buenos Aires Province	2,800.
Do.		Juan Minetti S.A. (LafargeHolcim Ltd., 100%)	Cordoba, Jujuy, and Mendoza Provinces	1,700.
Coal		Yacimientos Carbonífero Río Turbio S.A. (private, 100%)	Rio Turbio, Santa Cruz Province	210.
Copper		Minera Alumbrera Ltd. (Glencore plc, 50%; Goldcorp Inc., 37.5%; Yamana Gold Inc. 12.5%)	Alumbrera Mine, Catamarca Province	140.
Fluorspar		Fluorita Cordoba S.A. (private, 100%)	Mine and flotation plant, Cerro Negros, Cordoba Province	NA.
Gold	metric tons	Cerro Vanguardia S.A. [AngloGold Ashanti Ltd., 92.5%, and FOMICRUZ S.E. (Government of Santa Cruz Province), 7.5%]	Cerro Vanguardia Mine, Santa Cruz Province	10.
Do.	do.	Minera Santa Cruz (Hochschild Mining plc, 51%, and McEwen Mining Inc., 49%)	San Jose Mine, Santa Cruz Province	3.
Do.	do.	Minera Argentina Gold S.A. (Barrick Gold Corp., 50%, and Shandong Gold Ltd., 50%)	Veladero Mine, San Juan Province	35
Do.	do.	Austral Gold Ltd. (private, 100%)	Casposo Gold Mine, San Juan Province	48.
Do.	do.	Pan American Silver Corp., 100%	Manantial Espejo Mine, Santa Cruz Province	2.
Do.	do.	Yacimientos Mineros de Agua de Dionisio (YMD) (Government, 100%)	Farallon Negro, Hualfin, and Belen Mines, Catamarca Province	1.
Do.	do.	Yamana Gold Inc., 100%	Cerro Moro Mine, Santa Cruz Province	NA.
Do.	do.	do.	Gualcamayo Mine, San Juan Province	6.
Do.	do.	Minera Alumbrera Ltd. (Glencore plc, 50%; Goldcorp Inc., 37.5%; Yamana Gold Inc., 12.5%)	Alumbrera Mine, Catamarca Province	12.
Do.	do.	Goldcorp Inc., 100%	Cerro Negro Mine, Santa Cruz Province	16.
Iron ore[1]		MCC Minera Sierra Grande S.A.	Sierra Grande, Rio Negro Province	450 iron ore.
Iron and steel		Siderar S.A.I.C. (Ternium S.A.)	San Nicolas, Buenos Aires Province	2,880 steel, 4,500 semimanufactures.
Do.		Acindar S.A. (AcelorMittal Group)	Plant Nos. 1 and 3, Buenos Aires Province; and Plant No. 2, near Rio Parana, Santa Fe Province	1,350 steel, 1,000 DRI.[2]
Do.		Siderca S.A.I.C. (Techint Group)	Buenos Aires Province	900 steel, 670 DRI.[2]
Lead		AR Zinc Group, 100%	Aguilar Mine, Jujuy Province	11.
Lead and silver		do.	Palpala smelter, Jujuy Province	NA.
Lime		Cementos Avellaneda, S.A. (Corporación Uniland S.A. and C. Molins International S.A.)	La Calera plant, San Luis Province, and Olavarria plant, Buenos Aires Province	220.

See footnotes at end of table.

TABLE 2—Continued
ARGENTINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Lithium	metric tons	Sales de Jujuy S.A. [Orocobre Ltd., 66.5%; Toyota Tsusho Corp., 25%; Jujuy Energia y Mineria Sociedad del Estado [JEMSA], 8.5%]	Salar de Olaroz, Jujuy Province	17,500.
Do.	do.	Minera del Altiplano S.A. (FMC Corp.)	Salar del Hombre Muerto, Salta Province; plants in Catamarca Province	23,000.
Molybdenum		Minera Alumbrera Ltd. (Glencore plc, 50%; Goldcorp Inc., 37.5%; Yamana Gold Inc., 12.5%)	Alumbrera Mine, Catamarca Province	2.
Natural gas	thousand cubic meters	Yacimientos Petrolíferos Fiscales S.A.	Chubut, Formosa, Jujuy, La Pampa, Mendoza, Neuquen, Rio Negro, Salta, Santa Cruz, and Tierra del Fuego Provinces	13,100.
Do.	do.	Pan American Energy LLC (Sucursal Argentina) (BP p.l.c., 60%, and Bridas Corp., 40%)	Offshore Chubut and Santa Cruz Provinces	2,700.
Petroleum	million 42-gallon barrels	Yacimientos Petrolíferos Fiscales S.A.	Chubut, Formosa, Jujuy, La Pampa, Mendoza, Neuquen, Rio Negro, Salta, Santa Cruz, and Tierra del Fuego Provinces	366.
Do.	do.	Pan American Energy LLC (Sucursal Argentina) (BP p.l.c., 60%, and Bridas Corp., 40%)	Offshore Chubut and Santa Cruz Provinces	100.
Do.	do.	Chevron Argentina S.R.L. (Chevron Corp., 100%)	El Trapial field, Neuquen Province, and other concessions	46.
Do.	do.	Petrobras Energia S.A. (Petroleo Brasileiro S.A., 100%)	La Pampa, Mendoza, Neuquen, Rio Negro, Salta, and Santa Cruz Provinces	15.
Do.	do.	Petro Andina Resources Ltd. (Pluspetrol S.A., 100%)	Neuquen basin	10.
Do.	do.	Tecpetrol S.A.	Golfo San Jorge basin, Neuquen basin, Northwest basin	10.
Do.	do.	Total Austral S.A. (Total S.A., 100%)	Neuquen Province	NA.
Silver	metric tons	SSR Mining Inc., 75%, and Golden Arrow Resources Corp., 25%	Pirquitas Mine, Jujuy Province	350.
Do.	do.	Troy Resources Ltd., 100%	Casposo Mine, San Juan Province	34.
Do.	do.	Minera Santa Cruz S.A. (Hochschild Mining plc, 51%, and McEwen Mining Inc., 49%)	San Jose Mine, Santa Cruz Province	215.
Do.	do.	Cerro Vanguardia S.A. [AngloGold Ashanti Ltd., 92.5%, and FOMICRUZ S.E. (Government of Santa Cruz Province), 7.5%]	Cerro Vanguardia Mine, Santa Cruz Province	60.
Do.	do.	Goldcorp Inc., 100%	Cerro Negro Mine, Santa Cruz Province	173.
Zinc		AR Zinc S.A. (Glencore plc, 100%)	Aguilar Mine, Jujuy Province	44.
Do.		do.	AR smelter, Santa Fe Province, 100%	40.

Do., do. Ditto. NA Not available.

[1]Mill capacity per year.

[2]Abbreviations used in this table for commodities include the following: DRI—direct-reduced iron.