USGS
science for a changing world

2020–2021 Minerals Yearbook

MEXICO [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

June 2025

U.S. Geological Survey, Reston, Virginia: 2025

The Mineral Industry of Mexico

By Alberto Alexander Perez

Note: In this chapter, information for 2020 is followed by information for 2021.

In 2020, Mexico's real gross domestic product (GDP) decreased by 8.5% compared with that in 2019, mostly owing to the effects of the coronavirus disease 2019 (COVID-19) pandemic on the economy. In 2020, Mexico was the world's first-ranked producer of silver, accounting for about 24% of world production. Mexico was the second-ranked producer of fluorspar, accounting for 11% of world production; the third-ranked producer of wollastonite, accounting for 6% of world production; the fourth-ranked producer of celestite and lead, accounting for 10% and 6% of world production, respectively; the fifth-ranked producer of barite, diatomite, and molybdenum, accounting for 5%, 4%, and 6% of world production, respectively; the sixth-ranked producer of zinc, accounting for 5% of world production; the seventh-ranked producer of cadmium and gold, accounting for 4% and 3% of world production, respectively; the eighth-ranked producer of gypsum and salt, accounting for 4% and 3% of world production, respectively; and the ninth-ranked producer of bismuth and copper, accounting for 0.1% and 4% of world production, respectively (Cámara Minera de México, 2020, p. 215; 2021, p. 193; Servicio Geológico Mexicano, 2021, p, 7–8, 14–17, 21, 25; Anderson, 2022; Bolen, 2022; Callaghan, 2022; Crangle, 2022a, b; Flanagan, 2022; Klochko, 2022; McRae, 2022a, b; Merrill, 2022; Polyak, 2022; Sangine, 2022; Sheaffer, 2022; Tolcin, 2022).

In 2019 (the latest year for which data were available), Mexico was the fourth-ranked producer of crude petroleum in the Americas, after the United States, Canada, and Brazil. Although Mexico was a significant crude-petroleum producer, Mexico was a net importer of refined petroleum products. In 2019, the United States imported 51% of Mexico's crude petroleum exports. Mexico was the second-ranked source of crude petroleum imports to the United States after Canada (U.S. Energy Information Administration, 2020).

Minerals in the National Economy

As reported by the Servicio Geológico Mexicano, Mexico's mining sector contributed 8.3% to the GDP of the country's industrial sector in 2020. The sector contributed 2.3% to the country's total GDP, which was a 4.6% decrease from that in 2019, the fourth consecutive year that the industrial sector's contribution to the country's GDP decreased. Construction aggregates accounted for 37.8% of the total value of nonfuel mineral production, and basalt accounted for 21.4% of the total value. Other nonfuel minerals that contributed to the total value included limestone (10% of total nonfuel mineral production), gold (7.2%), silver (4.3%), copper (3.8%), construction sand (3.2%), construction gravel (2.7%), zinc (2%), and iron ore and pellets (1.7%) (Servicio Geológico Mexicano, 2021, p. 8, 57).

In 2019, the last year for which data were available, a total of 24,066 mining concessions were registered for an area of 168,300 square kilometers, accounting for about 8.6% of the country's territory. The State of Chihuahua accounted for 75.9% of the country's total mineral output, in terms of value, the State of Zacatecas accounted for 11.2%, the State of Sonora accounted for 6.5%, and the States of Durango and Guerrero accounted for 1.5% and 1.2%, respectively. In 2019, the State of Chihuahua was the principal producer of nonfuel minerals, by value. Minerals produced in the State of Chihuahua included barite, copper, dolomite, gold, gypsum, iron ore, kaolin, lead, silver, and zinc. The State of Zacatecas was the second-ranked producer of nonfuel minerals, by value, and produced copper, gold, lead, silver, and zinc. The State of Sonora was the third-ranked producer of nonfuel minerals, by value, and produced barite, copper, dolomite, gold, graphite, gypsum, molybdenum, salt, silica sand, silver, and wollastonite (Cámara Minera de México, 2020, p. 28; Servicio Geológico Mexicano, 2020, p. 25, 32, 35).

In 2020, employment in the mining sector decreased by 2.9%. The mining and quarrying sector employed 367,935 people in 2020 compared with 379,093 people in 2019. In 2020, a total of 179 companies that had been formed with foreign capital investment were operating in Mexico. About 70% of the capital was from investors from Canada; 11% from investors from the United States; and 4% from investors from China. Companies based elsewhere, including in Australia, France, India, Japan, the Republic of Korea, Spain, and the United Kingdom, also invested in Mexico's mineral sector (although their shares of capital investments were not specified) (Cámara Minera de México, 2021, p. 25, 31–32).

Government Policies and Programs

Announced in 2019 and confirmed in 2020, the most significant change in terms of mineral policy was the statement by the Government of Mexico that stated no new mining concessions would be granted in the country, effective immediately after announcement. However, the Government clarified that existing concessions and those that were being negotiated while this policy was announced would be respected according to the current mining law of Mexico (El Financiero, 2020).

In 2015, the Government enacted the Energy Reform Law in which state-owned Petróleos Mexicanos S.A. de C.V. (Pemex) was restructured into seven state-owned subsidiaries, which were Pemex Exploración y Producción [Pemex Exploration and Production], Pemex Perforación y Servicios [Pemex Drilling and Services], Pemex Transformación Industrial [Pemex Industrial Transformation], Pemex Logística [Pemex Logistics], Pemex Etileno [Pemex Ethylene], Pemex Fertilizantes [Pemex Fertilizers], and Pemex Cogeneración y Servicios [Pemex

Cogeneration and Services]. Through the restructuring process, each subsidiary was assigned a particular sector of Pemex's production, such as the production of natural gas and fertilizers, or petroleum exploration or production. These changes also allow for private investment in the new subsidiaries, although petroleum production and ownership are retained by the Government (Petróleos Mexicanos S.A. de C.V., 2017, p. 10–11).

Reforms to the Hydrocarbons Law were last published in the Official Journal of the Mexican Congress on November 15, 2016. Under the law, all hydrocarbon resources are considered to be the property of the people of Mexico. The law establishes that the Secretaría de Energía, with technical assistance from the National Hydrocarbons Commission, is responsible for awarding allocations to Pemex or any other state-owned company to conduct exploration for and extraction of hydrocarbons. The reforms also allow for new exploration and contract and licensing schemes, such as production-sharing, profit-sharing, and service contracts. As stipulated in the reform, Pemex has the right of first refusal on developing the country's resources before private companies can begin bidding (Cámara de Diputados del H. Congreso de la Unión, 2016, p. 1, 4, 8; U.S. Energy Information Administration, 2017).

The mineral sector is administered by the Secretaría de Economia [Ministry of Economy]. The Dirección General de Regulación Minera [General Department of Mining Regulation], which is part of the Ministry of Economy, is the organization in charge of revising the mining law and its regulations, as well as granting concessions and titles. The Servicio Geológico Mexicano [Mexican Geological Survey], which is part of the Ministry of Economy, is responsible for collecting and disseminating information on territory planning and for facilitating the development of the country's natural resources. Mineral commodities are considered part of the National patrimony of Mexico under its Constitution. Article 27 deals with issues of ownership and the mining of natural resources. The Ley Minera [Mining Law] became effective in 1992 and was subsequently modified and expanded in 1996, April 2005, June 2006, and August 2014. The mining law provides the legal framework for the exploration, production, and processing of the country's mineral resources. Neither petroleum and its derivatives nor radioactive materials are covered by this law. Under the law, mining concessions can be granted only by the Ministry of Economy. Exploration concessions are granted for 6 years and are not renewable. Production concessions are awarded for 50 years and are renewable for an additional 50 years. The Reglamento de la Ley Minera (Rules of the Mining Law), which was published in the Diario Oficial [Official Journal] by Mexico's Congress in 2012 was modified in October 2014. The Rules of the Mining Law regulates the granting and the administration of mining concessions and how the rights and obligations derived therefrom are exercised and fulfilled (Cámara de Diputados del H. Congreso de la Unión, 2014a, c, p. 1, 3, 11, 27).

The Foreign Investment Law, which establishes the parameters for foreign direct investment in Mexico, was published in 1993 and amended in 2014. Under the law, foreign investors seeking to obtain exploration and mining concessions within the country must submit to the Secretaría de Relaciones Exteriores [Ministry of Foreign Affairs] a statement of agreement that accepts the conditions that are established in article 27. Companies are also responsible for obtaining the corresponding mining permits from the Ministry of Economy. The law also establishes that foreign investors may hold 100% of the capital stock of any corporation or partnership in Mexico, except in those few areas that are expressly subject to limitations under the law (Cámara de Diputados del H. Congreso de la Unión, 2014b, p. 7).

Production

In 2020, the production of mineral commodities in Mexico was severely affected by the effects of the COVID-19 pandemic. Production of the following commodities decreased by more than 10% compared with production in 2019: refined bismuth, by 96.7%; crushed marble, by 69.9%; pig iron, by 36.6%; primary refined cadmium, by 29.9%; coke (breeze and metallurgical) and vermiculite, by 29.7% each; acid-grade fluorspar (estimated) and sulfur, by 27.7% each; ferromanganese, by 21.9%; bituminous and subbituminous coal, 20.7%; metallurgical-grade fluorspar (estimated), by 20.7%; iron ore, by 18%; direct-reduced iron, by 13.5%; metallurgical coal, by 13.3%; antimony, by 12.5%; natural amorphous graphite, by 11.7%; refined cobalt, by 11.6%; and refined gold and copper (electrowon), by 11.1% each. Increases in mineral production included that of talc, by 304%; bentonite, by 225.7%; kaolin, by 92.8%; dolomite (crushed), by 44.4%; mercury, by 40%; calcite (crushed), by 34.5%; and primary refined silver, by 13.1%. Data on mineral production are in table 1.

Structure of the Mineral Industry

Mexico's leading silver and gold producers included Fresnillo plc. (Fresnillo), Goldcorp Inc. of Canada, Grupo México S.A.B. de C.V. (Grupo México), Industrias Peñoles, S.A.B. de C.V. (Industrias Peñoles), and Pan American Silver Corp. of Canada. Industrias Peñoles, through its wholly owned subsidiary Metalúrgica Met-Mex Peñoles S.A.B. de C.V., was the leading producer of refined bismuth in the country. The refinery, which was located in the State of Coahuila, had the capacity to produce 1,440 metric tons per year (t/yr) of bismuth. Exportadora de Sal, S.A. de C.V., which was a joint venture between the Government (51% interest) and Mitsubishi Corp. of Japan (49%), was the leading producer of salt in the country. Exportadora de Sal was located in the State of Baja California Sur and had the capacity to produce about 9.5 million metric tons per year (Mt/yr) of salt. Minera Roca Rodando, S. de R.L. de C.V., which was a subsidiary of S&B Industrial Minerals S.A. of Greece, owned the Pilares Mine, located in the State of Sonora, that was the only mine in the country that produced wollastonite. Mexichem, S.A.B. de C.V., through its wholly owned subsidiaries Fluorita de México, S.A. de C.V. and Mexichem Fluor, S.A. de C.V., was the leading producer of fluorspar in the country. Fluorita de México operated the La Sabina Mine, which is located in the State of Coahuila and had the capacity to produce about 100,000 t/yr of fluorspar. Mexichem Fluor operated the Las Cuevas Mine, which is located in the State of San Luis de Potosi. The mine had the

capacity to produce about 1.2 Mt/yr of fluorspar. Table 2 is a list of major mineral industry facilities.

Mineral Trade

The value of Mexico's mineral exports reached $18,405 million in 2020, which was a decrease of 1.8% compared with that in 2019. Exports of precious metals (gold, platinum, and silver), which increased by 6.6% to $7,868 million, were the country's leading mineral exports, by value. Exports of nonprecious metals, which included cobalt, copper, lead, and zinc, among other nonprecious minerals, decreased by 12.9% to $8,537 million, mostly owing to a decrease in the international demand for these minerals (Cámara Minera de México, 2021, p. 27–28).

In 2020, the country's major mineral export trade partner was the United States, which received 37.6% of Mexico's mineral exports, followed by China (16.4%), the Republic of Korea (4.6%), Belgium (1.3%), the United Kingdom (1.2%), Canada (1.1%), and Japan (1.1%). The remainder was divided among several countries for which the exports received by each were less than 1% of Mexico's total mineral exports. Mexico's major mining import partners were, in descending order of value, the United States, which supplied 42% of Mexico's imports, Canada (4.9%), China (3.5%), India (3.4%), Colombia (3.3%), Chile (2.7%), Russia (2.7%), and Brazil (2.1%). The remainder was divided among several countries for which the imports received by each was less than 1% of Mexico's total mineral imports (Cámara Minera de México, 2021, p. 244–245).

Commodity Review

Metals

Copper.—In 2020, Mexico produced a total of 732,900 metric tons (t) of copper from concentrate and electrowon, an increase of 2.7% compared with 713,700 t in 2019. Mexico's leading copper-producing States were (by volume of output) Sonora, which accounted for 81.1% of production; Zacatecas, accounting for 8.3%; San Luis Potosi, accounting for 4.0%; Chihuahua, accounting for 2.6%, and Baja California Sur, accounting for 2.3% (table 1; Servicio Geológico Mexicano, 2021, p. 26).

In terms of tonnage of output by company, Grupo México was the leading copper producer in Mexico, accounting for 79% of output. In 2020, the company produced 577,580 t at its mines and operations in the States of Sonora, Chihuahua, San Luis Potosi, and Zacatecas. The 11 largest mining operations in 2020 were (in terms of volume of copper concentrate production) the Buenavista del Cobre Mine, which was owned by Grupo México and had a production total of 333,570 t; the La Caridad Mine, owned by Grupo México (109,670 t); the NEMISA Mine, owned by Negociación Minera Santa María de la Paz S.A. de C.V. (Neg. Mra.) (24,510 t); the Cozamin Mine, owned by Capstone Mining Corp. of Canada (Capstone) (17,200 t); the Aranzazú Mine, owned by Aura Minerals Inc. of the British Virgin Islands (Aura) (11,680 t); the Bolívar Mine, owned by Sierra Metals Inc. of Canada (Sierra) (11,130 t); the Santa Bárbara Mine, owned by Grupo México (3,610 t); the San Martín Mine, also owned by Grupo México (3,600 t); the Sabinas Mine, owned by Industrias Peñoles (3,410 t); the Charcas Mine, owned by Grupo México (3,090 t); and the El Águila Mine, owned by Gold Resource Corp. of the United States (1,590 t) (Cámara Minera de México, 2021, p. 46–49).

In 2020, the Tayahua Mine, owned by Minera Frisco S.A. de C.V., concluded the expansion of its primary copper project. The mine was expected to increase production to 3,500 t/yr by 2022. Sierra finished the expansion of its processing plant at the Bolívar Mine and increased its production in 2020 by 24% compared with that in 2019. In 2020, Industrias Peñoles, owing to the company's improvements in the flotation circuit of the Capela Mine, was able to obtain a more efficient separation of lead-silver from the copper in the ore and therefore increased the amount of copper produced in the mine (Cámara Minera de México, 2021, p. 46–49).

Gold.—In 2020, mined gold production in Mexico decreased by 8.8% to 101,631 kilograms (kg) from 111,404 kg in 2019. Gold remained the leading mineral commodity in terms of value, accounting for 31.2% of the total value of production of all "metallic minerals" produced in the country (table 1; Servicio Geológico Mexicano, 2021, p. 24).

At the State level, the State of Sonora was the leading producer of gold (by weight), accounting for 29.8% of total national gold production in 2020. The State of Zacatecas was the second-ranked gold producer, in terms of weight, accounting for 18.8% of gold production; the State of Chihuahua accounted for 16.1%, and the States of Guerrero and Durango accounted for 13.8% each. These five States accounted for 92.3% of Mexico's gold output in 2020. The five largest gold-producing companies, in terms of the weight of the gold produced, were Fresnillo, Newmont Corp. of the United States, Torex Gold Resources Inc. of Canada, Agnico Eagle Mines Ltd. of Canada, and Alamos Gold Inc. of Canada; these companies produced 59.6% of all mined gold in Mexico in 2020 (Cámara Minera de México, 2021, p. 33–39; Servicio Geológico Mexicano, 2021 p. 24).

The 10 principal gold mining operations in 2020 were (in terms of the weight of the gold produced) the Peñasquito Mine, which was owned by Newmont and produced 16,360 kg; the El Limón-Guajes Mine, owned by Torex Gold (13,389 kg); the La Herradura Mine, owned by Fresnillo (13,228 kg); the Pinos Altos Mine, owned by Agnico Eagle (4,771 kg); the Mulatos Mine, owned by Alamos Gold (4,690 kg); the Palmarejo Mine, owned by Coeur Mining Inc. (Coeur) of the United States (3,440 kg); the Dolores Mine, owned by Pan American Silver Corp. (Pan American) of Canada (3,048 kg); the Noche Buena Mine, owned by Fresnillo (2,736 kg); the La India Mine, owned by Agnico Eagle Mines (2,642 kg); Saucito Mine, also owned by Fresnillo (2,640 kg); and the San Dimas Mine, owned by First Majestic Silver Corp. (First Majestic) of Canada (2,227 kg) (Cámara Minera de México, 2021, p. 33–39).

In 2020, the Peñasquito Mine regained its position as the leading gold-producing mine in the country after a community-relations issue that affected productivity at the mine was resolved. Gold production at the Peñasquito Mine increased by about 400% in 2020 compared with that in 2019. The Mulatos Mine increased its production by 6.2% owing to the mining of higher grade ore from the Cerro Pelon mining area, which began operations in the fourth quarter of 2019 (Cámara Minera de México, 2021, p. 33–39, 42).

In 2020, some gold projects that had been expected to advance their construction or begin operations experienced delays in their development. In the State of Guerrero, the expansion of the Los Filos Mine was delayed. The project planned the expansion of the open pit, the development of a second underground mine (called Bermejal), the addition of a new open pit (called Guadalupe), and the construction of a new carbon-in-leach plant (CIL) to process ore with higher grades. According to the company, the total expansion project would increase production at the Los Filos Mine to more than 10,886 kilograms per year (kg/yr) of gold. However, the scheduled work in the Guadalupe pit and the preparatory works for the underground Bermejal Mine were suspended owing to the effects of the COVID-19 pandemic and the confinement of the local community of Carrizalillo. The Guadalupe Mine resumed operations at the end of December after the lifting of the confinement (Cámara Minera de México, 2021, p. 33–39).

In April 2020, Golden Minerals Co. of the United States reported on the preliminary economic assessment of its open pit gold and silver project, El Rodeo, located in the State of Durango. The company reported that, in August, it had completed its drilling program. The company expected to have its environmental permits by the fourth quarter of the year and expected to start production in January 2021. The company planned to start to deliver ore to its Velardeña mill right after production started and to start processing the ore immediately. The company estimated that the life of the mine was going to be approximately 2.5 years, or 10 quarters, and was expected to produce between 373 and 435 kg/yr of gold as well as between 777 and 933 kg/yr of silver (Cámara Minera de México, 2021, p. 33–39).

Fresnillo and MAG Silver Corp. of Canada (56% and 44% share of the project, respectively) planned to start production at the Juanicipio project by the end of the second quarter of 2021. The project, which was being developed at an estimated investment cost of $440 million, was expected to produce 364,000 kg of silver and 1,340 kg of gold. The construction of the Santana project by Alamos continued to advance in 2020. The project had temporarily stopped following the widespread closures during the COVID-19 pandemic. The project was anticipated to start operations in the first half of 2021 and was expected to produce between 777 and 933 kg/yr of gold at a project cost of $7.5 million (Cámara Minera de México, 2021, p. 33–39).

The Camino Rojo project, owned by Orla Mining Ltd. (Orla) of Canada, began construction in November 2020. Orla planned to update a feasibility study for the project that included changes derived from an expansion agreement with Fresnillo, showing an average production of 3,000 kg/yr during a mine life of 10.4 years and a capital expenditure of $134 million. The first production was planned for early 2022 (Cámara Minera de México, 2021, p. 33–39).

Iron and Steel.—Leading iron ore producers in Mexico included ArcelorMittal Holdings AG of Luxembourg, Altos Hornos de Mexico (AHMSA), S.A.B. de C.V., and Consorcio Minero Benito Juarez Peña Colorada S.A. de C.V. In 2020, Mexico was ranked 15th among the world's leading producers of crude steel and 2d among Latin America's leading producers, after Brazil. In 2020, raw steel production decreased by 8.7% from that in 2019. In 2020, consumption of steel in the country was measured at 21.5 million metric tons (Mt) (table 2; World Steel Association, 2021, p. 16).

In 2019 (the latest year for which data were available), Mexico imported about 10.2 Mt of steel, mainly from the United States (35%), the Republic of Korea (19.4%), Japan (16.2%), China (4.8%), Germany (3.8%), Canada (3.8%), the Netherlands (2.1%), Taiwan (2%), Vietnam (1.8%), and Spain (1.4%). The remaining 9.7% came from several other countries (Cámara Nacional de la Industria de Hierro y del Acero, 2020).

In 2019 (the latest year for which data were available), Mexico exported about 3.5 Mt of steel to the United States, accounting for 62.4% of the total exports of steel from Mexico. Other countries which received steel exports included Colombia (13.6%), Canada (4.2%), Guatemala (3.7%), Peru (2.1%), El Salvador (1.7%), Chile (1.7%), India (0.9%), Honduras (0.8%), and Cuba (0.6%). The remaining 8.3% was exported to several other countries (Cámara Nacional de la Industria de Hierro y del Acero, 2020).

In 2019 (the latest year for which data were available), the State of Coahuila was first-ranked among the country's raw-steel-producing States, accounting for about 34% or 6.34 Mt of the total quantity produced in the country, followed by the States of Michoacan (21%, or 3.83 Mt); Nuevo Leon (16%, or 3 Mt); Veracruz (9%, or 1.75 Mt); and San Luis Potosi (5%, or 1.02 Mt). The remainder was produced in six other States (Cámara Nacional de la Industria de Hierro y del Acero, 2020, p. 1).

Lead and Zinc.—In 2020, production of mined lead increased slightly to 260,390 t from 259,457 t in 2019. The State of Zacatecas accounted for 61.5% of the production of lead, in terms of tonnage. The State of Chihuahua was the second-ranked producer, accounting for 13.3% of production, followed by the State of Durango, which accounted for 10.9%. The combined production of the three leading States accounted for 85.7% of Mexico's total production of lead. Five companies held a 78% share of total lead production in Mexico in 2020. The remainder was produced by Industrias Peñoles, Grupo México, and Minera Frisco (Cámara Minera de México, 2021, p. 50–56; Servicio Geológico Mexicano, 2021, p. 26–27).

The Peñasquito Mine (owned by Newmont), was the leading producer of lead in Mexico. In 2020, lead production from the mine increased by 66% compared with that in 2019 and represented 31% of the country's total production of lead. In the State of Sinaloa, the San Rafael Mine (owned by Americas Gold & Silver Corp. of Canada), remained closed in 2020 owing to what the company called an "illegal strike" (Cámara Minera de México, 2021, p. 55–57).

In 2020, the production of mined zinc in Mexico increased by 1.7% to 688,461 t compared with 676,677 t in 2019. The State of Zacatecas produced 47.4% of the country's total output of mined zinc in 2020. The State of Durango was the second-ranked producer, accounting for 17.1% of total production; the third-ranked producer of zinc was the State of Chihuahua, accounting for 13.4% of total production; and the fourth-ranked producer was the State of Mexico, accounting for 5.5% of total production. The rest was divided among several other States in Mexico. In terms of output by company, Industrias Peñoles was the leading producer of zinc, by quantity, accounting for a 26.3% share of the total national production of zinc, followed by

Newmont, Fresnillo, Grupo México, and Minera Frisco (table 1; Cámara Minera de México, 2021, p. 50–53).

In April 2020, Industrias Peñoles suspended operations at the Francisco I. Madero Mine, citing lower ore grades; higher costs of extraction, milling, and processing; and a significant decrease in the price of zinc, among other factors. The company also closed the Bismarck Mine on June 27, 2020, owing to the natural depletion of ore reserves. The company stated that recent exploration efforts to keep the mine open had been unsuccessful. The San Julián Mine, owned by Fresnillo, reduced its production by almost 10%. The company did not indicate the reason for this decrease in production (Cámara Minera de México, 2021, p. 50–53; Industrias Peñoles, S.A.B. de C.V., 2021, p. 25; Servicio Geológico Mexicano, 2021, p. 26–27).

The Buenavista Zinc project completed basic construction of the mine site and was progressing according to plans stated by the company. Grupo México started to purchase machinery and equipment for the mine and reported that the company had all the permits necessary for the operation of the mine. The mine was expected to go into operation in the third quarter of 2022. Production was expected to reach 80,000 t/yr. The capital investment for the project was $413 million (Cámara Minera de Mexico, 2021 p. 50–53).

At the end of July 2020, Consolidated Zinc Ltd. of Australia received the permits to build and operate a tailings facility at the Plomosas project. After obtaining these permits, the company began planning the remodel of the processing plant. Commercial operations were expected to begin in the second quarter of 2021; about 100 to 200 t of tailings were expected to be processed daily (Cámara Minera de México, 2021, p. 50–53).

Silver.—In 2020, Mexico's production of mined silver decreased by 5.1% to 5,541 t from 5,840 t in 2019. The State of Zacatecas was Mexico's leading producer of silver by weight, accounting for 39% of total silver output in 2020. The leading silver-producing mines in the country included the Peñasquito Mine, the Saucito Mine, and the Fresnillo Mine, which are located in the State of Zacatecas. Silver production in the State of Zacatecas increased by 2.9% in 2020 compared with production in 2019. The State of Chihuahua was the second-ranked producer of silver in the country, accounting for 23.9% of the country's total silver output; production of silver in the State of Chihuahua increased by 10.1% in 2020. The State of Durango was the third-ranked producer of silver in the country, accounting for 13.0% of the country's total silver output. The State of Sonora was the fourth-ranked producer, accounting for 13% of total silver output, and the State of Oaxaca was the fifth-ranked producer, accounting for 7.3% (table 1; Servicio Geológico Mexicano, 2021, p. 25).

The 10 largest silver mines, in terms of output in 2020, were the Peñasquito Mine (865 t); the Saucito Mine (483 t); the San Julián Mine (414 t); the Fresnillo Mine (406 t); the San Dimas Mine (owned by First Majestic Silver) (199 t); the Palmarejo Mine (owned by Coeur Mining Inc. of the United States) (195 t); the San José Mine (owned by Fortuna Silver of the United States) (192 t); the Tizapa Mine (51% owned by Industrias Peñoles) (186 t); the La Ciénega Mine (owned by Fresnillo) (179 t); and the La Colorada Mine (owned by Pan American Silver) (156 t) (Cámara Minera de México, 2021, p. 25).

The mines for which silver production decreased in 2020 included the La Colorada Mine, which reduced its production by almost 39% owing to the suspension of activities related to the COVID-19 pandemic that prevented work on the mine's ventilation systems to allow the company to access a section of the mine with higher grade ore. Another mine, the Dolores Mine, reduced its production by 26.2% because it reached zones in the mine that had lower ore grades (Cámara Minera de México, 2021, p. 41–45).

Production at the El Águila and the San José Mines decreased by 31% and 21.6%, respectively, because work was suspended for 54 days as a result of the COVID-19 pandemic (Cámara Minera de México, 2021, p. 41–45).

The Tahuehueto polymetallic project (owned by Altaley Mining Corp. of Canada), located in the State of Durango, was under construction in 2020. Production was expected to begin during the second quarter of 2021, and the project was projected to process 300,000 t/yr of ore within 5 years. Once operational, the project was expected to produce 500 kg/yr of gold, 5,500 kg/yr of silver, 408 t/yr of copper, 1,452 t/yr of lead, and 2,540 t/yr of zinc. The Tahuehueto project was to be developed at a cost of $20 million (Cámara Minera de México, 2021, p. 44).

The La Terronera Mine project (owned by Endeavour Silver Corp. of Canada), located in the State of Jalisco, had a prefeasibility study based on updated information collected in 2019 and 2020. The company expected that, by the third quarter of 2020, the technical report would be completed. It was estimated that the useful life of the mine would be 10 years at an average production rate of 93,310 kg/yr of silver and 1,020 kg/yr of gold by 2021 (Cámara Minera de México, 2021, p. 41–45).

Industrial Minerals

Barite.—In 2020, barite production in Mexico decreased by 1.6% to 372,262 t from 378,295 t in 2019. Barite was produced in the States of Chihuahua, Coahuila, Jalisco, Nuevo Leon and Sonora. The decrease in production was most likely due to the effects of the COVID-19 pandemic (table 1; Servicio Geológico Mexicano, 2021, p. 32).

Vermiculite.—In 2020, the production of vermiculite in Mexico decreased by an estimated 29.7% compared with that in 2019. The value of its exports represented 3.43% of the value of all "nonmetallic mineral" exports from Mexico in 2019 (the latest year for which data were available). Vermiculite in Mexico was produced principally in the State of Oaxaca (table 1; Cámara Minera de México, 2021, p. 210).

Phosphate Rock.—Production of phosphate rock in Mexico increased by 3.4% in 2020 compared with that in 2019. The increase was due to an increase in the international demand for fertilizer-related commodities. The leading phosphate rock mine in terms of production by quantity, the San Juan de la Costa Mine, is located in the State of Baja California Sur (table 1; Servicio Geológico Mexicano, 2020, p. 70).

Mineral Fuels

Crude Petroleum and Natural Gas.—According to Pemex, as of January 1, 2020, proven crude petroleum reserves were estimated to be about 5.6 billion barrels (Gbbl), of which 4.2 Gbbl was located offshore and 1.4 Gbbl was located onshore. Proven natural gas reserves were estimated to be about 244 billion cubic meters (reported as 8,630 billion cubic feet). About 60% of the proven natural gas reserves were located onshore and about 40% were located offshore (Petróleos Mexicanos S.A. de C.V., 2020, p. 20).

In 2020, Pemex reported that it had produced an average of 1.66 million barrels per day (Mbbl/d) of crude petroleum compared with 1,678 bbl/d produced in 2019. Pemex's organizational structure divided Mexico's petroleum-producing areas into three regions: Marine, North, and South. The Marine region accounted for 81.8% of the country's total production of crude petroleum; followed by the South region, which accounted for 13.6% of production; and the North region, which accounted for 4.6% of production. The company reported that the decrease in crude petroleum production in 2020 was mainly attributed to the decrease in the production of heavy crude petroleum from the Cantarell Field; a decrease in the production of extra-light crude petroleum from the Pijije, the Sen, and the Terra Fields; and a decrease in production of light crude petroleum from the Cantarell, the Bellota-Jujo, and the Litoral de Tabasco Fields. Crude petroleum exports in 2019 (the latest year for which data were available) averaged 1,103 bbl/d, which was a decrease of 6.8% compared with the level of exports in 2018 and were the lowest reported in the past 5 years. This decrease in exports was due to a decrease in the level of production of heavy crude oil by 4.7% and from a decrease in the production of crude petroleum of the istmo (or isthmus) type, by 86.7% (Petróleos Mexicanos S.A. de C.V., 2018a–d; 2020, p. 25, 42; 2021, p. 32).

MINERAL INDUSTRY HIGHLIGHTS IN 2021

Minerals in the National Economy

In 2021, Mexico's real GDP increased by 5.3% from that in 2020 owing to the recovery of international markets following the winding down of the COVID-19 pandemic, and because of an increase in United States demand for goods and services from Mexico. Mexico's inflation rate during the year was 5.5%. Its nonfuel mineral sector accounted for 8.6% of the industrial sector GDP and 2.5% of the total GDP. In 2021, Mexico was estimated to be the world's leading producer of silver, by weight, accounting for about 24% of world production. The country was the second-ranked producer of fluorspar (accounting for about 12% of world production); ranked third among the world's leading producers of wollastonite (accounting for 9% of world production); ranked fourth among the world's leading producers of celestite (6% of world production) and lead (6% of world production); ranked fifth among the world's leading producers of barite (5% of world production), molybdenum (6% of world production), and zinc (6% of world production); ranked sixth among the world's leading producers of diatomite (4% of world production) and gold (4% of world production); ranked seventh among the world's leading producers of cadmium (3% of world production) and salt (3% of world production); ranked eighth among the world's leading producers of gypsum (4% of world production); and ranked ninth among the world's leading producers of copper (3% of world production) (Cámara Minera de México, 2022, p. 1, 208, 278, 280, 285; Bolen, 2023; Callaghan, 2023; Crangle, 2023a, b; Flanagan, 2023; George, 2023; Hatfield, 2023; Klochko, 2023; McRae, 2023a, b; Merrill, 2023; Polyak, 2023; Sangine, 2023; Sheaffer, 2023; Tolcin, 2023a, b).

Production

In 2021, the production of the following mineral commodities decreased by more than 10% compared with production in 2020: celestite, by 44%; mercury, by 44%; sulfur, by 33%; natural gas liquids, by 17%; natural gas (marketable), by 16%; phosphate rock (gross weight), by 15%; barite, by 14%; refined cadmium (primary), by 12%; molybdenum, by 12%; and phosphate rock (P_2O_5), by 12%.

In 2021, production of the following mineral commodities increased by more than 10% compared with production in 2020: ammonia, by 79%; ferromanganese, by 26%; refined gold, by 20%; mined gold, by 18%; acid-grade fluorspar, by 16%; refined cobalt, by 16%; iron ore, by 16%; silicomanganese, by 16%; pig iron, by 13%; direct reduced iron, by 12%; feldspar, by 12%; metallurgical coke, by 11%; mined cobalt, by 10%; copper (electrowon), by 10%; raw steel, by 10%; and mined silver, by 10%. Data on mineral production are in table 1.

Commodity Review

Metals

Copper.—In 2021, Mexico produced a total of 734,100 metric tons (t) of copper, which was a slight increase (less than 1%) compared with the total copper production in 2020. Grupo México was the leading copper producer by quantity in Mexico, producing 559,833 t from its mines and operations in the States of Chihuahua, San Luis Potosi, Sonora, and Zacatecas. In 2021, Grupo México accounted for 76% of Mexico's total mined copper production, by quantity.

In 2021, the 12 largest mining operations were (in terms of quantity of copper concentrate produced) the Buenavista del Cobre Mine, which produced 341,200 t during the year; the La Caridad Mine (102,690 t); the NEMISA Mine (25,210 t); the Cozamin Mine (24,420 t); the Tayahua Mine (23,230 t); the Aranzazú Mine (14,700 t); the Bolívar Mine (7,670 t); the Sabinas Mine (3,680 t); the Charcas Mine (3,340 t); the Capela Mine (3,210 t); the San Martín Mine (3,080 t); and the Velardeña Mine (2,870 t) (table 1; Cámara Minera de México, 2022, p. 42–46).

Gold.—In 2021, mined gold production in Mexico increased by 18% to an estimated 120,000 kg from 101,631 kg in 2020. Gold remained the country's leading mineral commodity in terms of the value of production, accounting for 28.4% of the total value of production of all "metallic minerals" produced in Mexico. The State of Sonora accounted for 28.8% of the country's total gold production (by weight) in 2021. The State of Zacatecas was the second-ranked gold producer (in terms of the quantity of production), accounting for 18.2%, and the State

of Guerrero was ranked third, accounting for 15.7% (table 1; Cámara Minera de México, 2022, p. 30–32, p. 58).

In 2021, the 11 principal gold mining operations were the Peñasquito Mine, which produced 21,335 kg during the year; the El Limón-Guajes Mine (14,563 kg); the La Herradura Mine (13,111 kg); the Dolores Mine (4,980 kg); the Los Filos Mine (owned by Equinox Gold Ltd. of Canada) (4,482 kg); the Pinos Altos Mine (4,346 kg); the Mulatos Mine (3,772 kg); the Palmarejo Mine (3,396 kg); the Noche Buena Mine (3,012 kg); the Saucito Mine (2,750 kg); and the San Dimas Mine (2,527 kg) (Cámara Minera de México, 2022, p. 31–33).

Lead and Zinc.—In 2021, production of mined lead increased by 5% to 272,231 t compared with 260,390 t (revised) in 2020. The State of Zacatecas accounted for 63% of the country's total production of lead, by quantity. The State of Chihuahua accounted for 13% of the country's total production of lead, by quantity, followed by the State of Durango, which accounted for 10%. In 2021, five companies accounted for 70% of Mexico's total lead production; Newmont was the largest producer, followed by Fresnillo, Industrias Peñoles, Grupo México, and Minera Frisco (Cámara Minera de México, 2022, p. 49–53).

The Peñasquito Mine (owned by Newmont) ranked first among the country's leading lead producing mines (in terms of the quantity of output). In 2021, the Peñasquito Mine produced 80,280 t, which represented 29% of the country's total production of lead. Mined zinc production increased by 5% to 724,201 t from 688,461 t (revised) in 2020. The State of Zacatecas was the country's leading zinc producer in terms of output. Production of lead from the State of Zacatecas increased by 9.5% compared with that in 2020 and accounted for 48.1% of the country's total zinc output. The State of Durango was the second-ranked producer, and the State of Chihuahua was the third-ranked producer. Of the operating companies, Newmont was the leading producer of zinc, in terms of quantity, accounting for 34.6% of the country's total production of zinc, followed by Industrias Peñoles (29.2%); Fresnillo (16.5%); Grupo México (11.2%); and Minera Frisco (8.2%) (Cámara Minera de México, 2021, p. 283–287).

Silver.—In 2021, the production of mined silver in Mexico increased by 10% to 6,108 t from 5,541 t in 2020. The State of Zacatecas was Mexico's leading producer of silver (by weight), accounting for 38% of the country's total silver output in 2021. In terms of output, the country's leading silver mines were, in order of production, the Peñasquito, the Saucito, and the Fresnillo Mines, all of which are located in the State of Zacatecas. Production of silver in the State of Zacatecas increased by 6% in 2021 compared with that in 2020. The State of Chihuahua was the second-ranked producer of silver in the country, accounting for 22% country's total silver output; the State increased its production of silver by 1.6% in 2021. The State of Durango was the third-ranked producer of silver in the country and accounted for 15% of the total silver produced in the country. Fresnillo was the leading producer of silver in the country, accounting for 24.6% of total silver output; followed by Newmont, Grupo México, Industrias Peñoles, and First Majestic (table 1; Cámara Minera de México, 2022, p. 36–38).

In 2021, the 10 largest silver mines, in terms of annual production, were the Peñasquito Mine (976 t); the San Julián Mine (owned by Fresnillo) (522 t); the Saucito Mine (387 t); the Fresnillo Mine (373 t); the San Dimas Mine (238 t); the Cerro los Gatos Mine (236 t); the Palmarejo Mine (212 t); the San José Mine (200 t); the Tizapa Mine (186 t); and the La Ciénega Mine (170 t) (Cámara Minera de México, 2022, p. 39–43).

Industrial Minerals

Lithium.—In 2021, Bacanora Lithium Plc of Canada (owned by a United Kingdom holdings company), was reported to have discovered a lithium deposit with reserves of more than 243 Mt of lithium; the lithium in this deposit was contained in clays. It was reported that the company had four concessions in the State and hoped to begin production in 2023 (El Financiero, 2021).

It was also reported that Bacanora had agreements with Hanwa Co. Ltd. of Japan. Bacanora was set to be taken over by Ganfeng Lithium Co. Ltd. of China, pending approval from Bacanora shareholders and authorities from Mexico. In September, the Government of Mexico began a series of legal reforms that would modify the status of the Comisión Federal de Electricidad, which was the national electricity monopoly owned by the Government. Because renewable energy fell within the domain of the energy reforms introduced, these reforms also targeted the control and production of lithium in the country. The legal reforms were not approved by the Cámara de Diputados; however, the specific reforms targeting the ownership, production, and extraction of lithium in Mexico were slated to be reintroduced for a vote in 2022 (Holzman and Dlin, 2021; Cámara Minera de México, 2022, p. 89).

Outlook

Mexico's economy was significantly affected by the COVID-19 pandemic in 2020. The mineral industry was subject to stoppages in mineral production at mines and processing facilities, which were closed for long periods of time during the pandemic. Mexico's economy depends heavily on exports of consumer goods, crude petroleum, and agricultural products, and the country went through a period of lower demand for most of its products during this period. Because the United States and Canada are two of Mexico's major trading partners, the economic performance of these two countries, and particularly that of the United States, was a determining factor in the economic recovery of Mexico as the pandemic wound down. As the economy of the United States accelerates in the wake of the pandemic, it is likely that the industries in Mexico (including the mineral industry) that export products to the United States will continue to recover and perform well. Production of metals (especially precious metals) will likely continue to be the most profitable part of the mineral industry of Mexico.

Based on the country's previous export trends, copper, gold, lead, silver, and zinc are likely to be the leading mineral exports in 2022, and aluminum, copper, coal, and iron ore are likely still to be the leading mineral imports. The opening of the petroleum and natural gas sector to foreign direct investment will likely result in increased output of crude petroleum and natural gas in the foreseeable future term and to increased private-sector participation in the mineral industry.

References Cited

Anderson, C.S., 2022, Silver: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 153–153.

Bolen, W.P., 2022, Salt: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 140–141.

Bolen, W.P., 2023, Salt: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 148–149.

Callaghan, R.M., 2022, Cadmium: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 42–43.

Callaghan, R.M., 2023, Cadmium: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 50–51.

Cámara de Diputados del H. Congreso de la Unión, 2014a, Ley de inversión extranjera [Foreign investment law]: Mexico City, Mexico, Cámara de Diputados del H. Congreso de la Unión, 53 p. [In Spanish.]

Cámara de Diputados del H. Congreso de la Union, 2014b, Ley minera [Mining law]: Mexico City, Mexico, Cámara de Diputados del H. Congreso de la Union, 34 p. (Accessed March 9, 2018, at http://www.diputados.gob.mx/LeyesBiblio/pdf/151_110814.pdf.) [In Spanish.]

Cámara de Diputados del H. Congreso de la Union, 2014c, Reglamento de la ley minera [Regulations of the mining law]: Mexico City, Mexico, Cámara de Diputados del H. Congreso de la Union, 51 p. (Accessed March 9, 2018, at http://www.diputados.gob.mx/LeyesBiblio/regley/Reg_LMin_311014.pdf.) [In Spanish.]

Cámara de Diputados del H. Congreso de la Unión, 2016, Ley de hidrocarburos [Hydrocarbons law]: Mexico City, Mexico, Cámara de Diputados del H. Congreso de la Unión, August 11, 76 p. (Accessed November 6, 2018, at https://cnh.gob.mx/media/14111/3-ley-de-hidrocarburos.pdf.) [In Spanish.]

Cámara Minera de México, 2020, Informe anual 2020 [Annual report 2020]: Mexico City, Mexico, Cámara Minera de México, 337 p. (Accessed February 2, 2021, at https://camimex.org.mx/application/files/5816/0204/8730/info_2020.pdf.) [In Spanish.]

Cámara Minera de México, 2021, Informe anual Camimex 2021 [Annual report Camimex 2021]: Mexico City, Mexico, Cámara Minera de México, 393 p. (Accessed December 29, 2022, at https://camimex.org.mx/application/files/2916/3095/7239/info_2021.pdf.) [In Spanish.]

Cámara Minera de México, 2022, Informe anual Camimex 2022 [Annual report Camimex 2022]: Mexico City, Mexico, Cámara Minera de México, 374 p. (Accessed January 2, 2023, at https://camimex.org.mx/application/files/6116/7053/3693/info2022.pdf.) [In Spanish.]

Cámara Nacional de la Industria de Hierro y del Acero, 2020, Radiografía de la industria del acero en México [Radiography of the steel industry in Mexico]: Mexico City, Mexico, Cámara Nacional de la Industria de Hierro y del Acero, 1 p. (Accessed February 3, 2020, at https://www.canacero.org.mx/en/aceroenmexico/descargas/Radiografia_de_la_Industria_del_Acero_en_Mexico_2020.pdf.) [In Spanish.]

Crangle, R.D. Jr., 2022a, Diatomite: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 58–59.

Crangle, R.D. Jr., 2022b, Gypsum: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 76–77.

Crangle, R.D. Jr., 2023a, Diatomite: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 66–67.

Crangle, R.D. Jr., 2023b, Gypsum: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 84–85.

El Financiero, 2020, AMLO disminuyó en 21% el territorio que se concesionó a las mineras [AMLO decreased by 21% the territory that was granted to mining companies]: Grupo Multimedia Lauman, S.A.P.I. de C.V., México D.F., November 23. (Accessed January 14, 2022, at https://www.elfinanciero.com.mx/empresas/amlo-disminuyo-en-21-el-territorio-que-se-concesiono-a-las-mineras/.)

El Financiero, 2021, Bacadéhuachi, el pueblo de Sonora con el yacimiento más grande de litio en el mundo [Bacadehuachi, the village of Sonora with the world's largest lithium deposit]: Mexico City, Mexico, Grupo Multimedia Lauman, S.A.P.I. de C.V., October 7. (Accessed January 14, 2023, at https://www.elfinanciero.com.mx/nacional/2021/10/07/bacadehuachi-el-pueblo-de-sonora-con-el-yacimiento-mas-grande-de-litio-en-el-mundo/.) [In Spanish.]

Flanagan, D.M., 2022, Copper: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 54–55.

Flanagan, D.M., 2023, Copper: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 62–63.

George, M.W., 2023, Silver: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 160–161.

Hatfield, A.K., 2023, Cement: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 52–53.

Holzman, J., and Dlin, Susan, 2021, $22.6 billion Mexican lithium mine bogs down in drug cartel, tech risks: New York, New York, S&P Global, October 20, 1 p. (Accessed January 2, 2023, at https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/22-6b-mexican-lithium-mine-bogs-down-in-drug-cartel-tech-risks-66512627.)

Industrias Peñoles, S.A.B. de C.V., 2021, Annual report 2020: Mexico City, Mexico, Industrias Peñoles, S.A.B. de C.V., 95 p. (Accessed February 16, 2025, at https://www.penoles.com.mx/assets/files/reportes/Anuales/en/PEN_IA20-ENG.pdf.)

Klochko, 2022, Lead: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 96–97.

Klochko, 2023, Lead: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 104–105.

McRae, M.E., 2022a, Barite: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 38–39.

McRae, M.E., 2022b, Fluorspar: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 70–71.

McRae, M.E., 2023a, Barite: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 38–39.

McRae, M.E., 2023b, Fluorspar: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 70–71.

Merrill, A.M., 2022, Bismuth: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 36–37.

Merrill, A.M., 2023, Bismuth: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 44–45.

Polyak, D.E., 2022, Molybdenum: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 112–113.

Polyak, D.E., 2023, Molybdenum: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 120–121.

Petróleos Mexicanos S.A. de C.V., 2017, Informe anual 2016 [Annual report 2016]: Mexico City, Mexico, Petróleos Mexicanos S.A. de C.V., April, 140 p. (Accessed January 3, 2022, at http://www.pemex.com/acerca/informes_publicaciones/Documents/Informe-Anual/Informe_anual_2016.pdf.) [In Spanish.]

Petróleos Mexicanos S.A. de C.V., 2018a, Monthly petroleum statistics—Liquid hydrocarbons production: Mexico City, Mexico, Petróleos Mexicanos S.A. de C.V., 1 p. (Accessed January 2, 2022, at http://www.pemex.com/en/investors/publications/Indicadores%20Petroleros%20Archivos/eprohidro_ing.pdf.)

Petróleos Mexicanos S.A. de C.V., 2018b, Monthly petroleum statistics—Value of crude petroleum exports: Mexico City, Mexico, Petróleos Mexicanos S.A. de C.V., 1 p. (Accessed January 2, 2022, at http://www.pemex.com/en/investors/publications/Indicadores%20Petroleros%20Archivos/evalorexporta_ing.pdf.)

Petróleos Mexicanos S.A. de C.V., 2018c, Monthly petroleum statistics—Volume of crude petroleum exports: Mexico City, Mexico, Petróleos Mexicanos S.A. de C.V., 1 p. (Accessed January 2, 2022, at http://www.pemex.com/en/investors/publications/Indicadores%20Petroleros%20Archivos/evolexporta_ing.pdf.)

Petróleos Mexicanos S.A. de C.V., 2018d, Reporte de resultados de Pemex al 31 de diciembre de 2017 [Reports of results of Pemex as of 31 December 2017]: Mexico City, Mexico, Petróleos Mexicanos S.A. de C.V., 35 p. (Accessed January 2, 2022, at http://www.pemex.com/ri/finanzas/Reporte%20de%20Resultados%20no%20Dictaminados/Reporte_4T17.pdf.) [In Spanish.]

Petróleos Mexicanos S.A. de C.V., 2020, Anuario estadístico 2020 [Statistical yearbook 2020]: Mexico City, Mexico, Petróleos Mexicanos S.A. de C.V., 102 p. (Accessed July 22, 2023, at https://www.pemex.com/ri/Publicaciones/Anuario%20Estadistico%20Archivos/Anuario-Estadistico_2020.pdf.) [In Spanish.]

Petróleos Mexicanos S.A. de C.V., 2021, Anuario estadístico 2021 [Statistical yearbook 2021]: Mexico City, Mexico, Petróleos Mexicanos S.A. de C.V., 101 p. (Accessed January 22, 2023, https://www.pemex.com/ri/Publicaciones/Anuario%20Estadistico%20Archivos/Anuario%20Estad%C3%ADstico%202021.pdf.) [In Spanish.]

Sangine, E.S., 2022, Wollastonite: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 186–187.

Sangine, E.S., 2023, Wollastonite: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 194–195.

Servicio Geológico Mexicano, 2020, Anuario estadístico de la minería mexicana 2019, [Statistical yearbook of Mexican mining 2019]: Mexico City, Mexico, Servicio Geológico Mexicano, 555 p. (Accessed January 2, 2022, at http://www.sgm.gob.mx/productos/pdf/Anuario_2019_Edicion_2020.pdf.) [In Spanish.]
Servicio Geológico Mexicano, 2021, Anuario estadístico de la minería mexicana, 2020—Edición 2021 [Statistical yearbook of Mexican mining, 2020—Edition 2021]: Mexico City, Mexico, Servicio Geológico Mexicano, 565 p. (Accessed January 3, 2022, at https://www.sgm.gob.mx/productos/pdf/Anuario_2020_Edicion_2021.pdf) [In Spanish.]
Sheaffer, K.N., 2022, Gold: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 72–73.
Sheaffer, K.N., 2023, Gold: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 80–81.
Tolcin, A.C., 2022, Zinc: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 192–193.
Tolcin, A.C., 2023a, Lead: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 104–105.
Tolcin, A.C., 2023b, Zinc: U.S. Geological Survey Mineral Commodity Summaries 2023, p. 200–201.
U.S. Energy Information Administration, 2017, Country analysis brief—Mexico: Washington, DC, U.S. Energy Information Administration Country Analysis Brief, October 16, 18 p. (Accessed January 7, 2022, at https://www.eia.gov/international/content/analysis/countries_long/Mexico/archive/pdf/mexico_2016.pdf.)
U.S. Energy Information Administration, 2020, Mexico—Analysis: Washington, DC, U.S. Energy Information Administration Country Analysis Brief, November 30, 10 p. (Accessed January 7, 2022, at https://www.eia.gov/international/content/analysis/countries_long/Mexico/mexico.pdf.)
World Steel Association, 2021, 2021—World steel in figures: Brussels, Belgium, World Steel Association, 30 p. (Accessed January 5, 2022, at https://worldsteel.org/wp-content/uploads/2021-World-Steel-in-Figures.pdf.)

TABLE 1
MEXICO: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2, 3]		2017	2018	2019	2020	2021
METALS						
Antimony, mine, Sb content		1,300 r	800 r	800 r	700	700
Bismuth, refinery, Bi content		513	333	300	10	10 e
Cadmium, refinery, primary		1,142	1,357	1,395	978	859
Cobalt:						
Mine, Co content[e]		1,000	1,400	1,100	1000	1,100
Refinery, metal		420 e	226	215	190 e	220 e
Copper:						
Mine, concentrates, Cu content		540,200 r	517,300 r	526,100 r	566,100	551,100
Solvent extraction		202,000 r	179,300 r	187,600 r	166,800	183,000
Total		742,200	696,600	713,700	732,900	734,100
Smelter:						
Primary		270,200 r	286,200	277,700 r	283,600 r	289,200
Secondary[e]		5,000	5,000	5,000	5,000	5,000
Refinery:						
Primary		256,300 r	289,300 r	294,300 r, e	320,100	284,800
Secondary[e]		5,000	5,000	5,000	5,000	5,000
Ferroalloys:						
Ferromanganese		90,013	95,468	73,000	57,000	72,000
Silicomanganese		148,130	152,000	154,000	148,000	171,000
Gold:						
Mine, Au content	kilograms	130,470	117,323	111,404	101,631	120,000 e
Refinery	do.	37,974	35,000 e	35,000 e	31,100 e	37,324
Iron ore, mine:						
Gross weight	thousand metric tons	18,600	22,300	11,300	9,300 r	10,800
Fe content	do.	11,713	14,021	7,141	5,859 r	6,807
Iron and steel:						
Direct-reduced iron	do.	6,011	5,972 r	5,975	5,170	5,792
Pig iron	do.	4,245	4,428	3,840	2,436 r	2,747
Steel:						
Raw steel	do.	19,924	20,204 r	18,595	16,803	18,473
Products, rolled	do.	18,694	18,872	18,131	18,100 e	18,100 e
Lead:						
Mine, Pb content		243,022	240,304 r	259,457 r	260,390 r	272,231
Refinery:						
Primary		92,535	104,100 e	119,000	112,000 e	120,000
Secondary		230,000 e	330,000 e	328,000	300,000 e	300,000
Manganese, mine:						
Gross weight		590,000 e	560,000 r	576,440 r	575,280 r	593,960
Mn content		211,510	209,023 r	219,046 r	218,606 r	225,703
Mercury, Hg content		200 r	230 r	50 r	70 r	39 e
Molybdenum, mine, Mo content		13,985	15,149	16,890 r	18,562 r	16,319
Silver:						
Mine, Ag content	kilograms	6,108,722	6,049,000	5,840,000 r	5,541,000	6,108,000
Refinery, primary, metallurgical products	do.	2,222,668	2,200,000 e	2,200,000 e	2,488,000	2,581,589
Zinc:						
Mine, Zn content		671,444	690,895	676,677	688,461 r	724,201
Smelter, primary		327,003	336,300	388,511	363,343	357,066
INDUSTRIAL MINERALS						
Barite		359,912	366,234	378,295 r	372,262 r	320,642
Celestite		40,699	35,489 r	39,215 r	38,304 r	21,351
Cement, hydraulic	thousand metric tons	41,601	48,328	45,163 r	47,833 r	51,559

See footnotes at end of table.

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

(Metric tons, gross weight, unless otherwise specified)

Commodity[2, 3]		2017	2018	2019	2020	2021
INDUSTRIAL MINERALS—Continued						
Clay:						
Bentonite		148,475 r	264,800 r	24,321 r	79,219 r	79,000 r
Common clay		7,397,721	8,042,884	7,388,578 r	7,681,189	7,680,000 e
Fuller's earth		110,860	110,000 e	110,000 e	110,000 e	110,000 e
Kaolin		279,225	143,156	122,431 r	236,033 r	240,000 e
Diatomite		96,374	96,000 e	96,000 e	96,000 e	96,000 e
Feldspar, mine		233,050	209,770	304,084 r	318,120 r	355,600
Fluorspar:						
Acid grade	thousand metric tons	692	800 r	940 r	680 e	790 e
Metallurgical grade[e]	do.	325	380 r	290 r	230 r	210
Graphite, amorphous, natural[4]		10,310 r	4,130 r	2,300 r, e	2,033 e	2,100 e
Gypsum, including anhydrite		5,400,000 e	5,400,000 e	5,400,000 e	5,400,000 e	5,400,000 e
Magnesite		101,000	100,000 e	1,000 r, e	1,000 e	1,000 e
Mica, all grades[e]		145	150	150	150	150
Nitrogen, ammonia, N content		411,000	124,000	--	112,000	201,000
Perlite		15,899	26,400	24,497 r	24,000 r	24,000 e
Phosphate rock:						
Gross weight	thousand metric tons	1,926	742 r	558	577	488
P_2O_5 content[e]	do.	540	210 r	160	170	150
Salt, all types[e]	do.	9,000	9,000	9,000	9,000	9,000
Stone, sand and gravel, construction:						
Sand and gravel:						
Gravel	do.	112,546	119,337	116,272 r	120,000 e	120,000 e
Sand	do.	210,286	212,733	182,770 r	213,000 e	213,000 e
Stone, crushed:						
Calcite, common		3,859,373	2,808,875	2,636,941 r	3,547,290	3,548,000 e
Dolomite		6,059,970	7,554,796	6,346,295 r	9,165,515	9,166,000 e
Limestone	thousand metric tons	362,654	355,592	233,526 r	248,248	245,248 e
Marble		2,352,614	1,964,041	1,557,159 r	468,501	469,000 e
Quartz and quartzite		2,356,000	2,511,246 r	2,671,422 r	2,514,378 r	2,500,000 e
Sulfur, S content		551,218	442,657 r	364,967	264,078	176,321
Talc		7,129 r	8,448 r	7,202 r	29,122 r	29,000 e
Vermiculite		464	244	148 r	104 r	100 e
Wollastonite		87,562	145,814	159,498 r	131,518	102,711
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous and subbituminous	thousand metric tons	7,280	6,773	5,288 r	4,195	4,407
Metallurgical	do.	4,637	3,897 r	3,275 r	2,841 r	2,730
Coke, breeze and metallurgical	do.	1,295	1,180	991 r	697 r	777
Natural gas, marketable	million cubic meters	31,573	31,570	28,702	28,578	24,000
Petroleum:						
Condensate, natural gas liquids	thousand 42-gallon barrels	90,520	77,015	79,935	75,190	62,415
Crude	do.	723,065	675,980	612,470 r	605,900	632,910

[e]Estimated. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through February 6, 2023. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]In addition to the commodities listed, secondary aluminum and additional types of crude construction materials may have been produced, but available information was inadequate to make reliable estimates of output.

[3]Sources: The Instituto Nacional de Estadística y Geografía and the Servicio Geológico Mexicano, Secretaría de Economía.

[4]Figures based on U.S. import data from the U.S. Census Bureau.

TABLE 2
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity[e]
Antimony	United States Antimony Corp. (USAC), 100%	San Jose (Wadley) Mines, S.L.P. Smelter in Madero, Coah.	365.
Barite	Baramin S.A. de C.V. (private, 100%)	Galeana and La Huiche Mines, Galeana, N.L.	NA.
Do.	Barita de Santa Rosa, S.A. de C.V. (private, 100%)	Muzquiz, Coah.	256.
Do.	Barita de Sonora, S.A. (Grupo Acerero del Norte, S.A. de C.V., 100%)	Mazatan, Son.	219.
Do.	Minerales y Arcillas, S.A. de C.V. (private, 100%)	San Francisco del Huerto Mine in San Pedro, Coah.; La Escondida and Angelita Mines, N.L.	55.
Bismuth metric tons	Metalurgica Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Refinery, Torreon, Coah.	1,440.
Celestite (strontium)	Minas de Celestita, S.A. de C.V.	Octubre Mine, Coah.	NA.
Cement	CEMEX México (Cementos Mexicanos, S.A.B. de C.V., CEMEX, 100%)	Ensenada, B.C.N.; Torreon, Coah.; Barrientos, D.F.; Arotonilco and Huichapan, Hgo.; Guadalajara and Zapotilic, Jal.; Hidalgo and Monterrey, N.L.; Tepeaca, Pue.; Tamuin and Valles, S.L.P.; Hermosillo and Yaqui, Son.; and Merida, Yuc.	29,500.
Do.	Holcim Mexico S.A. de C.V. (LaFargeHolcim Group, 100%)	Acapulco, Gro.; Apaxco, Mex.; Hermosillo; Son.; Macuspana, Tab.; Orizaba,Ver.; Ramos Arizpe, Coah.; and Tecoman, Col.	12,200.
Do.	Cooperativa La Cruz Azul, S.C.L. (private, 100%)	Cruz Azul, Hgo.; and Lagunas, Oax.	9,000.
Do.	Corporación Moctezuma, S.A.B. de C.V. (Buzzi Unicem SpA, 50%, and Cementos Molins S.A., 50%)	Apazapan, Ver.; Cerritos, S.L.P.; and Tepetzingo, Mor.	7,800.
Do.	Cementos Fortaleza S.A. de C.V. (Elementia, S.A. de C.V., 100%)	El Palmar, Tula, and Vito, Hgo.	3,500.
Do.	Grupo Cementos de Chihuahua, S.A.B. de C.V.	Chihuahua, Cuidad Juarez, and Samalayuca, Chih.	2,500.
Coal	Minera Carbonífera Río Escondido, S.A. [Altos Hornos de Mexico, S.A.B. de C.V. (AHMSA), 100%]	Mina I, Mina II, and Tajo I at Nava and Piedras Negras, Coah.	6,500.
Do.	Altos Hornos de Mexico, S.A.B. de C.V. (AHMSA), (Grupo Acerero del Norte, S.A. de C.V., 64.1%)	Mines at Coah. and coking plant at Monclova, Coah.	3,000.
Do.	Carbonífera de San Patricio, S.A. de C.V. (private, 100%)	Progreso, Coah.	1,314.
Do.	Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	Nueva Rosita, Coah.	900.
Copper	Mexicana de Cananea, S.A. de C.V. (Grupo México, S.A.B. de C.V., 90%)	Buenavista del Cobre Mine and SX–EW[2] plant at Cananea, Son.	340 concentrates, 150 SX–EW.[2]
	Mexicana de Cobre, S.A. de C.V. (Grupo México, S.A.B. de C.V., 90%)	La Caridad Mine, Pilares mine, smelter, refinery, SX–EW[2] plant at La Caridad, Son.	170 concentrates, 300 smelter, 25 SX–EW,[2] 300 refinery.
Do.	Negociación Minera Santa María de la Paz, S.A. de C.V.	NEMISA Mine in Villa de la Paz, S.L.P.	25.
Do.	Minera y Metalurgica El Boleo S.A. P. I. de C.V. (MMB) (Korea Resources Corp., 90%, and Baja Mining Corp., 10%)	Boleo Mine and SX–EW[2] plant in B.C.S.	20 concentrates, 20 SX–EW.[2]
Do.	Cobre del Mayo S.A. de C.V. (Invecture Group S.A. de C.V., 100%)	Piedras Verdes Mine and SX–EW[2] plant, Son.	20 concentrates, 32 SX–EW.[2]
Do.	Capstone Mining Corp. (100%)	Cozamin Mine near the town of Zacatecas,	18.
Do.	Aura Minerals Inc. (100%)	Aranzazú Mine in Concepcion del Oro, Zac.	12.
Do.	Sierra Metals Inc. (100%)	Bolívar Mine in Piedras Verdes, Chih.	12.

See footnotes at end of table.

TABLE 2—Continued
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity[e]
Copper—Continued		Grupo México, S.A.B. de C.V. (100%)	Santa Bárbara Mine in Santa Barbara, Chih.	5.
Do.		do.	San Martín Mine, in San Martin, Zac.	4.
Do.		do.	Charcas Mine, Charcas, S.L.P.	4.
Do.		Industrias Peñoles S.A.B. de C.V. (100%)	Sabinas Mine in Sabinas, Zac.	4.
Do.		Minera Frisco S.A. de C.V. (100%)	Tayahua Mine in Mazapil, Zac.	4.
Do.		Gold Resource Corp. (100%)	El Águila Mine in San Pedro Totolapa, Oax.	2.
Do.		Cia. Minera La Parreña de C.V (Industrias Peñoles, S.A.B. de C.V., 100%)	Milpillas Mine and SX–EW[2] plant at Santa Cruz, Son.	45 SX–EW.[2]
Do.		Minera María S.A. de C.V. (Minera Frisco S.A.B. de C.V., 99.6%)	Maria Mine and SX–EW[2] plant at Cananea, Son.	20 SX–EW.[2]
Do.		Red Tiger Mining Inc., (100%)	Luz de Cobre Mine and SX–EW[2] plant at San Antonio del Huerta, Son.	8 SX–EW.[2]
Ferroalloys		Compañía Minera Autlán, S.A.B. de C.V. (Grupo Ferrominero, S.A. de C.V., 81.75%, and private, 18.25%)	Plant in Tamos, Ver.	140.
Do.		do.	Plant in Teziutlan, Pue.	38.
Do.		do.	Plant in Gomez Palacio, Dgo.	35.
Fluorspar		Mexichem Fluor, S.A. de C.V. (Mexichem, S.A.B. de C.V., 100%)	Las Cuevas Mine, Zaragoza, S.L.P.	1,200.
Do.		Fluorita de México, S.A. de C.V. (Mexichem, S.A.B. de C.V., 100%)	La Sabina Mine, Muzquiz, Coah.	100.
Gold, mine	kilograms	Minera Peñasquito S.A. de C.V. (Newmont Corp., 100%)	Peñasquito Mine, Zac.	27,000.
Do.	do.	Fresnillo plc. (Industrias Peñoles, S.A.B. de C.V., 75%)	Cienega, Dgo.; Fresnillo, Zac.; La Herradura, Son.; Noche Buena, Son.; and Saucito, Zac.	23,700.
Do.	do.	Torex Gold Resources Inc., 100%	El Limón-Guajes (ELG) Mine, Gro.	14,500.
Do.	do.	Minas de las Altas Pimerias, S.A. de C.V. (Goldcorp Inc., 100%)	El Sauzal Mine, Chih.	8,500.[3]
Do.	do.	Desarrollos Mineros San Luis S.A. de C.V. (Leagold Gold Corp., 100%)	Los Filos Mines, Gro.	6,500.
Do.	do.	Agnico Eagle Mines Ltd., 100%	Pinos Altos Mine, Chih.; and La India Mine, Son.	6,000.
Do.	do.	Minera Frisco S.A.B. de C.V., 100%	El Coronel Mine, Zac.	6,000.
Do.	do.	Primero Empresa Minera, S.A. de C.V. (Primero Mining Corp., 100%)	San Dimas Mine, Dgo.	6,000.
Do.	do.	Alamos Gold Inc., 100%	Mulatos Mine, Son.	5,000.
Do.	do.	Timmins Gold Corp., 100%	San Francisco Mine, Son.	3,500.
Do.	do.	Minera Mexicana La Ciénega, S.A. de C.V. (Fresnillo plc., 100%)	La Cienega Mine, Dgo.	3,400.
Do.	do.	Ocampo Mining, S.A. de C.V. (Minera Frisco S.A.B. de C.V., 100%)	Ocampo Mine, Chih.	3,300.
Do.	do.	Yamana Gold Inc., 100%	Las Mercedes Mine, Son.	3,200.
Do.	do.	GoGold Resources Inc., 100%	Santa Gertrudis Mine, Son.	1,600.
Gold, refined	do.	Metalurgica Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Torreon, Coah.	53,900.
Graphite		Grafitos Mexicanos, S.A. de C.V., 100%	Lourdes, Topiyeca, and San Juan Mines, Son.	60.
Gypsum		Cía. Occidental Mexicana, S.A. de C.V. (private, 51%, and Domtar, Ltd., 49%)	Santa Rosalia on San Marcos Island, B.C.S.	2,500.
Iron ore		Altos Hornos de Mexico, S.A.B. de C.V. (AHMSA) (Grupo Acerero del Norte, S.A. de C.V., 64.1%)	La Perla Mine, Chih.; Hercules Mine, Coah.; and Cerro de Mercado Mine, Dgo.	5,000.
Do.		Consorcio Minero Benito Juarez Peña Colorada S.A. de C.V. (ArcelorMittal Holdings AG, 50%, and Ternium S.A., 50%)	Peña Colorada Mine, Col.	4,500.
Do.		ArcelorMittal Mexico S.A. de C.V. (ArcelorMittal Holdings AG, 100%)	El Volcan Mine, Son.	3,600.
Do.		ArcelorMittal Las Truchas, S.A. de C.V. (ArcelorMittal Holdings AG, 100%)	Las Truchas Mine, Mich.	2,600.

See footnotes at end of table.

TABLE 2—Continued
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity[e]
Lead, mine	Industrias Peñoles S.A.B. de C.V. (private, 100%)	Mines at Bismark, Chih.; Francisco I. Madero, Naica, Chih.; and Sabinas, Dgo.	51.
Do.	Fresnillo plc. (Industrias Peñoles, S.A.B. de C.V., 75%)	Mines at Fresnillo, Zac., La Cienega, Dgo.; and Saucito, Zac.	43.
Do.	Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	Charcas Mine, S.L.P.; San Martin Mine, Zac.; Santa Barbara and Santa Eulalia Mines, Chih.	35.
Do.	Minera San Francisco del Oro, S.A. de C.V. (Minera Frisco, S.A.B. de C.V., 99.6%)	San Francisco del Oro Mine, Chih.	13.
Do.	Minera Tayahua, S.A. de C. V. (Minera Frisco, S.A.B. de C.V., 89.9%)	Tayahua Mine, Zac.	10.
Do.	Minera Tizapa S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 51%; Dowa Mining Co., 39%; Sumitomo Corp., 10%)	Tizapa Mine, Mex.	10.
Lead, refined	Metalurgica Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Torreon, Coah.	180.
Manganese	Cía. Minera Autlán, S.A.B. de C.V. (Grupo Ferrominero, S.A. de C.V., 81.75%, and private, 18.25%)	Molango, Naopa, and Nonoalco Mines, Hgo.	600 ore and concentrate.
Molybdenum	Mexicana de Cobre, S.A. de C.V. (Grupo México, S.A.B. de C.V., 90%)	La Caridad Mine and molybdenum plant, Son.	11.
Do.	Mexicana de Cananea, S.A. de C.V. (Grupo México, S.A.B. de C.V., 90%)	Buena Vista del Cobre Mine and molybdenum plant, at Cananea, Son.	2.
Petroleum, crude thousand barrels per day	Petróleos Mexicanos S.A. de C.V. (Pemex) (Government, 100%)	Comalcalco, Poza Rica, Ver., and Gulf of Campeche, Cam., Districts	3,500.
Petroleum refinery products do.	do.	Cadereyta, N.L.; Madero, Tamps.; Minatitlan, Ver.; Salamanca, Gto.; Salina Cruz, Oax.; and Tula de Allende, Hgo.	1,700.
Phosphate rock	PEMEX Fertilizantes (Petróleos Mexicanos, S.A. de C.V., 100%)	San Juan de la Costa Mine, B.C.S.	NA.
Salt	Exportadora de Sal, S.A. de .C.V. (Government, 51%, and Mitsubishi Corp. 49%)	Solar salt complex at Guerrero Negro, B.C.S.	9,500.
Silver, mine kilograms	Fresnillo plc. (Industrias Peñoles S.A.B de C.V., 75%)	Fresnillo Mine, Zac.	1,100,000.
Do. do.	Minera Peñasquito S.A. de C.V. (Goldcorp Inc., 100%)	Peñasquito Mine, Zac.; San Julian, Chih.	1,000,000.
Do. do.	Fresnillo plc. (Industrias Peñoles S.A.B de C.V., 75%)	Saucito Mine, Zac.	567,000.
Do. do.	Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	Charcas Mine, S.L.P.; San Martin Mine, Zac.; Santa Barbara Mine, Chih; Santa Eulalia Mine, Chih.; and Taxco Mine, Gro.	336,000.
Do. do.	Pan American Silver Corp., 100%	La Colorada Mine, Zac.; Alamo Dorado Mine, Son.; and Dolores Mine, Chih.	283,000.
Do. do.	Primero Empresa Minera, S.A. de C.V. (First Majestic Silver Inc., 100%)	San Dimas Mine, Dgo.	250,000.
Do. do.	Coeur Mexicana S.A. de C.V. (Coeur Mining, Inc., 100%)	Palmarejo Mine, Chih.	220,000.
Do. do.	Co. Minera Sabinas, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	Sabinas Mine, Zac.	220,000.
Do. do.	Minera Tizapa S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 51%; Dowa Mining Co., 39%; Sumitomo Corp., 10%)	Tizapa Mine, Mex.	220,000.
Do. do.	Fortuna Silver Mines Inc., 100%	San Jose Mine, Oax.	210,000.
Do. do.	Minera Mexicana La Ciénega, S.A. de C.V. (Fresnillo plc., 100%)	La Cienega Mine, Dgo.	114,000.
Do. do.	GoGold Resources Inc., 100%	Parral tailings project, Chih.	34,000.
Do. do.	Golden Minerals Co., 100%	Velardeña, Dgo.	16,000.[4]
Do. do.	Argonaut Gold Inc., 100%	La Colorada Mine, Son.	10,000.

See footnotes at end of table.

TABLE 2—Continued
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities[1]	Annual capacity[e]
Silver, refined kilograms	Metalurgica Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Torreon, Coah.	3,350,000.
Sodium sulfate	Industrias Magnelec, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	Química del Rey plant, Laguna del Rey, Coah.	780.
Steel	ArcelorMittal Lazaro Cardenas S.A de C.V. (ArcelorMittal Holdings AG, 100%)	Facilities at Lazaro Cardenas, Mich.	5,500 steel, 4,000 pellet.
Do.	Altos Hornos de Mexico, S.A.B. de C.V. (AHMSA) (Grupo Acerero del Norte, S.A. de C.V., 64.1%)	Steelworks at Monclova, Coah.	3,320 steel, 3,800 pellet.
Do.	Hylsa S.A. de C.V. (Ternium S.A., 88.72%)	Steelworks and direct-reduction units at Monterrey, N.L., and Puebla, Pue.; pelletizing plant in Col. and El Encino, Jal.	3,100 steel, 1,500 pellet.
Do.	DEACERO, S.A. de C.V. (private, 100%)	Steelworks at Saltillo, Coah., and Celaya, Gto.	1,450.
Do.	Tubos de Acero de México, S.A. (Teranis S.A., 100%)	Veracruz, Ver.	1,000.
Sulfur	Petróleos Mexicanos, S.A. de C.V. (Pemex) (Government, 100%)	Nationwide petroleum operations	890.
Wollastonite	Minera Roca Rodando S. de R.L. de C.V. (S&B Industrial Minerals S.A. 100%)	Pilares Mine, Hermosillo, Son.	150.
Zinc, mine	Industrias Peñoles S.A.B. de C.V. (private, 100%)	Mines at Bismark, Chih.; Francisco I. Madero, Naica, Chih.; Sabinas, Dgo.; and Velardena, Dgo.	210.
Do.	Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	Charcas Mine, S.L.P.; Santa Barbara and Santa Eulalia Mines, Chih.; and San Martin Mine, Zac.	130.
Do.	Fresnillo plc. (Industrias Peñoles, S.A.B. de C.V., 75%)	Mines at Fresnillo, Zac.; La Cienega, Dgo.; and Saucito, Zac.	48.
Do.	Minera Tayahua, S.A. de C. V. (Minera Frisco, S.A.B. de C.V., 89.9%)	Tayahua Mine, Zac.	40.
Do.	Minera Tizapa S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 51%; Dowa Mining Co., 39%; Sumitomo Corp., 10%)	Tizapa Mine, Mex.	38.
Do.	Minera San Francisco del Oro, S.A. de C.V. (Minera Frisco, S.A.B. de C.V., 99.6%)	San Francisco del Oro Mine, Chih.	23.
Zinc, refined	Metalurgica Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Refinery in Torreon, Coah.	350.
Do.	Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	Zinc refinery at S.L.P.	105.

[e]Estimated. Do., do. Ditto. NA Not available.

[1]State abbreviations used in this table include the following: Baja California Norte (B.C.N.), Baja California Sur (B.C.S.), Campeche (Cam.), Chihuahua (Chih.), Coahuila (Coah.), Colima (Col.), Distrito Federal (D.F.), Durango (Dgo.), Guanajuato (Gto.), Guerrero (Gro.), Hidalgo (Hgo.), Jalisco (Jal.), Mexico (Mex.), Michoacan (Mich.), Morelos (Mor.), Nuevo Leon (N.L.), Oaxaca (Oax.), Puebla (Pue.), San Luis Potosi (S.L.P.), Sinaloa (Sin.), Sonora (Son.), Tabasco (Tab.), Tamaulipas (Tamps.), Veracruz (Ver.), Yucatan (Yuc.), and Zacatecas (Zac.).

[2]Solvent extraction–electrowinning.

[3]Closed.

[4]Suspended.