



2013 Minerals Yearbook

MEXICO

THE MINERAL INDUSTRY OF MEXICO

By Alberto Alexander Perez

In 2013, Mexico's economy was affected by a decrease in demand for its exports, particularly mineral commodity exports. According to the World Bank, Mexico's real gross domestic product (GDP) was \$1.261 trillion, which was about a 1.1% increase from that of 2012, reflecting a slowdown in the Mexican economy in response to world economic conditions in 2013 (World Bank The, 2015).

In 2013, Mexico was a significant world producer of several mineral commodities. The country was the world's leading producer of silver, by volume, with a 19% share of world production; the 2d-ranked producer of fluorspar (18%), and bismuth (9.8%); the 3d-ranked producer of wollastonite (excluding the United States) (10%), the 4th-ranked producer of cadmium (6.8%); the 5th-ranked producer of lead (3.8%) and molybdenum (4.7%), the 6th-ranked producer of diatomite (3.8%) and zinc (4.8%); the 7th-ranked producer of salt (4.1%) and graphite (0.6%); the 8th-ranked producer of gold (3.5%); the 9th-ranked producer of gypsum (2.1%); and the 11th-ranked producer of manganese (1.3%) and copper (2.6%) (Camara Minera de Mexico, 2014, p. 113; Bolen, 2015; Brininstool, 2015; Corathers, 2015; Crangle, 2015a, b; George, 2015; Guberman, 2015; Katrivanos, 2015a, b; McRae, 2015a, b; Olson, 2015; Polyak, 2015; Tolcin, 2015a, b; Virta, 2015).

Minerals in the National Economy

Exports of mineral commodities (excluding hydrocarbons) were an important source of foreign currency for the country and were exceeded only by exports from the automobile and electronics industries and by crude oil exports in 2013. Net exports, however, decreased by 18.2% compared with those of 2012, generating \$10.35 billion in 2013 (Secretaria de Economia, 2014, p. 12).

In 2013, mineral and metal processing accounted for 8.5% of the mineral industry's share of Mexico's GDP and 2.9% of Mexico's total GDP. The value of the mineral industry's contributions to the GDP increased by 6.8% from that of 2012, reaching the highest level ever at \$23.012 billion. Employment in the mineral industry increased by 18,833 to a total of 332,501 employees (Camara Minera de Mexico, 2014, p. 9–10).

Of the total mineral industry production in Mexico in 2013, gold accounted for 26%, by value, followed by silver (21.6%), copper (17.1%), zinc (4.6%), sand (3.9%), iron ore (3%), gravel (2.8%), and other minerals accounted for the remaining 21% (Secretaria de Economia, 2014, p. 12).

Government Policies and Programs

Changes in Mexico's policies and incentive structure in the mineral industry in 2013 were intended to have a positive effect on the industry in the near future. After long deliberation by the Mexican national assembly, reforms to the hydrocarbon

laws were introduced, and although the national oil company *Petróleos Mexicanos S.A. de C.V. (PEMEX)* was not privatized, significant reforms to its structure and functioning were debated and approved by December 2013. These reforms, which were to begin in August 2014, would allow the Government to issue contracts to private companies, regardless of whether they are associated with PEMEX, for exploration and extraction of hydrocarbons. The law, however, still specifies that hydrocarbons remain the property of the state. A notable change was the opening of the primary petrochemical industry, which previously was designated exclusively to PEMEX by law, to private companies for the refining of crude petroleum, the manufacture of petrochemicals, and the processing of natural gas (Gobierno de la Republica, 2015, p. 6–9).

The *Ley de la Commission Nacional de Hidrocarburos* [Law of the National Commission on Hydrocarbons] regulates and details the rules regarding the exploration for and extraction and exploitation of crude oil and associated commodities, with the exception of gas produced from coal (Gobierno de la Republica, 2015, p. 6–9).

The laws that regulate the mineral sector (excluding hydrocarbons) also had changes introduced in 2013. In particular, there were increases to the taxes on the income of mineral production (*impuesto sobre la renta*), and a tax labeled "Special tax over production and services" (*Impuesto especial sobre produccion y Servicios*), which taxes a small set of designated products, such as gasoline and other energy products that the mineral industry uses. The changes that would likely have a considerable effect were the elimination of the deduction of investment costs and the 100% deduction of exploration expenses from the taxes owed to the state by mineral companies (Camara Minera de Mexico, 2014, p. 11).

The mineral sector is administered by the *Secretaria de Economia*. The *Direccion General de Minas* is the organization in charge of making revisions to the Mining Law and its regulations, as well as granting concessions and titles. Mineral commodities are considered part of the national patrimony of Mexico under its Constitution. Article 27 deals with issues of ownership and exploitation of natural resources; however, the Mining Law that became effective in 1992 and was modified and expanded in 1996, in April 2005, and in June 2006, clarifies and spells out the legal framework for the exploration, production, and processing of the country's mineral resources. Crude oil exploitation is not covered by this law, and only the exploitation of gas produced from underground coal is covered by this law (Camara de Diputados del H. Congreso de la Union, 2013, p. 1–9).

In October 2012, the *Reglamento de la ley Minera* [Rules of the Mining Law] was published in the *Diario Oficial* of the Mexican Congress. These rules explain how the Mining Law is to be applied and the procedures to follow. The rules had been discussed and revised over the past several years and were

part of a series of reforms intended to streamline governmental procedures in the mineral industry (Camara de Diputados del H. Congreso de la Union, 2012, p. 1–37).

The Mining Law allows a 100% private equity ownership stake in the exploration, production, and development of mineral resources, including resources previously reserved for direct Government exploitation, such as coal, iron ore, phosphorus, potassium, and sulfur. Neither oil and its derivatives nor radioactive materials are covered by this law. 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 (Camara de Diputados del H. Congreso de la Union, 2006, p. 1–33).

Another important law concerning Mexico's natural resources is the Law of Foreign Investment. This law regulates the degree and form of foreign investment in Mexico, and, in particular, in the natural resources sector, which is an area that previously barred foreign investment and ownership. This law was published in 1993 and has been revised and amended by decrees in 1995, 1996, 1998, 1999, and, most recently, in 2000. In particular, Articles 10 through 14 deal with foreign investment in the mineral sector and the development and exploitation of geographic areas considered restricted by the Government (Camara de Diputados del H. Congreso de la Union, 2012, p. 1–34).

The General Law of Ecological Balance and Environmental Protection (LGEEPA), which is the keystone of the country's environmental law, was passed in 1988. Those environmental responsibilities that had resided in various Government agencies were transferred to the Secretaria de Medio Ambiente, Recursos Naturales y Pesca (SEMARNAP) in 1994. In 2000, the agency became the Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT). Under SEMARNAT, mineral exploration and mining require a number of environmental permits and authorizations to conform to the statutes of the LGEEPA. These requirements include a preliminary environmental impact statement for all major activities of the projects. The SEMARNAT also requires all mines and plants to have an operating license, as well as permits for explosives, hazardous materials handling, land use, water discharge, and well use. Other regulations are concerned with dumps and tailings, electrical transformers, gas and dust emissions, noise, and the storage of oil and fuel. A regulation concerning environmental impact statements was initiated in 2000. Under these rules, environmental impact reports for beneficiation plants, gas and oil pipelines, and mines must be approved by the SEMARNAT (Secretaria de Medio Ambiente y Recursos Naturales, 2008).

Production

In 2013, mineral production in Mexico had mixed results compared with mineral production in 2012, and the change was owing to the decrease in prices of many of the commodities that Mexico produced.

Commodities that had major increases in production included dolomite (315%), kaolin (132%), celestite (47%), metallurgical-grade fluorspar (44%), barite, (42%), fuller's earth (33%), gold content of mine ore (15%), and silver content of mine

ore (9%) (table 1). Commodities that had significant decreases in production in 2013 were feldspar (57%), bentonite (35%), acid-grade fluorspar (32%), refined gold (8%), and mine output of copper (7%) (table 1).

Structure of the Mineral Industry

A few large domestic companies produced a significant portion of Mexico's mineral output, including Cementos Mexicanos S.A.B. de C.V. (CEMEX), Compañía Minera Autlan S.A.B. de C.V. (Minera Autlan), Minera Frisco S.A.B. de C.V. (Frisco), Fresnillo plc., Grupo Acerero del Norte S.A. de C.V. (GAN), Grupo Mexico S.A.B. de C.V. (Grupo Mexico), and Industrias Peñoles S.A.B. de C.V. (Peñoles). Medium- and small-size companies produced many of the industrial minerals. State-owned PEMEX controlled the crude petroleum, refining, and natural gas production sector (table 2).

The Secretaria de Economía reported that, in 2013, a total of 266 companies were involved in 870 projects in Mexico that had received direct foreign investments. Of the companies making direct foreign investments, 185 had their central offices in Canada and 44 were headquartered in the United States; 9, in China; 6, in Japan; 4 each, in Australia, the Republic of Korea, and the United Kingdom; 2, in India and Chile; and 1 each, in Belgium, Brazil, Italy, Luxembourg, Peru, and Spain. Precious metals, particularly gold and silver, were the primary targets for 573 of the projects, and polymetallic projects numbered 117. Copper and iron ore accounted for 100 and 49 projects, respectively, and the remainder were diverse projects involving various mineral commodities (Secretaria de Economía, 2014, p 622–624).

Mineral Trade

In 2013, Mexico was a net exporter of nonfuel minerals, in terms of value, registering a trade surplus of \$10.35 billion, which was a decrease of 18.2% compared with that of 2012 (Camara Minera de Mexico 2014, p. 10). Mexico's principal export partners were the United States and Canada (both of which were fellow members of the North America Free Trade Agreement), as well as Spain. Mexico's share of exports to these countries was 78.4%, 2.9%, and 1.7%, respectively. Mexico's principal import partners were the United States, China, and Japan, which supplied 49.7%, 15.5%, and 4.6%, respectively, of Mexico's total imports. Nine Chinese companies had investments in Mexico's mineral industry, and China was becoming increasingly important as a destination for Mexico's mineral exports (United Nations Statistical Division, 2015).

Commodity Review

Metals

Copper.—In 2013, the volume of mined copper production in Mexico decreased by 6.4% compared with that of 2012. This reduction in production was owing principally to a flood that affected the Buenavista del Cobre Mine, which was owned by a subsidiary of Grupo Mexico, and to a strike that affected

production at the Maria Mine, which was owned by Minera Frisco S.A.B. de C.V. Of all the country's copper production, 76.9% took place in the State of Sonora; the remaining copper production came principally from the States of Zacatecas (10.5%), San Luis Potosi (5%), Chihuahua (3.5%), Guerrero (1.1%), and several other States, which produced copper in lesser amounts (Camara Minera de Mexico, 2014, p. 25).

Of the principal companies producing copper in Mexico, Grupo Mexico was the most significant, accounting for 70% of all copper production in Mexico. Other significant producers were, in order of volume of production, Peñoles, Capstone Mining, NEMISA, and Minera Frisco (Camara Minera de Mexico, 2014, p. 25; Grupo Mexico S.A.B. de C.V., 2014, p. 6).

The Chinese company Jinchuan Group controlled the Bahuerachi project in the State of Chihuahua. In 2012, the project was in the feasibility stage. The project's estimated resources were about 525 million metric tons (Mt) of ore with grades of 0.4% copper and 0.55% zinc. The estimated required investment for the project was \$900 million. Grupo Mexico stated in 2012 that it would invest \$1 billion in the Buenavista Mine, which was owned by Buenavista del Cobre S.A. de C.V. (a fully owned subsidiary of Grupo Mexico) to incorporate a new concentrator at the plant. The concentrator was expected to be finished by 2015 and would have the capacity to produce 188,000 metric tons per year (t/yr) of copper (Camara Minera de Mexico, 2014, p. 25; Grupo Mexico S.A.B. de C.V., 2014, p. 6).

Gold.—In 2013, Mexico's gold mine production increased by 14.6% compared with that of 2012. This increase was owing to the increase in capacity of existing mines and the start of several new projects, such as the Porvenir Mine in the State of Aguascalientes; the Concheño Mine in the State of Chihuahua; and the Cierro Prieto, the Carmen, and the San Felix Mines in the State of Sonora (Camara Minera de Mexico, 2014, p. 20).

The State of Sonora continued to be the principal producer of gold in Mexico. The State produced 31.1% of the national mined gold output in 2013, which was an increase of 2.1% compared with 2012. Other important States that produced gold were Zacatecas, which produced 16.3% of the national mined gold output, followed by Chihuahua (17.2%), Durango (13.3%), and Guerrero (9.3%); several other States produced gold in lesser amounts (Camara Minera de Mexico, 2014, p. 9).

The principal companies producing mined gold in Mexico were GoldCorp Inc., of Canada, Fresnillo plc., Agnico Eagle Corp. of Canada, Newmont Mining Corp. of the United States, Alamos Gold Inc. of Canada, Minera Frisco S.A.B. de C.V., and New Gold Inc. of Canada (Camara Minera de Mexico, 2013, p. 164).

Iron and Steel.—In 2013, Mexico increased its iron ore production (in gross weight) by 25.3% but owing to the diminishing iron content of the ore, it produced only slightly more than 8 Mt in actual iron content. Production came mostly from the States of Coahuila, Colima, and Michoacan (table 1; Camara Minera de Mexico, 2014, p. 181).

Lead.—In 2013, the output of lead mine production in Mexico increased by 6.4% and reached a new record level of production for the third year in a row. The principal States that produced lead in Mexico were, in order by volume of production, Zacatecas, Chihuahua, and Durango

(table 1; Camara Minera de Mexico, 2014, p. 29; Secretaria de Economia, 2014, p. 371).

Molybdenum.—Mexico, which was the fifth-ranked producer of molybdenum in the world, increased its production of molybdenum by 10.5% to 12,562 t in 2013. Grupo Mexico, which was the only molybdenum producer in the country, obtained most of its output in 2013 from the La Caridad Mine and the Buenavista del Cobre Mine in the State of Sonora. Mercator Minerals Ltd. of Canada declared that its El Creston project in Sonora was advancing. Mercator expected to begin production of molybdenum in 2016 with a potential output of 11,000 t/yr (table 1; Camara Minera de Mexico, 2014, p. 26; 2014, p. 30; Grupo Mexico S.A.B. de C.V., 2014 p. 6).

Silver.—Mexico's silver mine output in 2013 was 5,821 t, which was the highest annual level of silver production ever registered in Mexico, and it represented an increase in production of 8.6% compared with that of 2012. Mexico was again the leading silver producer in the world in 2013, accounting for 21% of the world silver production (table 1; Katrivanos, 2014).

The principal companies producing silver in Mexico were Coeur d'Alene Mines Corp. of the United States; First Majestic Silver Corp. of Canada, Fresnillo, GoldCorp, Grupo Mexico, Minera Frisco, Pan American Silver Corp. of Canada, Peñoles, and Primero Mining Corp of Canada; and small companies produced small amounts of silver. Approximately 30% of Mexico's production was obtained through dore; the rest was found principally in concentrates of copper, lead, and zinc, for which the capacity for refining has not been sufficient for the quantity obtained. The Fresnillo, the Saucito, and the Peñasquito Mines produced concentrates of zinc that contained high percentages of silver (Camara Minera de Mexico, 2013, p. 169).

In 2012 (the latest year for which data were available), the State of Zacatecas produced 43.5% of all the silver produced in Mexico. In 2012, the Fresnillo Mine which is located in Zacatecas, remained the leading silver mine in the world, producing 820.5 t in 2012; the mine accounted for 15.3% of all the silver produced in the country (Camara Minera de Mexico, 2013, p. 19, 168).

Zinc.—Production of zinc metal in Mexico decreased slightly in 2013 compared with that of 2012, and the level of zinc mine output decreased by 2.7% (table 1). Peñoles was the principal producer of zinc in Mexico. The company produced zinc from its five units—Bismark, Francisco I. Madero, Naica, Sabinas, and Tizapa (Camara Minera de Mexico, 2013, p. 23; Secretaria de Economia, 2014, p. 400).

Industrial Minerals

Fluorspar was the most valuable of Mexico's nonmetallic mineral commodities in 2013, accounting for 20.9% of the value of nonmetallic minerals produced. Salt was the second most valuable nonmetallic mineral at 15.9%; followed by phosphate rock, 10.6%; sodium sulfate, 10.2%; silica sand, 10.1%; sulfur, 9%; gypsum, 3.7%; and diatomite, 2.1% (table 1; Camara Minera de Mexico, 2014, p. 40).

Gypsum.—Gypsum production increased in Mexico by 8.4% in 2013. The principal producer of gypsum in Mexico

was Compañía Occidental Mexicana S.A. de C.V., which had reserves of 16.6 Mt in 2012. More than 55% of the national production of gypsum took place in the municipality of Mulege, which is located in the State of Baja California Sur (tables 1, 2).

Phosphate Rock.—In 2013, the phosphate rock mine owned and operated by Roca Fosforica de Mexico S.A. de C.V. (Rofomex), which was a subsidiary of Grupo Fertinal S.A. de C.V., produced 2.2 Mt of concentrate compared with 1.7 Mt in 2012. This increase was owing to the modernization of the equipment in the mine. The Rofomex Mine is located in San Juan de la Costa in the State of Baja California Sur (table 1; Camara Minera de Mexico, 2013, p. 197; Secretaria de Economia, 2014, p. 501).

Mineral Fuels

Crude Petroleum and Natural Gas.—Mexico's crude oil production consists of 54% heavy crude oil, 33% light crude oil, and 13% extra light crude oil. In 2012 (the latest year for which data were available), PEMEX reported that it had produced an average of 2,548,000 barrels per day (bbl/d). This production originated in the company's 449 fields, which are located on 12 properties. Seventy-four percent of production came from, in order of volume produced, the Ku-Malob-Zaap, the Cantarell, the Litoral Tabasco, and the Abkatun-Pol Chuc properties, which are located in the marine region of the Gulf of Mexico (Petróleos Mexicanos S.A. de C.V., 2013 p. 8–11).

In 2012, production at Cantarell decreased by 0.17% whereas production in the Kab, the Sihil, and the Yaxche oilfields increased significantly. The average production of these three fields combined was 139,000 bbl/d in January 2012 and, by yearend, production had increased to 218,000 bbl/d. PEMEX also reported that the combined output from the Kuil and the Tsimin fields (which began producing in August 2012) and the Pareto field (which had begun producing in March 2011) amounted by year's end to 43,000 bbl/d. According to PEMEX, these results were in line with its strategy to manage the decreased oil production that had been taking place in Mexico during the past few years (Petróleos Mexicanos S.A. de C.V., 2013 p. 8–11).

As a result of its exploration activities in the deep waters of the Gulf of Mexico, PEMEX made several discoveries that confirmed the occurrence of light crude oil in the Perdido Fold Belt. The Trion-1 well, which is located 28 kilometers (km) south of the border with the United States and 177 km from the State of Tamaulipas, and the Supremu-1 well, which is located 39 km from the U.S. border and 250 km from the coast of Tamaulipas, was drilled at a depth of 2,900 meters (m) below the surface, making it the deepest well ever drilled by PEMEX and the eighth deepest in the world. In 2013, the well had reached a depth of 4.5 km below sea level (Petróleos Mexicanos S.A. de C.V., 2013, p. 8–11).

Outlook

In 2013, mineral production in Mexico had mixed results as a whole, and production of metals will likely continue to be the most dynamic and profitable part of the mineral industry. Gold

and silver exploration is continuing, with several new projects slated to commence production within 3 to 5 years, and many other mines are slated to reach their productive stages in 2014. The base-metals sector will likely profit from the development of these mines, as the majority of the mines are polymetallic projects.

In the area of industrial minerals, production still tends to be correlated with international prices and internal consumption. The Mexican Government expects the country's economy to continue to grow in the coming years, although at a slower pace, and this would benefit the construction sector and the promotion of internal consumption. Steps by PEMEX to manage its declining crude oil production will continue, and PEMEX has stated that it foresees the replacement rate of future reserves to remain above 100% in the foreseeable future (Petróleos Mexicanos, 2013 p. 10).

The Mexican Government estimates that growth in the coming years will be closely tied to that of the United States, as the United States is Mexico's principal trading partner (U.S. Central Intelligence Agency, 2014).

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TABLE 1
MEXICO: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2009	2010	2011	2012	2013
METALS					
Antimony ³	74	71	100 ^r	169 ^r	294
Bauxite	20,000	21,250	14,400	96,000	--
Bismuth:					
Mine output, Bi content ⁴	854	982	935	800	824
Metal, refined	854	952	935	800	824
Cadmium:					
Mine output, Cd content	1,510	1,464	1,485	1,482	1,451
Metal, refined	1,510	1,464	1,485	1,482	1,451
Copper:					
Mine output, Cu content:					
By concentration or cementation	170,597	168,855	336,739	367,852	344,140
Leaching, electrowon	57,151	68,754	65,691	71,679	65,032
Total	227,748	237,609	402,430	439,531	409,172
Metal:					
Anode and blister, primary	169,000	124,000	239,000	261,000	260,000 ^e
Refined:					
Primary	255,700	242,200	395,000	365,000	365,000
Secondary ^c	5,000	5,000	5,000	5,000	5,000
Total	260,700	247,200	400,000	370,000	370,000
Gold:					
Mine output, Au content kilograms	51,393	72,596	88,648	102,802	117,848
Metal, refined do.	19,410	29,000	32,729	38,926	35,985
Iron and steel:					
Iron ore, mine output: ⁵					
Gross weight thousand metric tons	11,677	13,998	12,806	14,915	18,840
Fe content do.	7,073	7,931	7,763	8,047	8,094
Metal:					
Pig iron do.	3,925	4,707	4,620	4,612	4,911
Direct-reduced iron do.	4,147	5,368	5,854	5,587	6,100
Total do.	8,072	10,075	10,474	10,199	11,011
Ferroalloys, electric arc furnace: ⁶					
Ferromanganese do.	42	81	74	70	75 ^e
Silicomanganese do.	85	134	139	130	140 ^e
Total do.	127	215	213	200	215 ^e
Crude steel do.	13,957	16,710	18,101	18,095	18,208
Rolled products ⁷ do.	12,994	14,491	15,482	15,927	15,950 ^e
Lead:					
Mine output, Pb content	143,838	192,062	223,717	238,091	253,361
Metal:					
Smelter:					
Primary ⁸	85,411	110,980	101,729	112,431	107,262
Secondary ^c	110,000	110,000	110,000	110,000	110,000
Total ^c	195,411	220,980	211,729 ^r	222,431 ^r	217,262
Refined:					
Primary ⁹	85,411	110,980	80,473	97,951	92,067
Secondary ^c	110,000	110,000	110,000	150,000	150,000
Total ^c	195,411	220,980	190,473 ^r	247,951 ^r	242,067
Manganese ore: ¹⁰					
Gross weight ^c	329,400	485,447	474,820	523,000	587,000
Mn content	118,577	174,761	170,935	188,294	211,559
Mercury, mine output, Hg content ^e	15	15	--	--	--
Molybdenum, mine output, Mo content	10,166	10,849	10,787	11,366	12,562

See footnotes at end of table.

TABLE 1—Continued
MEXICO: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2009	2010	2011	2012	2013
METALS—Continued					
Silver:					
Mine output, Ag content kilograms	3,553,841	4,410,749	4,777,710	5,358,195	5,821,001
Metallurgical products, Ag content:					
In copper bars do.	104,922	--	--	--	--
Mixed gold and silver bars do.	353,930	572,901	817,981	923,056	1,322,059
Metal, refined, primary do.	1,845,029	2,230,024	2,336,141	2,329,963	2,318,718
Tin: metal, smelter, primary	--	--	--	--	--
Zinc:					
Mine output, Zn content	489,766	570,004	631,859	660,349	642,542
Metal, refined, primary	313,044	322,508	202,846	202,773	201,402
INDUSTRIAL MINERALS					
Barite	152,790	143,225	134,727	139,997	200,000 ^e
Cement, hydraulic ¹¹ thousand metric tons	35,160	34,503	35,400	36,184	34,612
Clays:					
Bentonite	511,429	590,998	563,795	956,224	617,632
Common	10,036,832	9,111,988	7,721,040	7,700,000 ^e	7,948,840
Fuller's earth	108,139	170,350	107,436	227,496	301,462
Kaolin	78,086	120,094	120,003	163,148	379,110
Diatomite	80,807	91,710	84,231	84,537	87,463
Feldspar	347,510	398,849	382,497	380,441	164,484
Fluorspar:					
Acid-grade thousand metric tons	641	719	731	749	510
Metallurgical-grade do.	405	348	475	487	700
Total do.	1,046	1,067	1,206	1,236	1,210
Graphite, natural, amorphous	5,105	6,628	7,348	7,520	7,024
Gypsum and anhydrite, crude (yeso)	5,756,936	3,559,579	3,560,000 ^e	4,692,510	5,090,863
Magnesium compounds:					
Magnesia ¹²	72,600	84,200	85,700	88,400	88,000 ^e
Magnesite	34,700	39,400	45,598	44,700	44,000 ^e
Mica, all grades	5,000	160	--	160	160 ^e
Nitrogen, N content of ammonia	861,034	824,373	765,500	879,700	879,000 ^e
Perlite	51,395	31,779	31,779	29,950 ^r	27,200
Phosphate rock ¹³	426,547	452,220	507,181	517,398	665,244
Salt, all types thousand metric tons	7,445	8,430	8,812	8,730	9,461
Sodium compounds: ^e					
Carbonate, soda ash, synthetic	290,000	290,000	290,000	290,000	290,000
Sulfate, natural, bloedite ¹⁴	646,000	620,000	630,500	638,000	641,500
Stone, sand and gravel:					
Calcite, common	2,555,544	3,185,369	2,366,160	4,694,156	5,179,277
Dolomite	982,650	1,499,744	2,785,314	2,111,114	8,756,485
Limestone thousand metric tons	62,000	64,678	54,344	55,725	52,289
Marble	2,800,512	2,495,649	4,431,447	3,820,517	3,563,699
Quartz, quartzite, glass sand (silica)	2,483,605	2,607,650	2,542,143	3,592,813	2,937,949
Sand thousand metric tons	89,172	89,036	86,324	92,374	90,723
Gravel do.	78,777	76,789	68,965	71,870	65,874
Strontium minerals, celestite	36,127	31,429	40,669	46,192	67,778
Sulfur, elemental, byproduct:					
Of metallurgy ^e thousand metric tons	700	800	800	800	810 ^e
Of petroleum and natural gas do.	1,114	992	959	1,010	1,026
Total ^e do.	1,814	1,792	1,759	1,810	1,836
Talc	33,421	870	51,221	51,000 ^{e,15}	50,000 ^{e,15}
Vermiculite	291	98	--	500 ^r	425
Wollastonite	29,728	46,548	47,523	55,204	57,302

See footnotes at end of table.

TABLE 1—Continued
MEXICO: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2009	2010	2011	2012	2013	
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Run of mine:						
Metallurgical	thousand metric tons	13,555	16,318	20,967	16,276	15,718
Steam	do.	9,496	11,247	13,718	13,656	13,065
Total	do.	23,051	27,565	34,685	29,932	28,783
Washed metallurgical coal	do.	2,000 ^e	4,767	5,061	4,903	4,613
Coke:¹⁶						
Metallurgical	do.	1,240	1,553	2,016	2,047	2,098
Breeze	do.	75	95	105	118	120 ^e
Total	do.	1,315	1,648	2,121	2,165	2,218
Gas, natural:						
Gross	million cubic meters	72,660	72,615	68,153	59,470	59,000 ^e
Marketable (dry)	do.	32,237	33,632	34,986	47,690 ^r	47,600 ^e
Petroleum:						
Crude	thousand 42-gallon barrels	949,365	940,240	930,750	930,020	935,079
Condensate, natural gas liquids	do.	135,050	137,605	140,160	148,190	148,100 ^e
Total	do.	1,084,415	1,077,845	1,070,910	1,078,210	1,083,179 ^e
Refinery products:						
Liquefied petroleum gas	do.	9,891	9,308	7,811	9,162 ^r	9,100 ^e
Motor gasoline	do.	172,097	154,833	146,110	147,606 ^r	147,000 ^e
Jet fuel	do.	20,841	18,944	20,550	20,367 ^r	20,300 ^e
Distillate fuel oil, diesel	do.	123,005	105,668	99,937	138,882 ^r	138,000 ^e
Lubricants	do.	1,533	1,570	1,351	1,300	1,300 ^e
Residual fuel oil	do.	115,413	117,530	112,238	99,974 ^r	99,900 ^e
Asphalt	do.	11,643	9,089	9,527	9,500	9,500 ^e
Other, refinery fuel and losses	do.	36,900	11,571	13,834	13,800	13,800 ^e
Total	do.	491,323	428,513	411,358	440,591 ^r	438,900 ^e

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through February 27, 2015.

²In addition to the commodities listed, secondary aluminum and additional types of crude construction materials are produced, but output is not reported, and available information is inadequate to make reliable estimates of output.

³Sb content of antimonial lead.

⁴Refined metal. Bismuth content of impure smelter products no longer reported.

⁵Iron ore pellets.

⁶Reported by Cámara Nacional del Hierro y del Acero.

⁷Includes flat, nonflat, and seamless pipe steel products.

⁸Lead content of impure bar, antimonial lead, and refined metal.

⁹Includes lead content of antimonial lead.

¹⁰Mostly oxide nodules; includes smaller quantities of direct-shipping carbonates and oxide ores for metallurgical and battery applications.

¹¹Includes gray and white portland and masonry cement.

¹²Reported by Industrias Peñoles, S.A. de C.V. as the only major producer. Includes caustic, electromelt, hydroxide, and refractory.

¹³Includes only output used to manufacture fertilizers.

¹⁴Series reflects output reported by the Secretaría de Economía.

¹⁵The Secretaría de Economía reported total production of 463,214 metric tons (t) in 2012 and 846,813 t in 2013, but these figures have not been verified.

¹⁶Includes coke made from imported metallurgical coal.

TABLE 2
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities ¹	Annual capacity
Antimony	Cía. Minera y Refinadora Mexicana, S.A. (private Mexican, 51%, and Cookson Ltd., 49%)	San Jose Mine, Catorce, S.L.P.	365.
Barite	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 Mexican, 100%)	San Francisco del Huerto Mine in San Pedro, Coah., La Escondida and Angelita Mines and plant in Galeana	55.
Do.	Barita de Santa Rosa, S.A. de C.V. (private Mexican, 100%)	Muzquiz, Coah.	256.
Bismuth	metric tons Metalurgia Met-Mex Peñoles, S.A.B. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Torreón, Coah.	1,200.
Cement	CEMEX México (Cementos Mexicanos, S.A.B. de C.V., CEMEX 100%)	Ensenada, B.C.N.; Torreón, 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.	26,650.
Do.	Cementos Apasco, S.A. de C.V. (Holcim Group, 49%, and other, 51%)	Apasco, Mex.; Ramos Arizpe, Coah.; Macuspana, Tab.; Tecoman, Col.; Orizaba, Ver.; and Acapulco, Gro.	8,900.
Do.	Cooperativa La Cruz Azul, S.C.L. (private Mexican, 100%)	Cruz Azul, Hgo., Lagunas, Oax.	5,000.
Do.	Cementos de Chihuahua, S.A. de C.V. (CEMEX México, 36%, and private Mexican, 64%)	Chihuahua, Ciudad Juárez, and Samalayuca, Chih.	2,000.
Do.	Lafarge México (Lafarge Group, 100%)	Vito, Hgo.	600.
Do.	Corporación Moctezuma, S.A. (Cementos Molins, S.A., 50%, and Buzzi Unicem SpA, 50%)	Tepetzingo, Mor.	2,400.
Do.	Corporación Moctezuma, S.A. (Cementos Molins, S.A., 50%, and Buzzi Unicem SpA, 50%)	Cerritos, S.L.P.	2,400.
Coal	Minera Monclova, S.A. [Altos Hornos de México, S.A. de C.V. (AHMSA), 100%]	Mimosa and Palau Mines and Muzquiz washing plant at Palau, Coah., and coking plant at Monclova, Coah.	3,000.
Do.	Carbonífera de San Patricio, S.A. de C.V. (private Mexican, 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.	1,500.
Do.	Minera Carbonífera Río Escondido, S.A. [Altos Hornos de México (AHMSA), 100%]	Mina I, Mina II, and Tajo I at Nava and Piedras Negras, Coah.	6,500.
Copper	Mexicana de Cobre, S.A. de C.V. (Grupo México, S.A.B. de C.V., 90%)	La Caridad Mine, smelter, refinery, SX-EW ² plant, and rod plant at Nacoziari de Garcia, Son.	350 smelter, 50 SX-EW, ² 300 refinery, 150 rod plant.
Do.	Buenavista del Cobre, 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.	29,200 mill, 33 SX-EW. ²
Do.	Minera María S.A. de C.V. (Minera Frisco S.A.B de C.V., 100%)	Mine and SX-EW ² plant at Cananea, Son.	20 SX-EW. ²
Do.	Cobre de México, S.A. de C.V. (Grupo Condumex)	Primary refinery in Mexico City and secondary refinery in Villagran, Gto.	150.
Ferroalloys	Cía. Minera Autlán, S.A.B de C.V. (Grupo Ferrominero, S.A. de C.V., 54%; Minas de Basis, S.A. de C.V., 32%; BHP Billiton Ltd., 14%)	Plant in Tamos, Ver.	140.
Do.	do.	Plant in Teziutlan, Pue.	38.
Do.	do.	Plant in Gomez Palacio, Dgo.	35.

See footnotes at end of table.

TABLE 2—Continued
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities ¹	Annual capacity
Fluorspar		Cía. Minera Las Cuevas, S.A. de C.V. (Mexichem, S.A. de C.V.)	Salitera (Zaragoza), S.L.P.	520.
Do.		Fluorita de México, S.A. de C.V. (Mexichem S.A. de C.V.)	Mines at La Encantada district and plant at Muzquiz, Coah.	150.
Gold, mine	kilograms	Fresnillo plc. (Industrias Peñoles S.A.B de C.V., 77.1%)	Proaño (Fresnillo) Mine, Zac.	1,200.
Do.	do.	Goldcorp Inc., 100%	Peñasquito Mine, Zac.	17,700.
Do.	do.	Minas de las Altas Pimerias, S.A. de C.V. (Goldcorp Inc., 100%)	El Sauzal Mine, Chih.	10,000.
Do.	do.	Fresnillo plc., 56%	La Herradura Mine, Son.	6,900.
Do.	do.	Goldcorp Inc., 100%	Los Filos, Gro.	8,100.
Do.	do.	Primero Mining Corp. 100%	San Dimas, Dgo	4,850
Do.	do.	Minera Frisco S.A.B. de C.V.	Ocampo Mine, Chih.	1,590.
Do.	do.	Minera Mexicana La Ciénega, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	La Cienega Mine, Dgo.	4,500.
Do.	do.	Animas Resources Ltd. (Animas Resources Ltd., 100%)	Santa Gertrudis Mine, Son.	1,600.
Do.	do.	Cía. Minera El Cubo, S.A. de C.V. (Endeavour Silver Corp., 100%)	El Cubo Mine, Gto.	1,200.
Do.	do.	Pediment Gold Corp. (Argonaut Gold Inc., 100%)	La Colorada Mine, Son.	800.
Do.	do.	Alamos Gold Inc., 100%	Mulatos Mine, Son.	4,700.
Do.	do.	Great Panther Silver Ltd., 100%	Guanajuato Mine, Gto.	438.
Gold, refined	do.	Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Torreon, Coah.	36,700.
Graphite		Grafitos Mexicanos, S.A. (Cummings Moore Graphite Co., 25%, and private Mexican, 75%)	Lourdes and San Francisco Mines, Son.	60.
Do.		Grafito Superior, S.A. de C.V. (Superior Graphite Co., 100%)	Covalmar, Santa Clara, and Rio Mayo Mines, and plant in Son.	25.
Gypsum		Cía. Occidental Mexicana, S.A. de C.V. (private Mexican, 51%, and Domtar, Ltd., 49%)	Santa Rosalia on San Marcos Island, B.C.S.	2,500.
Iron ore		Peña Colorada Ltd. de C.V. (ArcelorMittal Holdings AG, 50%, and Ternium S.A., 50%)	Peña Colorada Mine and pellet plant near Manzanillo, Col.	4,200.
Do.		Altos Hornos de Mexico, S.A. de C.V. (AHMSA) [Grupo Acerero del Norte, S.A. de C.V. (GAN), 78.9%]	La Perla Mine, Chih.; Hercules Mine, Coah.; and Cerro de Mercado Mine, Dgo.	5,000.
Do.		ArcelorMittal Las Truchas S.A. de C.V. (ArcelorMittal Holdings AG, 100%)	Ferrotepec, Volcan, and Mango deposits in Las Truchas project area and pellet plant, Mich.	2,350.
Do.		Hylsa, S.A. de C.V. (Ternium S.A., 88.72%)	Aguila Mine, Mich.	1,900
Lead and zinc		Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	Charcas, S.L.P.; San Martin, Zac.; Santa Eulalia, Chih.; Taxco, Gro.; Rosario, Sin.; Santa Barbara, Chih.; Velardena, Dgo; lead refinery at Monterrey, N.L.; and zinc refinery at S.L.P.	70 lead, mine, 110 refined zinc.
Do.		Industrias Peñoles S.A.B. de C.V. (private Mexican, 100%)	Mines at La Encantada, Coah.; Fresnillo, Zac.; Naica, Chih.; Bismark, Son; Rey de Plata, Gro. (Industrias Peñoles S.A. de C.V., 51%, and Dowa Mining Co., 39%). Metallurgical complex at Torreon, Coah., with silver, lead, and zinc smelter and refineries operated by Met-Mex Peñoles (Industrias Peñoles S.A. de C.V., 100%)	180 refined lead, 240 refined zinc.
Do.		Industrias Peñoles, S.A.B de C.V.	Francisco I. Madero Mine, Zac.	50,000 zinc.
Do.		Minera San Francisco del Oro, S.A. de C.V. (Minera Frisco, S.A.B. de C.V., 100%)	San Francisco del Oro, near Hidalgo del Parral, Chih. Tayahua, Zac.	15 lead, 21 zinc.

See footnotes at end of table.

TABLE 2—Continued
MEXICO: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities ¹	Annual capacity
Manganese		Cía. Minera Autlán, S.A.B. de C.V. (Grupo Ferrominero, S.A. de C.V., 81.75%, and private Mexican, 18.25%)	Molango, Naopa, and Nonoalco Mines, Hgo.	600 ore and concentrate.
Molybdenum		Mexicana de Cobre, S.A. (Grupo México, S.A.B. de C.V., more than 90%)	La Caridad Mine and molybdenum plant, Son.	11.
Petroleum ³	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.
Phosphate Rock		Roca Fosforica de Mexico S.A. de C.V. (Grupo Fertinal S.A. de C.V., 100%)	San Juan de la Costa Mine, B.C.S.	NA
Salt		Exportadora de Sal, S.A. (Fideicomiso de Fomento 51%, and Mitsubishi Corp., 49%)	Solar salt complex at Guerrero Negro, B.C.S.	6,000.
Silver	kilograms	Fresnillo Plc. (Industrias Peñoles S.A.B de C.V., 75%)	Proaño (Fresnillo) Mine, Zac.	1,100,000.
Do.	do.	do.	El Saucito Mine, Zac	480,000.
Do.	do.	Minera Mexicana La Ciénega, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	La Cienega Mine, Dgo.	65,800.
Do.	do.	Minera Bismark, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	Bismark Mine, Chih.	7,000.
Do.	do.	Co. Minera Sabinas, S.A. de C.V. (Industrias Peñoles, S.A.B. de C.V., 100%)	Sabinas Mine, Zac.	157,000.
Do.	do.	Minera Tizapa, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 51%; Dowa Holdings Ltd., 39%; Sumitomo Corp., 10%)	Tizapa Mine, Mex.	140,000.
Do.	do.	Minas Peñoles S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Francisco I. Madero Mine, Zac.	63,000.
Do.	do.	Industrial Minera México, S.A. de C.V. (IMMSA) (Grupo México, S.A.B. de C.V., 90%)	San Martin Mine, Sombrerete, Zac.; Taxco, Gro.; Charcas, S.L.P.; Santa Eulalia, Chih.; and refinery at Monterrey, N.L.	335,000.
Do.	do.	Pan American Silver Corp.	La Colorada Mine, Zac. and Alamo Dorado, Son.	200,000.
Do.	do.	Metalurgica Met-Mex Peñoles, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Torreon, Coah.	2,900,000 refinery.
Do.	do.	Mexicana de Cobre, S.A. de C.V. (Grupo México, S.A.B. de C.V., 100%)	La Caridad metallurgical complex, Son.	466,500.
Do.	do.	Coeur d'Alene Mines Corp, 100%	Palmarejo Mine, Chih.	250,000.
Do.	do.	First Majestic Silver Corp., 100%	La Encantada Mine, Coah.	140,000.
Do.	do.	Goldcorp Inc., 100%	Peñasquito Mine, Zac.	361,000.
Sodium sulfate		Química del Rey, S.A. de C.V. (Industrias Peñoles S.A.B. de C.V., 100%)	Plant at Laguna del Rey, Coah.	620.
Steel		Altos Hornos de Mexico, S.A. de C.V. (AHMSA) [Grupo Acerero del Norte, S.A. de C.V. (GAN), 78.9%]	Steelworks at Monclova, Coah.	3,316 steel, 3,800 pellet.
Do.		Hylsa S.A. de C.V. (Ternium S.A., 88.72%)	Steel works and direct-reduction units at Monterrey, Monterrey, N.L., and Puebla, Pue.; pelletizing plant in Col.	3,100 steel, 1,500 pellet.
Do.		DEACERO, S.A. de C.V. (private Mexican, 100%)	Steelworks at Saltillo, Coah., and Celaya, Gto.	1,450.
Do.		ArcelorMittal Lazaro Cardenas S.A de C.V. (ArcelorMittal Holdings AG, 100%)	Facilities at Lazaro Cardenas, Mich.	5,300 steel, 4,000 pellet.
Do.		Tubos de Acero de México, S.A. (private Mexican, 100%)	Veracruz, Ver.	1,000.
Strontium (celestite)		Cía. Minera La Valenciana (private Mexican, 100%)	San Agustin Mine, Torreon, Coah.	50.
Sulfur		Petróleos Mexicanos, S.A. de C.V. (PEMEX)	Nationwide petroleum operations	890.

Do., do. Ditto. NA Not available.

¹State 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.), Veracruz (Ver.), Yucatan (Yuc.), and Zacatecas (Zac.).

²Solvent extraction-electrowinning.

³Petróleos Mexicanos, S.A. de C.V. operated six refineries with an installed capacity of 1.68 million barrels per day.