



# 2017–2018 Minerals Yearbook

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## MOROCCO AND WESTERN SAHARA

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# THE MINERAL INDUSTRIES OF MOROCCO AND WESTERN SAHARA<sup>1</sup>

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

## MOROCCO

Morocco was the world's leading exporter of phosphate rock, phosphoric acid, and phosphate fertilizers; it was the world's second-ranked producer of phosphate rock after China and accounted for about 11.2% of the world's phosphate rock output in 2017. The country also was the world's third-ranked producer of barite after China and India and accounted for 11.0% of world output. Morocco was the world's seventh-ranked producer (excluding United States production) of acid-grade fluor spar, accounting for 1.3% of world output. The country was the 11th-ranked and 17th-ranked producer of cobalt and silver, respectively, and accounted for 1.8% and 1.4% of world output, respectively. Morocco also accounted for 1.4% of the world's copper production. Other mineral commodities produced in Morocco included arsenic trioxide, cement, clays (bentonite, fuller's earth, and montmorillonite), feldspar, gold, iron ore, lead, manganese, mercury, natural gas, nickel, petroleum condensate, salt, and zinc (table 1; OCP Group, 2018, p. 20–21; Silver Institute, The, 2018, p. 26; Jasinski, 2019; McRae, 2019a, b).

### Minerals in the National Economy

Morocco's mineral sector was the leading foreign exchange earner for the Government, and phosphate rock mining and the phosphate-based products industry continued to be a major source of exports, accounting for about 18% of the total value of exports. The mining sector's contribution to the gross domestic product (GDP) was 4.0% in 2017 compared with 2.1% in 2016; the value added by the mining sector to the GDP increased by 17.8% in real terms in 2017 compared with a decrease of 2.2% in 2016. The mining sector employed 41,000 people (Bank Al-Maghrib, 2018, p. 74, 206, 219–220).

The flow of foreign direct investment (FDI) into Morocco increased by 23% to \$2.7 billion in 2017 from revised \$2.2 billion in 2016, and the flow of FDI out of Morocco increased by 66% to \$960 million from a revised \$580 million in 2016. FDI flows into Morocco went mainly to the real estate sector (33%), the industry sector (20%), and the financial and insurance sector (13%). The major sources of the FDI inflows to Morocco were France (31%), the United States (21%), the United Arab Emirates (10%), and Saudi Arabia (6%) (Bank Al-Maghrib, 2018, p. 79; United Nations Conference on Trade and Development, 2018, p. 184).

## Government Policies and Programs

Morocco's mining code is based on law No. 33–13 of August 6, 2015, which repealed the mining regulation of April 16, 1951. This law, which was implemented on May 23, 2016, was designed to attract foreign investment, boost exports, and help ensure that companies abide by the Government's labor and environmental laws. Morocco's hydrocarbon law is based on law No. 21–90 of April 15, 1992, and its amendment by law No. 27–99 of March 16, 2000, and supplemented by Decree No. 2–93–786 of November 3, 1993. The law regulates crude petroleum and natural gas exploration and production activity at onshore and offshore locations. The Office National des Hydrocarbures et des Mines [National Office of Hydrocarbons and Mines] (ONHYM) is the primary agency responsible for the exploration of mineral resources in the country and the promotion of investment in the hydrocarbon and mining sectors. The Government promotes investment in the hydrocarbon sector by offering fiscal incentives that allow international petroleum and natural gas companies to acquire up to a 75% share of production in return for investing a portion of their profits in further exploration in the country's open areas onshore and offshore. The royalty rate on crude petroleum production in water depths of up to 200 meters (m) inclusive is 10%, and that on natural gas, 5%, after the first 300,000 metric tons (t) of crude petroleum and 300 million cubic meters of natural gas, respectively, have been produced. The royalty rate for offshore production in water depths of more than 200 m is 7% for crude petroleum and 3.5% for natural gas after the first 500,000 t of crude petroleum and 500 million cubic meters of natural gas, respectively, are produced. A corporate tax holiday for 10 years is given for crude petroleum and natural gas discoveries (Office National des Hydrocarbures et des Mines, 2018b, c).

The Directorate of Mines, which is under the Ministère de l'Energie, des Mines et du Développement Durable [Ministry of Energy, Mines, and Sustainable Development] (MEM), enforces the law through Executive orders. Exploration permits are awarded for an initial 3-year period for an area that covers up to 16 square kilometers (km<sup>2</sup>) and are renewable for four additional years. Mining permits are awarded for 4 years and are renewable in 4-year increments for a maximum of 12 years. The Government provides incentives for mining companies, such as tax exemptions on imported equipment for investments that exceed \$25 million and a reduced tax rate of 17.5% for companies that export their output and for companies that supply ores to domestic mineral-processing and beneficiation companies. The Government also contributes 5% of the project

<sup>1</sup>Effective as of December 10, 2020, the U.S. Government recognizes the sovereignty of Morocco over all the territory of former Western Sahara. The information in this report reflects the situation at the time of reporting.

value to mining projects that invest more than \$25 million. The Government's contribution goes to infrastructure development, such as building roads and supplying electricity and water to the project areas (Office National des Hydrocarbures et des Mines, 2018c).

By the end of 2017, the Government had awarded 6,670 mining permits, 60% of which were granted to mining companies; 22%, to individual operators; and 18%, to ONHYM. The ONHYM conducted 43 exploration studies throughout Morocco, 31 of which were ONHYM's own projects and 12 were in partnership with domestic and international mining companies. The ONHYM studies included exploration for base metals (cobalt, copper, iron ore, lead, nickel, and zinc), industrial minerals, mineral fuels (uranium), precious metals (gold), and other high-value mineral commodities, such as molybdenum, niobium, tantalum, and rare-earth elements (Office National des Hydrocarbures et des Mines, 2018a, p. 28; 2018b).

ONHYM partnered with several local and international mining companies for exploring and developing several mining projects in the country. The companies included Managem S.A., which was exploring for metals at Central Jebilet [located 50 kilometers (km) north of Marrakech], and at Tekna in Sidi Kacem Province in northern Morocco; Maya Gold and Silver Inc. (Maya) of Canada, which was exploring and developing the Boumadine polymetallic deposit in Errachidia Province; and Metalex Ventures Ltd. of Canada, which was exploring for copper and gold at Tichla-Awserd, which is located in the Awserd area in southern Morocco. ONHYM, in partnership with the OCP Group, was exploring for potash at the Khemisset deposit in northwestern Morocco (Office National des Hydrocarbures et des Mines, 2018a, p. 36, 41).

## Production

Notable increases in mineral commodity production in 2017 compared with that of 2016 included the increase in iron content of iron ore by 563%; iron ore (gross weight), by 556%; mercury, by an estimated 100%; bentonite, by 69%; manganese content, by 63%; zinc oxide, by 47%; manganese ore (gross weight), by 45%; mined cobalt (Co content), by 44%; recoverable cobalt ore, by 34%; mined lead, by 33%; gold, by 26%; solid fertilizers, by 24%; barite and phosphate rock, by 22% each; zinc, by 21%; phosphoric acid, by 16%; feldspar, by an estimated 14%; sulfuric acid, by 14%; and arsenic trioxide, by 12%. The significant increase in iron ore was attributed to much lower production in the previous 2 years and to higher iron content. Notable decreases in mineral commodity production included the decrease in crude montmorillonite (Ghassoul), by 54%; refined lead, by 27%; hot-rolled steel, by estimated 21%, fuller's earth (smectite), by estimated 16%; acid grade fluorspar, by 15%; by and petroleum condensate, by 11%. Data on mineral production are in table 1.

## Structure of the Mineral Industry

The Office Chérifien des Phosphates [Office of Moroccan Phosphates] (OCP), which was also known as the OCP Group, was responsible for phosphate rock mining and phosphate-based fertilizers and other products manufactured in Morocco. OCP,

which was wholly owned by the Government, was the country's sole producer of phosphate rock through its more than 30 subsidiaries and joint ventures (OCP Group, 2018, p. 15).

Managem S.A. was a group of companies publicly listed under one company on the Casablanca Stock Exchange. Managem produced metals, such as cobalt, copper, lead, nickel, and zinc; precious metals, such as gold and silver; and industrial minerals, such as arsenic, and fluorspar. Managem was the leading metal mining company in Morocco; it conducted mineral exploration, marketing, processing, and services through its subsidiaries. Managem's subsidiaries in Morocco included Akka Gold Mining (AGM), Cie minière d'Oumejrane (CMO), Cie minière Dadès, Cie minière de SAGHRO, Compagnie de Tifnout Tighanimine (CTT), Compagnie Minière des Guemassa (CMG), Société Anonyme d'entreprise Minière (SAMINE), Société Métallurgique d'Imiter (SMI), and Société Minière de Bou Gaffer (SOMIFER). Managem also operated mining development projects in such African countries as Burkina Faso, the Democratic Republic of the Congo [Congo (Kinshasa)] (Lamikal S.A.), Côte d'Ivoire (Managold Ltd.), Ethiopia, Gabon (Managem Gabon), Guinea (Société des Mines de Mandiana, Guinée (SMM Guinée), and Sudan (Manub Mining Company Ltd. and MCM Soudan). The company employed more than 5,660 people (Managem S.A., 2018, p. 10–11, 30–31, 56; 2019, p. 102).

Artisanal miners had been legally mining for barite, kohl (black powder used for cosmetics), lead, and zinc at the Figuig and the Tafilalet regions near Meknes City since 1960. Dahir No. 1–60–019 of 11 Joumada II 1380 Hijri (Royal Decree No. 1–60–019 of December 1, 1960) created Centrale d'Achat et de Développement de la Région Minière du Tafilalet et de Figuig (CADETAF) as an independent public agency with financial and legal authority. The Ministry of Energy and Mines was responsible for the technical supervision of mining operations in the Figuig and Tafilalet mining zone. Artisanal miners produced barite, lead, kohl, and zinc ores within an area of 60,000 km<sup>2</sup>. Artisanal miners sold ores to collection centers, which were equipped with chemical analysis, storage, and weighing facilities. Prices were based on cost, insurance, and freight (c.i.f.) value after subtracting taxes, which were 10 Moroccan dirham (MAD) (US\$1.00) per metric ton for barite, 300 MAD (US\$30.00) per metric ton for kohl, 10% for lead, and 15% for zinc. In 2017, 1,083 artisanal miners produced 472,102 t of barite ore, 20,778 t of zinc ore, and 5,183 t of lead ore (Tahiri, 2018, p. 3–6; World Bank, The, 2019, p. 53–58).

## Mineral Trade

The value of Morocco's total exports increased to \$25.6 billion in 2017 from a revised \$23.0 billion in 2016, and imports, to \$45.1 billion from \$41.9 billion. The increase in total exports was attributed to higher export volumes of phosphate rock, phosphate-based fertilizers, and phosphoric acid compared with those of the previous year. Natural and chemical fertilizers exports increased to \$2.6 billion in 2017 from \$2.1 billion in 2016, exports of raw products of mineral origin increased to \$1.6 billion from about \$1.3 billion, phosphoric acid exports decreased slightly to \$1.1 billion, and phosphate rock exports

increased to \$864 million from \$756 million (Bank Al-Maghrib, 2018, p. 218, 221).

In terms of tonnage, Morocco exported 11.1 million metric tons (Mt) of phosphate rock, which accounted for 37% of the world's trade of phosphate rock; 2.0 Mt of phosphoric acid; 8.2 Mt of phosphate fertilizer; 932,000 t of barite; 166,000 t of copper ore; 59,000 t of lead ore; and 1.8 Mt of other raw mineral products. The country imported 5.5 Mt of sulfur; 518,000 t of scrap metal; 150,000 t of sand, quartz, and other clay; and 185,000 t of other raw products of mineral origin (Bank Al-Maghrib, 2019, p. 227, 230, 231).

The value of hydrocarbon and other energy products imports increased to \$7.2 billion in 2017 from \$5.6 billion in 2016. Morocco's sulfur imports were valued at \$455 million; they originated mainly in the United Arab Emirates (44%), Russia (18%), Poland (9%), and the United States (8%). Morocco imported 8.3 Mt of coal briquettes valued at \$622 million in 2017 compared with about 8.0 Mt valued at \$448 million in 2016. Coal imports came from Russia (42%), South Africa (37%), the United States (14%), Poland (4%), Colombia (2%), and Spain (1%) (Bank Al-Maghrib, 2018, p. 218, 221, 235).

Morocco's exports to the United States increased to \$1.2 billion in 2017 from \$1.0 billion in 2016. They included, in descending order of value, chemical fertilizers (\$484 million), barite (\$102 million), iron and steel mill products (\$15 million), inorganic chemicals (\$5 million), and cement, sand, and stone (\$3 million). Morocco's imports from the United States increased to \$2.2 billion in 2017 from \$1.9 billion in 2016. Major minerals and metal-related exports included, in descending order of value, fuel oil (\$527 million), natural gas liquids (\$186 million), petroleum products (\$146 million), coal and other fuels (\$106 million), metallurgical-grade coal (\$82 million), chemical fertilizers (\$56 million), other nonmetallic minerals (\$32 million), other chemicals (\$28 million), and organic and inorganic chemicals (\$5 million), excavation machinery and iron and steel products (\$4 million each), and steelmaking materials (\$3 million) (U.S. Census Bureau, 2018a, b).

## Commodity Review

### *Metals*

**Cobalt and Nickel.**—CTT, a subsidiary of Managem, mined cobalt and nickel ore at the Bou Azzer Mine, which is located 35 km south of Marrakech in southern Morocco within the central Anti-Atlas Mountain range. Cobalt production decreased to an estimated 2,300 t from a revised 1,600 t in 2016. Refined cobalt (cobalt cathodes) production decreased to 1,924 t in 2017 from 2,081 t in 2016. CTT reported 16,000 t of cobalt reserves at the Bou Azzer Mine. CTT also produced nickel in the form of nickel hydroxide as a byproduct of cobalt production at the Guemassa metal complex. In 2017, nickel production increased by 4% to 196 t from 188 t in 2016 (table 1; Managem S. A., 2018, p. 35, 50–51).

**Copper.**—Managem's output of copper concentrate increased by 4% to 118,100 t in 2017 from 113,219 t in 2016 owing to the beginning of production at the Quansimi Mine by AGM in 2017. Additional copper production came from four mines

that were operated by Managem subsidiaries—the Akka Mine (AGM), the Bleida Mine (Société SOMIFER), the Bou Azzer Mine (CMG), and the Oumjrane Mine (CMO). Managem completed a feasibility study for the Bouskour copper project, which is located 80 km southeast of Ouarzazate and had an estimated 9 Mt of mineral resources grading 1.61% copper. The company also completed a feasibility study for the Tizert copper project, which is located 80 km east of the city of Agadir and had combined mineral resources of 35 Mt. Managem planned to increase its copper concentrate production to 250,000 t by 2020 through increased production at its active mines and by starting commercial production at the Bouskour and Tizert projects (Managem S.A., 2017, p. 6, 40, 44, 46, 52; 2018, p. 45).

**Lead, Silver, and Zinc.**—SMI, which was owned by Managem (75.72%), produced 221,120 kilograms (kg) of silver at the Imiter Mine, which was slightly more than in 2016. SMI was able to maintain the previous year's production level despite lower silver ore content in 2017 by increasing the quantity of ore treated. Reserves at the Imiter Mine at the end of 2017 were 4,700 t of contained silver, and the mine's life was 12 years. Zgounder Millennium Silver Mining, which was owned by Maya (85%) and ONHYM (15%), produced 16,085 kg of silver at the Zgounder Mine in 2017 compared with 16,191 kg in 2016. The Zgounder Mine is located 150 km south of Marrakech, had estimated historical (2004) reserves of 582,000 t at an average grade of 361 grams per metric ton (g/t) silver. The mine also had an additional 500,000 t of tailings at an average grade of 125 g/t silver. Maya also was the sole owner of concessions that held polymetallic deposits at the Amizmiz property, the Azegour Mine, and the 233263 permit, and held an 85% share in the development of a gold-lead-silver-zinc deposit at the Boumadine polymetallic mine, which had been in operation from 1964 to 1992 (Managem S.A., 2018, p. 46–47; Maya Gold and Silver Inc., 2018).

Companie Minière de Touissit (CMT), which was the Moroccan subsidiary of Auplata Mining Group of France, produced lead-silver and silver-zinc concentrates at the Tighza Mine, which is located in the Middle Atlas region in Meknes Province. CMT held 13 concessions, 18 mining licenses, and 35 exploration permits throughout Morocco. The company milled 320,000 t of ore and produced 15,600 t of lead-silver concentrate and 4,300 t of silver-zinc concentrates (Compagnie Minière de Touissit, 2018).

**Tin.**—Kasbah Resources Ltd. of Australia carried out a second definitive feasibility study for the Achmmach tin project, which is located in the El Hajeb region, in the Central Hercynian Massif, about 150 km east of Rabat. The Achmmach tin project was owned by Kasbah (75% interest), Toyota Tsusho Corp. of Japan (20% interest), and Nettetsu Mining Co. Ltd. of Japan (5% interest) and consisted of two mining permits (PE No. 2912 and PE No. 193172) that cover an area of about 32 km<sup>2</sup>. The Achmmach project was at an advanced development stage following the completion of 120 km of drilling (Kasbah Resources Ltd., 2018, p. 1, 8, 10).

### *Industrial Minerals*

**Barite.**—Morocco's barite production increased by 22% to about 818,000 t from 668,500 t in 2016. The increase



was attributed to increased worldwide demand for barite by petroleum companies that use barite as a water-based mud for oilfield drilling. CADETAF produced 472,000 t of ore in 2017 compared with 299,000 t in 2016. Broychim S.A.R.L., which purchased barite ore from CADETAF artisanal miners and mined barite at its own mines, was the country's leading exporter of barite products and held a market share of about 65%. Broychim exported barite to the United States as well as 14 other countries. Broychim owned six mines, which had a combined estimated resource of 3 Mt. The Nkob and the Touroug Mines were the only two active mines in 2017. The Touroug Mine had the capacity to produce 200,000 metric tons per year (t/yr) of barite. Other barite producers in Morocco included Compagnie Marocaine des Barytes S.A. (COMBAR), Société Nord-Africaine de Recherches et d'Exploitation des Mines d'Argana (SNAREMA), and Société Nouvelle Union des Métaux Maroc (SNUMM) (tables 1, 2; Broychim S.A.R.L., 2018; Tahiri, 2018, p. 7).

**Phosphate Rock.**—Morocco held more than 50 billion metric tons of phosphate rock reserves, including deposits in the Western Sahara region, which represented about 71% of the world's reserves. In 2017, OCP produced 32.8 Mt of phosphate rock compared with 26.9 Mt in 2016. The company also produced 5.7 Mt of phosphoric acid ( $P_2O_5$  equivalent) and 8.6 Mt of phosphate-based fertilizers. The company planned to produce 12 Mt of phosphate fertilizer in 2018. OCP's capacity was 35 million metric tons per year (Mt/yr) of phosphate rock, 10 Mt/yr of phosphate-based fertilizers, and 5.2 Mt/yr of phosphoric acid. OCP planned to increase its phosphate rock production capacity to 60 Mt/yr by 2025. The company's share in the global trade market in 2017 was 47% for phosphoric acid, 37% for phosphate rock, and 22% for phosphate-based fertilizers. OCP operated four phosphate rock mining sites at Benguerir, Boucraa, Khouribga, and Youssefia; two processing plants at Jorf Lasfar and Safi; and four phosphate export ports at Casablanca, Jorf Lasfar, Laayoune, and Safi (OCP Group, 2018, p. 8, 16, 18, 21).

The Beni Amir plant had the capacity to treat 5.5 Mt/yr of phosphate rock from the Beni Amir Mine and 5 Mt/yr of extract from the Sidi Chennane Mine. The Beni Amir plant was the world's largest phosphate washing plant and was expected to increase its capacity to 12 Mt/yr of phosphate rock in 2019 from 10.5 Mt/yr in 2017. In 2017, OCP created a new subsidiary, OCP Africa, which operated a new fertilizer plant to help meet the demand from African countries. The company's fertilizer exports to Africa increased in tonnage by 50% in 2017 (OCP Group, 2018, p. 23–24, 28, 50).

### **Mineral Fuels**

Morocco produced 31,000 barrels of condensate and 44 million cubic meters of natural gas in 2017. Production of refined petroleum products at the Mohammedia refinery by Société Anonyme Marocaine de l'Industrie du Raffinage (SAMIR) continued to be on hold throughout 2017. The refinery was closed and liquidated in August 2015, and Morocco became entirely dependent on refined petroleum products imports (table 1; El Yaakoubi, 2016; Office National des Hydrocarbures et des Mines, 2018b).

The ONHYM signed partnership agreements with 21 companies to explore for crude petroleum and natural gas in areas that cover about 170,000 km<sup>2</sup>. The ONHYM signed two memoranda of understanding for the development of oil shale with two unnamed companies and continued to support other companies with which ONHYM had existing agreements. The holders of onshore permits in Morocco in 2017 included SDX Energy PLC of the United Kingdom, which held exploration permits at the Central Sebou Gharb Occidental and the Lalla Mimouna areas. Royal Dutch Shell plc held a reconnaissance permit at the Issouka area, Sound Energy plc of the United Kingdom was exploring at the Sidi Mokhtar area, and Petroleum Exploration (Pvt) Ltd. of Pakistan was exploring at the Haha onshore field (Office National des Hydrocarbures et des Mines, 2018a, p. 21).

Chariot Oil and Gas Ltd. of the United Kingdom held the Mohammedia offshore exploration permit and the Rabat deep offshore permit with Eni S.p.A. of Italy and Woodside Petroleum Co. of Australia. Chevron Morocco Exploration Ltd. (a subsidiary of Chevron Corp. of the United States) and Qatar Petroleum of Qatar held exploration permits for the Cap Cantin, the Cap Rhir, and the Cap Wilidia deep offshore zones. Kosmos Energy Ltd. of the United States held an exploration permit for the Essaouira offshore zone, and it also held the Boujdour Maritime exploration permit with Capricorn Exploration and Development Co. Ltd. (a subsidiary of Cairn Energy Plc of India). New Age Morocco Ltd. [a subsidiary of New Age (African Global Energy) Ltd. of the United Kingdom] held the Fom Ognit exploration permit. Repsol Exploration Atlas S.A. of Spain held the Gharb offshore south exploration license (Office National des Hydrocarbures et des Mines, 2018a, p. 20).

### **MINERAL INDUSTRY HIGHLIGHTS IN 2018**

Morocco's real GDP increased by 3.0% in 2018 compared with 4.2% in 2017. The value added of the mining sector, which contributed 10% to the country's GDP, increased by 5.2% in 2018 compared with an increase of 16.5% in 2017. The value of phosphate rock production increased by 3.8% in 2018 compared with an increase of 22.2% in 2017, and that of phosphate-based products increased by 3.9% compared with an increase of 20.6% in 2017. The share of mineral exports in the country's total exports was 20.9%. The mining sector provided 40,000 direct jobs in 2018 compared with 41,000 direct jobs in 2017. In 2018, the number of valid mining permits decreased to 5,890 from 6,670 in 2017; of that total, 80% of the permits were held by mining companies in 2018 and 20% were held by ONHYM compared with 60% and 18%, respectively, in 2017 (Office National des Hydrocarbures et des Mines, 2018c; 2019a, p. 12; 2019b; Ministry of Energy, Mines, and Environment, 2019).

The value of Morocco's total exports increased to \$28.1 billion in 2018 from \$25.6 billion in 2017, and imports, to \$49.1 billion from \$42.2 billion. Natural and chemical fertilizers exports increased to \$3.0 billion from \$2.6 billion. Raw and semiworked silver exports decreased to \$68 million from \$115 million. Exports of raw products of mineral origin decreased to \$1.5 billion from about \$1.6 billion; they included copper concentrate (valued at \$119 million), phosphate rock

(\$846 million), scrap metal (\$169 million), barite (\$86 million), lead concentrate (\$83 million), and other raw products of mineral origin (\$193 million). Phosphoric acid exports increased to \$1.4 billion from \$1.1 billion. The value of hydrocarbon and other energy products imports increased to \$8.4 billion in 2018 from \$7.2 billion in 2017; the value of sulfur imports increased to \$816 million from \$515.6 million (Bank Al-Maghrib, 2019, p. 235–239).

## Commodity Review

### Metals

**Cobalt, Copper, Lead, Nickel, and Zinc.**—Managem was the sole cobalt, copper, and nickel producer in Morocco. Managem's production of refined cobalt (cobalt cathode) decreased by 6% to 1,806 t, of which 1,236 t was processed from cobalt mined at Bou Azzer and 570 t was sourced from an unnamed third party. The company's copper concentrate output decreased by 3% to 114,532 t from 118,100 t in 2017; its zinc concentrate production also decreased, to 75,951 t from 77,173 t, owing to lower ore grade. Zinc oxide output also decreased by 6% in 2018. Managem mined zinc and lead at the Douar Hajar, the Draa Sfar, and the Tighardine Mines (table 2; Managem S.A., 2019, p. 37, 39, 43).

Production of cobalt cathodes at Managem's polymetallic mining complex in Guemassa near Marrakech was expected to increase in 2020 with the supply of 5,000 t/yr of cobalt from the Pumpi cobalt and copper mining project, which is located in Kolwezi in Lualaba Province of the Democratic Republic of Congo [Congo (Kinshasa)]. Managem was developing the Pumpi Mine and owned an 81.2% interest in it. In 2017, Managem sold 60% of its share in the Pumpi project to Wanbao Mining of China and retained a 20% share in the project (Morocco World News, 2017; Managem 2019, p. 18).

**Silver.**—Silver output by Managem at the Imiter Mine decreased by 35% to 143,645 kg in 2018 from 222,120 kg in 2017 owing to the mining of lower grade ore during the first half of 2018. The company completed the construction of a silver tailings retreatment plant at the Imiter Mine; the plant was expected to produce 30 t/yr of silver metal. The Imiter Mine had an estimated life of 12 years in 2018 and 5.9 Mt of combined resources and reserves. In March, Maya completed the National Instrument (NI) 43–101 technical report on the preliminary economic assessment of the Zgounder silver mine. The report confirmed that the mine would support the extraction of about 4 Mt of ore grading 292 g/t silver. Following the completion of exploration and development work in 2017, Maya increased its mining capacity to 500 metric tons per day (t/d) in 2018 for a targeted production of 44,000 kilograms per year (kg/yr) in 2019 and 2020. The company planned to increase its mining capacity to 2,000 t/d for a targeted production of 149,000 kg/yr of silver in 2021–27. CMT produced lead-silver and silver-zinc concentrates at its Tighza Mine in Meknes Province (Compagnie Ménière de Touissit, 2018; Managem S.A., 2019, p. 41; Maya Gold and Silver Inc., 2019).

**Tin.**—Kasbah completed the second definitive feasibility study for the Achmmach tin project, which held measured and indicated mineral resources of 14.9 Mt grading 0.85%

tin including an upgrade to the ore reserve of 7 Mt of ore grading 0.82% tin for a total of 58,000 t of probable and proved reserves. The project was expected to produce 750,000 t/yr of ore during a mine life of 10 years. Kasbah was also developing the Bou El Jaj tin project, which is located 8 km southwest of the Achmmach tin project. The Bou El Jaj project could provide supplementary feed to the planned tin-processing facility at the Achmmach Mine; the resources at Bou El Jaj included 0.5 to 1 Mt of ore grading between 0.30% and 0.50% tin for about 1,500 to 5,000 t of contained tin (Kasbah Resources Ltd., 2019, p. 3).

### Industrial Minerals

**Fluorspar.**—Fluorite production by SAMINE, a Managem subsidiary, decreased to 48,751 t in 2018 from 56,395 t in 2017, or by 14%. SAMINE's El Hammam Mine, which had the capacity to produce 80,000 t of acid-grade fluorspar, was the main producer of fluorspar in Morocco. Most of the company's production was exported through the Casablanca Port. GFL GM Fluorspar S.A. (a subsidiary of Gujarat Fluorochemicals Ltd. of India) began fluorspar mining at the Taourit Mine, which is located 95 km south of Nador Port in northeastern Morocco. GFL planned to increase its capacity from 40,000 t/yr of acid grade fluorspar in 2018 to 60,000 t/yr by mid-2020. Almost all fluorspar mined by GFL was exported by way of Nador Port (table 2; Managem S.A., 2019, p. 44; O'Driscoll, 2019).

**Phosphate Rock.**—OCP estimated that it held 71% of the world's reserves of phosphate ore by the end of 2018. The company produced a record 37.6 Mt of dry marketable phosphate rock in 2018; its commercial output of phosphate rock increased to 34.3 Mt from 32.8 Mt in 2017. Solid fertilizers production increased to 8.8 Mt in 2018 from 8.6 Mt in 2017, and that of phosphoric acid increased to 6.1 Mt from 5.7 Mt. OCP's phosphate products exports went to 160 clients located on five continents, including Asia (23%); Africa (21%), Europe (20%), South America (18%), North America (16%), and other unassigned destinations (2%). The company's phosphate exports included 11.3 Mt of phosphate rock, which accounted for 38% of the world's phosphate rock trade market; 8.4 Mt of phosphate fertilizers, which accounted for 23% of the phosphate fertilizers market; and 1.9 Mt of phosphoric acid, which accounted for 49% of the phosphoric acid trade market (OCP Group, 2019, p. 6, 14, 27, 29).

In 2018, OCP began production at the Jorf Complex IV fertilizer plant, which had the capacity to produce 1 Mt/yr of phosphate fertilizers; constructed two phosphoric acid concentration units, which had a combined capacity of 360,000 t/yr; and expanded the Jorf Lasfar Terminal to be able to handle 35 Mt/yr of trade products. The company was on track to complete the construction of a 1.5-Mt/yr-capacity sulfuric acid plant, a 360,000-t/yr-capacity phosphoric acid concentration unit, and a 100,000-t/yr-capacity water soluble fertilizer plant in 2019 (OCP Group, 2019, p. 640–41).

**Potash.**—Emmerson PLC of the United Kingdom was developing the Khemisset potash project, which is located southeast of Rabat, as a low-capital-cost potash mine in Morocco. When completed, the project would be the first active potash mine in North Africa. Khemisset's Joint Ore Reserves Committee (JORC)-compliant resource estimate was 311.4 Mt

of ore grading 10.2% potassium oxide (K<sub>2</sub>O) in 2012. In 2018, Emmerson commissioned Golder Associates of Canada to carry out a scoping study. The study confirmed the potential for a potash mine that would have the capacity to produce 800,000 t/yr of 60% K<sub>2</sub>O for the first 20 years of the mine's life (Emmerson PLC, 2019).

### Mineral Fuels

Morocco produced 31,000 barrels of condensate and an estimated 45 million cubic meters of natural gas. Production of refined petroleum products at the Mohammedia refinery by SAMIR continued to be on hold throughout 2018. Thirteen petroleum companies were involved in hydrocarbon operations in Morocco in 2018 covering a combined area of 127,000 km<sup>2</sup>. The Government issued 70 exploration permits, including for 42 offshore locations, and awarded two natural gas production concessions. The concessions were the Sidi Al Harati Ouest (Sebu permit) concession, which was awarded to the joint venture of SDX Energy Morocco Ltd. (a subsidiary of SDX Energy) (75% interest) and ONHYM (25% interest) and the Tendirara concession to the joint venture of Sound Energy Meridja Ltd. (a subsidiary of Sound Energy) (75% interest) and ONHYM (25% interest). ONHYM signed exploration and production agreements with Eni Maroc B.V. for the Tarfaya Offshore Shallow area; Repsol Exploration Tanfit S.L. and Shell Exploration et Production du Maroc GmbH for the Tanfit area; Sound Energy Morocco East Ltd. and Sound Energy Morocco South Ltd. (subsidiaries of Sound Energy) for the Sidi Mokhtar Onshore area; and Schlumberger Silk Rout Service Ltd. of the United States for the Grand Tendirara area (table 1; Ministry of Energy, Mines, and Environment, 2019).

### Outlook

Morocco continues to attract foreign direct investment to its energy and mineral sectors following the implementation of changes to its legal framework in 2015. The country is expected to remain the world's leading supplier of phosphate rock and phosphate-based fertilizers for the next 5 years as OCP continues to invest in expanding capacity at existing mines, adding new mines, and adding new concentrating, floating, and washing units at the Bou Craa, Contour-Asfi, and Khouribga-Jorf mining centers by 2030. Managem is focusing on increasing its output of cobalt cathode, copper concentrate, and silver by developing its mineral resources in Morocco through exploration studies in partnership with ONHYM.

Cobalt cathode output by Managem at the Guemassa complex is expected to increase in the next 5 years with the beginning of the supply of cobalt from the company's share at the Pumpi Mine in Congo (Kinshasa) in 2020. Silver production by Maya is expected to increase at the Zgounder Mine with the increase in mining capacity to 2,000 t/d. Kasbah plans to start tin production at the Achmmach Mine in 2020 at an average annual rate of 750,000 t/yr of ore.

Morocco's standing as a significant world supplier of acid-grade fluorspar was further solidified with the entry of GFL into Morocco's fluorite production in Taourirt Province and exports by way of Nador Port. Natural gas production is

expected to increase in the next 5 years with Sound Energy's commencement of production at the Tendirara concession in eastern Morocco and the completion of exploration and development work by SDX Energy at the Gharb basin in northern Morocco.

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## WESTERN SAHARA

Western Sahara is a desert area bordering the Atlantic Ocean between Mauritania and Morocco. About 75% of the Western Saharan territory was administered by the Government of Morocco, and the remaining 25% was under the administration of the Popular Front for the Liberation of the Saguia el Hamra and Rio de Oro (Polisario). The issue of sovereignty for Western Sahara, which was claimed by the Government of Morocco, the Saharawi Arab Democratic Republic (SADR), and the Polisario, remained unresolved as of yearend 2018. Western Sahara's economy is dependent on fishing, pastoral nomadism, and phosphate rock mining. Cement and phosphate rock production, and offshore crude petroleum and natural gas exploration were the main mining activities that were carried out in the territory (U.S. Central Intelligence Agency, 2019).

The Phosboucraa mining center, which was owned by Phosphate de Bou Craa S.A. (Phosboucraa), was the main mineral production facility in Western Sahara. Phosboucraa was a majority-owned subsidiary of OCP Group responsible for mining, beneficiation, transportation, and marketing of

phosphate rock at the Phosboucraa Mine. Phosboucraa extracted 1.9 Mt of phosphate rock in 2016 (the latest year for which comprehensive data were available), of which 1.8 Mt was from commercial production. The company had the capacity to produce 3 Mt/yr of phosphate rock. The Phosboucraa Mine had the world's longest conveyor belt; the mine held 800 Mt of phosphate rock ore, which accounted for 2% of Morocco and Western Sahara's reserves. The mine employed 2,200 people (OCP Group, 2017, p. 32, 37).

Phosphate rock mined in Western Sahara was moved by the conveyor belt for more than 100 km to the Laayoune Wharf. The wharf contained a docking terminal for loading ships with phosphate ore and an intermediate dock for unloading ships carrying fuel oil to supply the phosphate processing plant. Phosboucraa completed building a new drying plant dedicated to exports, along with a new washing plant with an integrated flotation unit, and a new storage and handling facility (OCP Group, 2018, p. 21–22).

Ciments du Maroc owned and operated a clinker mill at Laayoune. Clinker was shipped from the Safi cement plant in western Morocco. The mill had the capacity to produce 500,000 t/yr of cement. Other cement components, such as limestone, gypsum, and pozzolan, were sourced from nearby quarries located in Western Sahara (Ciments du Maroc, 2019).

ONHYM carried out seven exploration studies for metals in southern Western Sahara in 2017; these studies were located at Al Warma (gold), Chenna (gold), Lafhouda (iron ore, niobium, and rare-earth elements), Lafhouda-Drag (niobium, rare-earth elements, tantalum, and uranium), Tlayha (gold and uranium), Tizegzaouine (copper, gold, and silver), and Twihinata-Lamlaga (gold, iron ore, molybdenum, niobium, rare-earth elements, tantalum, and uranium). Metalex Ventures Ltd. of Canada conducted exploration studies for copper and gold at the Tichla Awserd region in partnership with ONHYM in 2017 (Office National des Hydrocarbures et des Mines, 2018b, p. 37).

Several petroleum companies were exploring for crude petroleum and natural gas offshore of and onshore in Western Sahara. They included San Leon Energy plc of Ireland, which operated the Tarfaya onshore block and the Zag offshore block through its subsidiary San Leon Morocco Ltd.; Glencore plc of Switzerland, which held an exploration license at the Boujdour Offshore Shallow block; Cairn Energy PLC; Eni Maroc B.V. of Italy, which was exploring for oil at the Tarfaya Offshore Shallow; New Age (African Global Energy) Ltd., Petromaroc Corp. plc, Teredo Oils Ltd., and Xplorer PLC (all of the United Kingdom); and Kosmos Energy Ltd. of the United States, which was exploring at the Boujdour Maritime block (Office National des Hydrocarbures et des Mines, 2018a, p. 22–23).

## MINERAL INDUSTRY HIGHLIGHTS IN 2018

In 2018, Capricorn Exploration and Development Co. Ltd. of the United Kingdom, Glencore, and Kosmos Energy ended their exploration activity and interest in the Cap Boujdour Maritime petroleum and natural gas permits, which are located offshore Western Sahara. Kosmos Energy attributed its decision to its plan to focus on other projects in Mauritania and Senegal (Western Sahara Resources Watch, 2018; Office National des Hydrocarbures et des Mines, 2019).



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TABLE 1  
MOROCCO AND WESTERN SAHARA: PRODUCTION OF MINERAL COMMODITIES<sup>1\*</sup>

(Metric tons, gross weight, unless otherwise specified)

Commodity <sup>2</sup>	2014	2015	2016	2017	2018
<b>METALS</b>					
Cobalt:					
Mine:					
Cobalt ore, recoverable	21,500	22,460	23,900	32,000 <sup>e</sup>	35,390
Co content <sup>c, 3</sup>	1,400 <sup>r</sup>	1,500 <sup>r</sup>	1,600 <sup>r</sup>	2,300	2,100
Refinery, metal	1,391	1,982	2,081	1,924	1,806
Copper, mine, concentrates:					
Gross weight	66,480	95,542 <sup>4</sup>	113,219	118,100 <sup>5</sup>	114,532
Cu content	16,600 <sup>r</sup>	24,000 <sup>r, e</sup>	28,000 <sup>r, e</sup>	30,000 <sup>e</sup>	29,000 <sup>e</sup>
Gold, mine, Au content kilograms	212	292 <sup>r</sup>	174 <sup>r</sup>	220	200 <sup>e</sup>
Iron ore, mine:					
Gross weight	22,910	17,860	15,300	100,300	100,300 <sup>e</sup>
Fe content <sup>e</sup>	12,366 <sup>r</sup>	9,644 <sup>r</sup>	8,300	55,000	55,000
Iron and steel, steel:					
Raw steel	501,000 <sup>r</sup>	516,000	520,000	550,000	600,000
Products, hot-rolled	970,000	1,200,000 <sup>e</sup>	1,200,000 <sup>e</sup>	950,000 <sup>e</sup>	1,000,000 <sup>e</sup>
Lead:					
Mine, concentrate:					
Gross weight	39,070	45,650	40,690	53,990	70,962
Pb content	27,300 <sup>e</sup>	32,165 <sup>r</sup>	28,670 <sup>r</sup>	38,041 <sup>\</sup>	50,000 <sup>e</sup>
Products, cuprous matte,	600	--	--	--	--
Refinery, secondary <sup>e</sup>	15,000	14,000	11,000 <sup>r</sup>	8,000	10,000
Manganese, mine, largely chemical-grade: <sup>6</sup>					
Gross weight	91,271	71,700	68,330	99,000	53,000 <sup>e</sup>
Mn content <sup>7</sup>	52,500 <sup>r, e</sup>	38,000 <sup>e</sup>	36,200 <sup>r, e</sup>	59,000 <sup>e</sup>	28,000 <sup>e</sup>
Mercury, Hg content <sup>e</sup>	8	5	5	10	10
Nickel, Ni content, chemicals, nickel hydroxide <sup>8</sup>	220 <sup>r</sup>	203	188	196	200 <sup>e</sup>
Silver, mine, Ag content kilograms	270,000 <sup>r</sup>	298,000 <sup>r</sup>	337,000 <sup>r</sup>	362,000	348,000
Zinc:					
Mine:					
Gross weight	89,570	106,010	84,850	101,900	112,000
Zn content <sup>e</sup>	45,000	53,000 <sup>r</sup>	42,000	51,000	56,000
Products, zinc oxide	7,166	4,890	5,180	7,594	8,000 <sup>e</sup>
<b>INDUSTRIAL MINERALS</b>					
Arsenic trioxide	3,863 <sup>r</sup>	7,566	6,122	6,879	6,000 <sup>e</sup>
Barite	1,006,600	1,212,130	668,500	818,010	940,000 <sup>e</sup>
Cement, hydraulic thousand metric tons	14,320 <sup>r</sup>	14,460 <sup>r</sup>	14,260 <sup>r</sup>	14,850	15,300
Clay:					
Bentonite	98,757	92,290	103,230	174,546	170,000 <sup>e</sup>
Fuller's earth, smectite	73,500	84,570	141,760	119,070	85,000 <sup>e</sup>
Montmorillonite, ghassoul	810	1,160	910	420	1,000 <sup>e</sup>
Feldspar <sup>e</sup>	45,000	45,000	35,000	40,000	40,000
Fertilizers, solid thousand metric tons	4,800	5,210	6,960	8,600	8,800
Fluorspar, acid grade <sup>5</sup>	74,854	73,879 <sup>r</sup>	66,584 <sup>r</sup>	56,395	48,751
Phosphate rock: <sup>9</sup>					
Gross weight thousand metric tons	27,390	26,264	26,900	32,800	34,300
P <sub>2</sub> O <sub>5</sub> content do.	8,460 <sup>r</sup>	8,404	8,607	10,300	11,000
Phosphate, compounds, phosphoric acid do.	5,000	4,500	4,930	5,700	6,100
Salt, rock	459,160	555,760	634,610	659,260	660,000 <sup>e</sup>
Sulfur:					
All forms, S content	60,000	40,000 <sup>r, e</sup>	-- <sup>r</sup>	--	--
Compounds, sulfuric acid thousand metric tons	15,000 <sup>e</sup>	15,000 <sup>e</sup>	14,823 <sup>r</sup>	16,905	18,161

See footnotes at end of table.

TABLE 1—Continued  
MOROCCO AND WESTERN SAHARA: PRODUCTION OF MINERAL COMMODITIES<sup>1\*</sup>

(Metric tons, gross weight, unless otherwise specified)

Commodity <sup>2</sup>	2014	2015	2016	2017	2018
MINERAL FUELS AND RELATED MATERIALS					
Natural gas, dry basis      million cubic meters	44	41	44 <sup>r</sup>	44	45 <sup>e</sup>
Petroleum:					
Condensate      thousand 42-gallon barrels	37	36	35	31	31
Refinery:					
Distillate fuel oil      do.	16,443	9,044	--	--	--
Gasoline      do.	2,876	1,582	--	--	--
Jet fuel      do.	7,185	3,952	--	--	--
Liquefied petroleum gas      do.	9,915	5,453	--	--	--
Residual fuel oil      do.	10,026	5,514 <sup>r</sup>	--	--	--
Other      do.	1,555	855	--	--	--
Total      do.	48,000	26,400 <sup>r</sup>	--	--	--

<sup>e</sup>Estimated. <sup>r</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>Table includes data available through January 13, 2020. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>In addition to the commodities listed, gypsum, perlite, and a variety of crude construction materials may have been produced, but available information was inadequate to make reliable estimates of output.

<sup>3</sup>Cobalt content of concentrate estimated from reported gross weight.

<sup>4</sup>Managem Annual report 2016.

<sup>5</sup>Managem Annual report 2017.

<sup>6</sup>Reported by the country or producer(s).

<sup>7</sup>Mn content, 84% MnO<sub>2</sub>.

<sup>8</sup>Represents recoverable mine production of nickel.

<sup>9</sup>Includes production from Western Sahara.

**\*Note:** Effective on December 10, 2020, the U.S. Government recognizes the sovereignty of Morocco over all the territory of former Western Sahara. The information in this table reflects the situation at the time of reporting.



TABLE 2  
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2018\*

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
<b>MOROCCO</b>			
Arsenic trioxide	Compagnie de Tifnout Tighanimine (CTT) (Managem S.A., 55.2%, and Société Métallurgique d'Imler, 20%)	Mine at Guemassa, Marrakech	6,100
Barite	Central d'Achat et de Développement de la Région Minière du Tafilalet et de Figuig (CADETAF) (artisanal miners)	Mines at Errachidia, Figuig, and Tafilalet	500,000
Do.	Broychim S.A.R.L.	Plant at Casablanca	120,000
Do.	do.	Plant at Safi	30,000
Do.	do.	Nkob Mine, Ouarzazate	100,000
Do.	do.	Touroug Mine, Errachidia Province	200,000
Do.	Compagnie Marocaine des Barytes S.A. (COMABAR) [Norbar Minerals AS, 55%, and Office National des Hydrocarbures et des Mines (ONHYM), 45%]	Mine at Tlet Ighoud, Safi	160,000
Do.	do.	Mine at Zelmou, Figuig	110,000
Do.	Société Nord Africaine de Recherches et d'Exploitation des Mines d'Argana (SNAREMA)	Mine at Seksaoua, Marrakech	120,000
Do.	Société Nouvelle Union des Metaux Maroc (SNUMM)	Mine at Jbel Abdellah	12,000
Do.	Société Nord Africaine de Recherches et d'Exploitation des Mines d'Argana (SNAREMA)	Mine at Argana	30,000
Do.	North African Industrial Minerals Exploration S.A.R.L.	Trebia Mine, Nador region	NA
Barite, chemical grade	Compagnie Marocaine des Barytes S.A. (COMABAR) [Norbar Minerals AS, 55%, and Office National des Hydrocarbures et des Mines (ONHYM), 45%]	Mine at Azzouzet-Tidiennit	5,000
Do.	North African Industrial Minerals Exploration S.A.R.L.	Trebia Mine, Nador region	NA
Do.	Artisanal miners	Mines at Errachidia, Figuig, and Tafilalet	6,000
Cement, portland	Asment de Temara (Vtorantim Cimentos S.A.)	Kiln and mill at Temara	1,200,000
Do.	Ciments de L'Atlas (CIMAT)	Kiln and mill at Beni Mellal, Béni Mellal-Khénifra Region	1,600,000
Do.	do.	Kiln and mill at Settati, Chaouia-Ouadigha	1,600,000
Do.	Ciments du Maroc S.A. (HeidelbergCement AG, 58.3%)	Kiln and mill at Ait Baha	2,200,000
Do.	do.	Kiln and mill at Marrakech	1,300,000
Do.	do.	Kiln and mill at Safi	1,000,000
Do.	do.	Clinker mill at El Jadida	450,000
Do.	do.	Clinker mill at Jorf Lasfar	450,000
Do.	LafargeHolcim Maroc S.A. (LafargeHolcim Group, 50%)	Kiln and mill at Bouskoura, near Casablanca	3,000,000
Do.	do.	Kiln and mill at Tetouan	2,500,000
Do.	do.	Cadem clinker mill at Meknes	1,750,000
Do.	do.	Tamuda kiln and mill, Tetouan	800,000
Do.	do.	Grinding unit at Tangier	1,000,000
Do.	do.	Kiln and mill at Oujda	1,300,000
Do.	do.	Kiln and mill at Settati	1,700,000
Do.	do.	Kiln and mill at Fes, Ras El Ma	1,300,000
Do.	do.	Clinker mill AT Fes, Doukkarat	600,000
Do.	do.	Clinker mill at Nador	400,000

See footnotes at end of table.

TABLE 2—Continued  
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2018\*

(Metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
MOROCCO—Continued				
Clay:				
Bentonite		Société d'Exploitation des Mines du Rif (SEFERIF) [Office National des Hydrocarbures et des Mines (ONHYM), 100%]	Mine at Bou Hoed, near Ouxiane	15,000
Do.		Société Minière Bentonite d'Afarha S.A. [Grupo Tolsa, 80%, and Office National des Hydrocarbures et des Mines (ONHYM), 20%]	Mine at Aferha	9,200
Montmorillonite, ghassoul		Société du Ghassoul et de ses Derives SEFRIQUI SA	Mine at Tamdafelt	NA
Do.		Antonio Reyes Mines S.A.	Mine at Haddou Ammar, Nador	NA
Cobalt:				
Ore, gross weight		Compagnie de Tifnout Tighanimine (CTT) (Managem S.A.)	Bou-Azzer Mine, Ouarzazate	200,000
Metal		do.	Guemassa polymetallic plant, Marrakech	2,500
Copper, mine, concentrate		Compagnie Minière de Guemassa (CMG) [Managem S.A., 70.77%, and Office National des Hydrocarbures et des Mines (ONHYM), 29.23%]	Douar Hajar Mine, Guemassa, Marrakech	18,000
Do.		Akka Gold Mining Co. (AGM) [Managem S.A., 50.02%, and Office National des Hydrocarbures et des Mines (ONHYM), 16.07%]	Akka and Quansimi Mines at Iourim, Tiznit	50,000
Do.		Compagnie Minière de Oumjrane S.A. (CMO) (Managem S.A., 100%)	Oumjrane Mine, Errachidia	20,000
Do.		Société Minière de Bou Gaffer (SOMIFER) (Managem S.A., 100%)	Bleida Mine, central Anti-Atlas	50,000
Fluorspar, concentrate		GFL GM Fluorspar SA (Gujarat Fluorochemicals Ltd., 100%)	Mine at Taourirt Province	40,000
Do.		Société Anonyme d'Entreprises Minières (SAMINE) (Managem S.A., 100%)	El Hammam Mine, Khemisset	100,000
Iron ore:				
Crude ore		Société d'Exploitation des Mines du Rif (SEFERIF) [Office National des Hydrocarbures et des Mines (ONHYM), 100%]	Mine at Bouhoua, Nador	120,000
Concentrated		Compagnie Minière de Guemassa (CMG) [Managem S.A., 74%, and Bureau de Recherches de Participations Minières (BRPM), 23.08%]	Bou Azzer Mine, Guemassa	29,900
Do.		Compagnie Minière de Touissit (CMT) (Emerging Capital Partners, 50%, and Truffle Capital, 50%)	Mine at Touissit, Jerada	73,000
Lead:				
Mine		Artisanal miners	Mines at Errachidia, Figuig, and Tafilalet	6,000
Do.		Compagnie Minière de Touissit (CMT)	Mine at Tighza, Meknes Province	15,000
Secondary		Société des Fonderies de Plomb de Zellidja (SFPZ) <sup>1</sup> (Zellidja S.A., 50.4%)	Plant at Oued El Heimer	70,000
Lime		Lafarge Calincor Maroc (Lafarge Group)	Two kilns at Tlad Loulad	180,000
Manganese, concentrate		Société Anonyme Chérifienne d'Etudes Minières (SACEM) [Bureau de Recherches de Participations Minières (BRPM), 43%, and Compagnie Minière de l'Ogooué SA (COMILOG), 30%]	Mine at Imini, Ouarzazate	14,000
Natural gas	million cubic meters	Joint venture of SDX Energy PLC, 75%, and Office National des Hydrocarbures et des Mines (ONHYM), 25%	Sebou gasfield, near Kenitra	64
Do.	do.	Joint venture of Sound Energy PLC, 75%, and Office National des Hydrocarbures et des Mines (ONHYM), 25%	Greater Tendirara gasfield, Figuig	620
Nickel hydroxide		Compagnie de Tifnout Tighanimine (CTT) (Managem S.A.)	Guemassa metal complex, Marrakech	250

See footnotes at end of table.

TABLE 2—Continued  
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2018\*

(Metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
MOROCCO—Continued				
Petroleum, refinery products	thousand 42-gallon barrels	Société Anonyme Marocaine de l'Industrie du Raffinage (SAMIR) (Group Corral Petroleum, 64.7%, and general public, 35.3%)	Refinery at Mohammedia <sup>2</sup>	75,000
Phosphate rock		Office Chérifien des Phosphates (OCP) (Government, 100%)	Khouribga mining center (Beni Amir, Khouribga Mine, Merah El Ahrach, Sidi Chennane), Jorf Lasfar	22,600,000
Do.		do.	Gantour mining center (Ben Guerir Mine, Bouchane, Mzinda)	14,000,000
Phosphoric acid, P <sub>2</sub> O <sub>5</sub>		Bunge Maroc Phosphore (Office Chérifien des Phosphates (OCP), 50%, and Bung Brasil, 50%)	do.	375,000
Do.		Indo Maroc Phosphore S.A. [Office Chérifien des Phosphates (OCP), 33.33%; Chambal Fertilizers and Chemicals Ltd., 33.33%; Tata Chemicals Ltd., 33.33%]	Plant at Jorf Lasfar	430,000
Do.		Jorf Fertilizer Co. V [Office Chérifien des Phosphates (OCP), 100%]	do.	375,000
Do.		Pakistan Maroc Phosphore [Office Chérifien des Phosphates (OCP), 50%, and Fauji Pakistani Group, 50%]	do.	375,000
Do.		Office Chérifien des Phosphates (OCP) (Government, 100%)	Maroc Phosphore I and II plants, Safi	1,150,000
Do.		do.	Maroc Phosphore III, IV plants,	1,500,000
Do.		do.	Maroc Chimie I and II, Safi	500,000
Phosphoric acid, P <sub>2</sub> O <sub>5</sub> (purified)		Euro-Maroc Phosphore Co. [Office Chérifien des Phosphates (OCP), 33.33%; Société Chimique Prayon-Rupel, 33.33%; Chemische Frabrik Budenheim KG, 33.33%]	Plant at Jorf Lasfar	150,000
Salt:				
Rock		Société de Sel de Mohammedia (SSM) [Office National des Hydrocarbures et des Mines (ONHYM), 100%]	Mine at Ain Tekki, Mohammedia	226,500
Marine		Société Chérifienne des Sels (SCS) [Government, 50%, and Société Nouvelle des Salins du Sine Saloum (SNSSS), 50%]	Brine at Lake Zima, Safi	30,000
Silver	kilograms	Compagnie Minière de Touissit (CMT)	Mine at Tighza, Meknes Province	15,000
Do.	do.	Société Métallurgique d'Imiter (SMI) (Managem S.A., 75.72%, and public, 24.28%)	Imiter Mine, Imiter, 150 kilometers east of Ouarzazate	230,140
Do.	do.	Zgounder Millennium Silver Mining [Maya Gold and Silver Inc., 85%, and Office National des Hydrocarbures et des Mines (ONHYM), 15%]	Zgounder Mine, south of Marrakech	17,727
Steel products:				
Bars and sections		Société Nationale de Sidérurgie (Sonasid) (public, 31.14%; Société Nationale d'Investissement S.A., 21.07%; Axa Assurances Maroc, 8.53%; Aceralia Redendos, 8.5%)	Plant at Jorf Lasfar	300,000
Rebar and wire rod		Univers Acier S.A.	Plant at Casablanca	1,000,000
Do.		do.	do.	80,000
Cold-rolled sheet		Maghreb Steel S.A.	do.	250,000
Sulfuric acid		Bunge Maroc Phosphore S.A.	Plant at Jorf Lasfar	1,250,000
Do.		Indo Maroc Phosphore SA (IMACID)	do.	1,200,000
Do.		Maroc Phosphore III-IV [Office Chérifien des Phosphates (OCP)]	do.	5,800,000
Do.		Pakistan Maroc Phosphore S.A. (PMP)	do.	1,300,000
Do.		Maroc Chimie [Office Chérifien des Phosphates (OCP)]	Plant at Safi	1,600,000
Do.		Maroc Phosphore I [Office Chérifien des Phosphates (OCP)]	do.	2,500,000
Do.		Maroc Phosphore II [Office Chérifien des Phosphates (OCP)]	do.	1,900,000
Do.		Office Chérifien des Phosphates (OCP) (Government, 100%)	do.	3,200,000

See footnotes at end of table.



TABLE 2—Continued  
MOROCCO AND WESTERN SAHARA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2018\*

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
MOROCCO—Continued			
Talc and pyrophyllite:			
Pyrophyllite	Société Industrie Minière Marocaine (IMM)	Mine at Khenifra	NA
Talc	Société Zenaga	Mine at Tinjdad, Errachidia	NA
Do.	do.	Mine at Taliouine, Ouarzazate	NA
Zinc:			
Concentrate	Compagnie Minière de Guemassa (CMG) [Managem S.A., 70.77%, and Office National des Hydrocarbures et des Mines (ONHYM), 29.23%]	Douar Hajar Mine, Guemassa, Tighardine Mine	170,000
Do.	do.	Draa Sfar Mine, Marrakech	NA
Do.	Compagnie Minière de Touissit (CMT)	Mine at Tighza, Meknes Province	5,000
Do.	Société des Mines de Tonnous (SOMITE)	Mine at Aguerd NTazoult, Azilal	NA
Do.	Société Mineral et Substances	Mine at Lalla Mimouna, Taza	NA
Ore	Artisanal miners	Errachidia, Figuig, and Tafilalet	10,000
WESTERN SAHARA			
Cement	Ciments du Maroc S.A. (HeidelbergCement AG, 58.3%)	Grinding unit at Laayoune	500,000
Phosphate rock	Phosphates de Bou Craa S.A. [Office Chérifien des Phosphates (OCP), 65%]	Mine and mining center at Boucraa	3,000,000

Do., do. Ditto. NA Not available.

<sup>1</sup>Société des Fonderies de Plomb de Zellidja also refines silver and produces copper matte and sodium antimonate.

<sup>2</sup>Shut down in August 2015.

\***Note:** Effective on December 10, 2020, the U.S. Government recognizes the sovereignty of Morocco over all the territory of former Western Sahara. The information in this table reflects the situation at the time of reporting.