



# 2020–2021 Minerals Yearbook

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**MOROCCO [ADVANCE RELEASE]**

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# THE MINERAL INDUSTRIES OF MOROCCO

By Mowafa Taib

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

Morocco was the world's leading exporter of phosphate rock, phosphoric acid, and phosphate fertilizers; it remained the world's second-ranked producer of phosphate rock after China and accounted for about 17.1% of the world's phosphate rock output in 2020. Morocco held 50 billion metric tons (Gt) of phosphate rock reserves, which represented about 70% of the world's reserves. Excluding the United States, Morocco was the world's fourth-ranked producer of barite (after China, India, and Kazakhstan), accounting for 6.0% of world output. Including the United States, Morocco was the world's 3d-ranked producer of arsenic trioxide (after China and Peru), accounting for 12.8% of world output; the 7th-ranked producer of acid-grade fluor spar, 1.0% of world output; the 8th-ranked producer of mined cobalt, 1.6% of world output; and the 15th-ranked producer of silver, 1.1% of world output. Other mineral commodities produced in Morocco included cement, clays (bentonite, fuller's earth, and montmorillonite), feldspar, gold, iron ore, lead, manganese, mercury, natural gas, nickel, petroleum condensate, salt, raw steel, sulfuric acid, and zinc (table 1; OCP Group, 2020a, p. 6, 20–21; George, 2022; Jasinski, 2022; McRae, 2022a, b; Shedd, 2022; Silver Institute, The, 2022, p. 27).

On December 10, 2020, the United States recognized Morocco's sovereignty with respect to Western Sahara; the decision changed decades old United States policy concerning the Morocco-Western Sahara dispute. In this chapter, developments in the mineral industry of the Western Sahara region are included in the discussion of Morocco (Lee, 2020).

## Minerals in the National Economy

In 2020, the nominal gross domestic product (GDP) of Morocco was \$115.6 billion, and the country's real GDP decreased by 6.3% compared with an increase of 2.6% in 2019. In 2020, the mining sector was the leading foreign exchange earner for the Government; it accounted for 21.1% of the value of total exports and employed 40,000 people. The mining sector's contribution to the nominal GDP was 10% in 2020; 90% of its contribution came from phosphate mining and phosphate products processing. The value added by the mining sector to real GDP increased by 5.0 % in 2020 compared with an increase of 2.4% in 2019 (Bank Al-Maghrib, 2021, p. 31, 249; Ministry of Energy, Mines, and Sustainable Development, 2021b).

## 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. Law No. 33–13, 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, law No. 27–99 of March 16, 2000; these laws are supplemented by Decree No. 2–93–786 of November 3, 1993. These laws regulate crude petroleum and natural gas exploration and production activity onshore and offshore. (Office National des Hydrocarbures et des Mines, 2021c).

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 encourages investment in the hydrocarbon sector by offering financial incentives that allow international petroleum and natural gas companies to acquire as much as a 75% share of production in return for investing a portion of their profits in further exploration in the country's unclaimed areas onshore and offshore. The royalty on crude petroleum is 10%, and that on natural gas is 5%, and a corporate tax holiday for 10 years is given for crude petroleum and natural gas discoveries (Office National des Hydrocarbures et des Mines, 2021b).

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], enforces the mining laws through executive orders. Exploration permits (research permits) are awarded for an initial 3-year period for an area that covered as much as 16 square kilometers (km<sup>2</sup>). The permits were renewable for 4 additional years. Mining permits were awarded for 10-year periods and were renewable for 10-year periods until reserves are exhausted (Office National des Hydrocarbures et des Mines, 2021c).

The Government provided incentives for mining companies that included tax exemptions on imported equipment for investment that exceeds \$20.8 million<sup>1</sup> and a reduced tax rate of 17.5% for companies that exported their output and that supplied ores to mineral-processing and beneficiation companies. The Government also contributed 5% of the project value to mining projects that invested more than \$20.8 million. The Government's contribution would go towards infrastructure development, such as building roads and supplying electricity and water to the project areas (Office National des Hydrocarbures et des Mines, 2021c).

By the end of 2020, the Government had awarded 1,071 mining permits and 3,579 exploration permits to mining companies, individual operators, and the ONHYM. In 2020,

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<sup>1</sup>Where necessary, values have been converted from Moroccan dirhams (MAD) to U.S. dollars (US\$) at the annual average exchange rates of 8.992 MAD=US\$1.00 for 2021, 9.502 MAD=US\$1.00 for 2020, and 9.617 MAD=US\$1.00 for 2019.

the ONHYM conducted 22 exploration studies for its own projects, including 8 each for base metals and precious metals, and 6 for rocks and industrial minerals. The ONHYM's studies with partners included seven for base metals, five for rocks and industrial minerals, and four for precious metals. The ONHYM's partners included Aya Gold and Silver Inc. (Aya) of Canada, Emmerson PLC of the United Kingdom, Kasbah Resources Ltd. of Australia, Managem S.A., Metalex Ventures Ltd. of Canada, North America Nickel Inc. of Canada, and OCP Group (Ministry of Energy, Mines, and Sustainable Development, 2021b; Office National des Hydrocarbures et des Mines, 2021a, p. 12, 43; 2022a, p. 48).

Several of the ONHYM's metallic mineral exploration studies were conducted in southern Western Sahara; these studies were located at Al Warma (copper and gold), Awark (rare-earth elements and uranium), Chenna (copper and gold), Tlayha (gold and uranium), and Twihinate-Center (niobium, rare-earth elements, and uranium). Metalex Ventures Ltd. conducted exploration studies for copper and gold at the Awserd-Tichla area in partnership with the ONHYM (Office National des Hydrocarbures et des Mines, 2021a, p. 43).

## Production

Notable increases in mineral commodity production in Morocco in 2020 compared with production in 2019 included that of natural gas, which increased by 107%; iron ore (gross weight), by 97%; feldspar, by 90%; iron ore (iron content), by 57%; arsenic trioxide, by 52%; mined lead (lead content), by an estimated 27%; mined lead (gross weight), by 17%; petroleum condensate, by 15%; mined manganese (gross weight), by an estimated 12%; and mined manganese (manganese content), by 11%. Notable production decreases in 2020 compared with production in 2019 included that of barite, which decreased by 63%; bentonite, by 51%; rock salt, by 43%; zinc oxide, by 40%; gold, by 35%; mined zinc (gross weight), by 18%; fluorspar (acid grade), by 17%; smectite, by 16%; cobalt ore (gross weight), by 14%; silver, by 12%; and cement and hot-rolled iron and steel products, by an estimated 10% each. Data on mineral production are provided in table 1.

## Structure of the Mineral Industry

The Office Chérifien des Phosphates [Office of Moroccan Phosphates] (OCP), also known as the OCP Group, was responsible for mining phosphate rock and manufacturing phosphate-based fertilizers and other phosphate products in Morocco. The OCP, which was wholly owned by the Government, was the country's sole producer of phosphate rock and phosphate fertilizers through its more than 30 subsidiaries and joint ventures (OCP Group, 2020a, p. 15).

Managem S.A. was an international mining and mineral-processing company based in Morocco, which was publicly listed on the Casablanca Stock Exchange. It operated 13 mines in nine countries in Africa and was owned by Al MADA-Positive Impact Fund (81.4%), free floating shares (10%) and Interprofessional Moroccan Retirees Fund (CIMR) (8.3%). In Morocco, Managem produced metals, such as cobalt, copper, iron ore, 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 the country; it conducted mineral exploration, mining, processing, marketing, and services through its subsidiaries. Managem's subsidiaries in Morocco included Akka Gold Mining Co. (AGM), Cie minière d'Oumejrane (CMO), Compagnie de Tifnout Tighanimine (CTT), Compagnie Minière des Guemassa (CMG), Compagnie minière de Dadès, Compagnie minière de SAGHRO, Société Anonyme d'entreprise Minière (SAMINE), Société Métallurgique d'Imiter (SMI), and Société Minière de Bou Gaffer (SOMIFER). Managem employed about 5,300 people in 2020 compared with 5,400 people in 2019 (table 2; Managem S.A., 2021, p. 11–14, 47).

Artisanal miners have been legally mining barite, kohl (eyeliner), lead, and zinc within an area of 60,000 km<sup>2</sup> in the region of Figuig and Tafilalet 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 the Centrale d'Achat et de Développement de la Région Minière du Tafilalet et de Figuig [Central Purchasing and Development of the Mining Region of Tafilalet and Figuig] (CADETAF) as an independent public agency with financial and legal power within the Government. The Ministry of Energy, Mines, and Sustainable Development was responsible for technical supervision of mining operations in the Figuig and Tafilalet mining zone. Artisanal miners sold ores to local 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. The taxes were \$1.05 per metric ton of barite, \$31.57 per metric ton of kohl, 10% of the sale value of lead, and 15% of the sale value of zinc (Ministry of Energy, Mines, and Sustainable Development, 2017; Tahiri, 2018, p. 3–6; World Bank, The, 2019, p. 53–58).

## Mineral Trade

The value of total exports from Morocco decreased to \$27.7 billion in 2020 from a revised \$29.6 billion in 2019 and the value of total imports decreased to \$44.4 billion from \$51.0 billion. Exports of raw products of mineral origin decreased to \$1.3 billion from about \$1.4 billion; phosphoric acid exports decreased to \$1.2 billion from \$1.4 billion; and lead concentrate exports decreased to \$70 million from \$76 million. However, the value of exports of some items had increased, as follows: natural and chemical fertilizer exports increased to \$3.4 billion in 2020 from \$2.9 billion in 2019; phosphate rock exports increased to \$764 million from \$761 million; copper concentrate exports increased to \$117 million from \$96 million; and semifinished silver exports increased to \$103 million from \$93 million. In terms of tonnage, Morocco exported 11.5 million metric tons (Mt) of natural and chemical fertilizers in 2020 compared with 9.1 Mt in 2019; 10.3 Mt of phosphate rock compared with 9.5 Mt; 1.9 Mt of phosphoric acid compared with 2.0 Mt; 123,000 metric tons (t) of copper concentrate compared with 117,000 t; 57,000 t of lead concentrate compared with 61,000 t; and 2.4 Mt of other raw mineral products compared with 3.5 Mt (Bank Al-Maghrib, 2021, p. 250, 266–267).

In 2020, Morocco imported 7.2 Mt of sulfur valued at \$514 million compared with 6.7 Mt valued at \$719 million in 2019; the sulfur originated mainly in the United Arab Emirates (44%), Russia (18%), Poland (9%), and the United States (8%). The country also imported 2.0 Mt of semifinished and finished steel products, 1.9 Mt of ammonia, 869,000 t of steel ingots, 578,000 t of long steel products, 431,000 t of scrap metal, 389,000 t of flat steel products, and 321,000 t of other raw products of mineral origin (Bank Al-Maghrib, 2021, p. 263–264; World Steel Association, 2021, p. 53, 58, 63, 66, 68).

The value of hydrocarbon and other energy product imports decreased to \$5.3 billion in 2020 from \$7.9 billion in 2019. Morocco imported 11.3 Mt of coal, coke, and solid fuels valued at \$757 million in 2020 compared with about 11.4 Mt valued at \$945 million in 2019. Coal imports came from Russia (42%), South Africa (37%), the United States (14%), Poland (4%), Colombia (2%), and Spain (1%) (Bank Al-Maghrib, 2021, p. 263).

Exports to the United States from Morocco decreased to \$1.05 billion in 2020 from \$1.58 billion in 2019. The decrease was attributed to a 62% decrease in chemical fertilizer exports to \$276 million in 2020 from \$729 million in 2019. Morocco's chemical fertilizer exports to the United States appeared to have stopped in the second half of 2020 following the petition that was filed by Mosaic Co. of the United States with the U.S. Department of Commerce and the U.S. International Trade Commission that requested investigating phosphate fertilizer imports from Morocco and Russia for alleged government subsidies that provided unfair advantages to Moroccan and Russian exports of phosphate. Other mineral-related commodity exports to the United States included, in descending order of value, inorganic chemicals (\$46 million), barite (\$16 million), other nonferrous metals (\$11 million), cement, sand, and stone (\$4 million), and iron and steel mill products (\$0.5 million). Imports to Morocco from the United States decreased to \$2.3 billion in 2020 from \$3.5 billion in 2019. Major mineral- and metal-related exports included, in descending order of value, fuel oil (\$286 million), natural gas liquids (\$267 million), coal and other fuels (\$64 million), petroleum products (\$41 million), other nonmetallic minerals (\$17 million), and fertilizers and other chemicals (\$15 million each) (Taganida, 2020; Bank Al-Maghrib, 2021, p. 13; U.S. Census Bureau, 2022a–c).

## Commodity Review

### *Metals*

**Cobalt, Copper, and Nickel.**—Managem was the sole cobalt, copper, and nickel producer in Morocco. The company mined 28,695 t of cobalt-nickel ore and produced an estimated 2,300 t of cobalt and 142 t of nickel in 2020. Production of refined cobalt (cobalt cathode) at the polymetallic mining complex in Guemassa near Marrakech increased to 2,416 t from 2,397 t in 2019. Most of the raw cobalt materials used for cathode production came from cobalt mined at Managem's Bou Azzer Mine; the remaining supply came from a third party. Production of cobalt cathodes was expected to increase in the future with an additional supply of 5,000 metric tons per year

(t/yr) of mined materials from the Pumpi cobalt project—in Katanga Province of Congo (Kinshasa)—starting in 2021. Managem owned a 20% share in Pumpi and planned to process its share of the mine output at the polymetallic mining complex in Morocco (Managem S.A., 2021, p. 104).

Managem's copper concentrate output increased by 6% to 107,600 t in 2020 from 101,623 t in 2019. The Akka Mine produced 40,676 t; the Bleida Mine, 42,114 t; the Oumejrane Mine, 16,110 t; and the Douar Hajar Mine, 8,700 t. In 2020, Managem was exploring for copper at six mining sites in Morocco. Proved and probable reserves at the Bouskour exploration site were 144,900 t of copper; at the Bleida Mine, 60,700 t; at the Guemassa Mine, 59,000 t; at the Akka Mine, 45,914 t; and at the Oumejrane Mine, 32,924 t. The measured and indicated resources at the Tizert copper exploration site were 881,000 t (table 1; Managem S.A., 2021, p. 45, 104, 155).

**Lead.**—Production of lead concentrate in Morocco increased by 17% to 54,208 t in 2020 from 46,505 t in 2019. Lead concentrate production by CMG at the Bou Azzer Mine increased to 13,882 t in 2020 from 11,362 t in 2019. In 2020, CMG held 124,000 t of lead reserves. Compagnie Minière de Touissit (CMT) produced lead-silver and silver-zinc concentrates at the Tighza Mine in 2020. The Tighza Mine is in the Middle Atlas mountain range in Meknes Province. In 2019, CMT became a 50–50 joint venture of Emerging Capital Partners of the United States and Truffle Capital of France. In 2020, CMT held 13 concessions, 18 mining licensees, and 35 exploration permits throughout Morocco. The joint venture produced 21,380 t of lead-silver concentrate in 2020 compared with 23,700 t in 2019 (table 1; Compagnie Minière de Touissit, 2021, p. 17, 29; Managem S.A., 2021, p. 108; AuPlata Mining Group, 2022).

**Silver.**—Silver production in Morocco decreased by 12% in 2020 to 249,000 kilograms (kg) from 284,000 kg in 2019. SMI produced silver at three sites in Morocco—the Guemassa, the Imiter, and the Tizert Mines. Silver output by SMI decreased by 19% in 2020 to 143,133 kg from 176,504 kg in 2019. In July 2020, SMI commissioned the silver tailings retreatment plant at the Imiter Mine; the plant, which had the capacity to produce 30,000 kilograms per year (kg/yr) of silver, produced 19,000 kg in 2019 (the latest year for which data were available). Of the measured and indicated ore resources, SMI held 8.2 Mt, including 5.1 Mt of probable and proved ore reserves (tables 1, 2; Managem S.A., 2021, p. 45, 57, 60).

In 2020, Maya Gold and Silver Inc. of Canada changed its name to Aya Gold & Silver Inc. (also known as Aya Or & Argent Inc., or Aya). The company started commercial silver production at the Zgounder Mine in 2019 at a rate of 500 metric tons per day of ore for a targeted production capacity of 44,000 kg/yr of silver. The Zgounder Mine produced 22,588 kg of silver in 2020, which was an increase of 61% compared with that in 2019. The company planned to increase its ore extraction capacity to 730,000 t/yr for a targeted production of 149,000 kg/yr of silver from 2021 through 2027 (Aya Gold and Silver Inc., 2021; Office National des Hydrocarbures et des Mines, 2021a, p. 41).

CMT produced lead-silver concentrates at the Tighza Mine. The company mined 310,000 t of ore in 2020 and produced 25,600 t of lead-silver concentrates from four underground mining sites (Aoussar, Ighrem, Sidi Ahmed, and Signal) in the

Tighza Mine vicinity (Compagnie Mènière de Touissit, 2021, p. 8–9).

**Tin.**—In 2019, Kasbah Resources Ltd. of Australia completed the second definitive feasibility study for the Achmmach tin project, which was launched in 2018. The study identified proved and probable reserves of 55,000 t of tin at the Meknes Trend and 3,000 t of tin at the Sidi Addi Trend at the Achmmach project site for a total of 58,000 t of tin at a cutoff grade of 0.55% tin. The underground Achmmach Mine was expected to produce about 4,500 t/yr of concentrate containing 60% tin during 10 years of mine life. The Achmmach project was owned by Kasbah (75%), Toyota Tsusho Corp. of Japan (20%), and Nittetsu Mining Co. Ltd. of Japan (5%). Kasbah was also developing the Bou El Jaj tin project, which is located 8 kilometers (km) southwest of the Achmmach project and was wholly owned by Kasbah. The Bou El Jaj project could provide supplementary feed to the planned tin-processing facility at the Achmmach Mine; its resources included 0.5 to 1 Mt grading from 0.3% to 0.5% tin for about 1,500 to 5,000 t of contained tin. Tin production was expected to begin in Morocco with the start of operations by Kasbah at 750,000 t/yr of ore in 2020 but was delayed owing to low tin demand until an unspecified later date (Kasbah Resources Ltd., 2020, p. 5, 8–9, 11; Office National des Hydrocarbures et des Mines, 2020, p. 41).

**Zinc.**—Morocco produced 70,623 t of zinc concentrate in 2020 compared with 85,930 t in 2019. Managem mined lead and zinc at the Douar Hajar, the Draa Sfar, and the Tighardine Mines. Managem's zinc concentrate production decreased to 60,003 t in 2020 from 61,764 t in 2019. The decrease was attributed to lower concentrate grade. Managem's output of zinc oxide decreased by 40% to 4,791 t in 2020 from 7,962 t in 2019. The company held 379,000 t of proved and probable zinc reserves in 2020. The same year, CMT produced 3,145 t of zinc-silver concentrate from its mines at Tighza compared with 3,381 t in 2019 (tables 1, 2; Compagnie Mènière de Touissit, 2021, p. 17; Managem S.A., 2021, p. 58, 60).

### **Industrial Minerals**

**Barite.**—Barite production in Morocco was estimated to have decreased by 63% to 410,000 t in 2020 from 1.1 Mt in 2019. The decrease was attributed to decreased worldwide demand for barite by petroleum companies as a result of the effects of the coronavirus disease 2019 (COVID-19) pandemic on petroleum production. (Petroleum companies use barite as a water-based mud for oilfield drilling.) Most of the barite was produced by Broychim S.A.R.L., CADETAF, Compagnie Marocaine des Barytes S.A. (COMABAR), 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., 2021).

**Fluorspar.**—In 2020, production of acid-grade fluorspar in Morocco was estimated to have decreased by 17% to 54,000 t from 65,000 t (revised) in 2019. The decrease was attributed to the negative effects of the COVID-19 pandemic on world fluoride consumption. Fluorite production by SAMINE, a Managem subsidiary, decreased by 21% to 39,847 t in 2020 from 50,390 t in 2019. SAMINE was the main producer of fluorspar in Morocco; its El Hammam Mine had the capacity

to produce 80,000 t/yr of acid-grade fluorspar. The mine had 135,000 t of proved and probable reserves at the end of 2020. Most of SAMINE's production was exported by way of Casablanca Port. A subsidiary of Gujarat Fluorochemicals Ltd. of India, GFL GM Fluorspar, began fluorspar mining at the Taourirt Mine in 2018, which is located 95 km south of Nador Port in northeastern Morocco. In 2019, GFL had the capacity to produce 40,000 t/yr of acid-grade fluorspar; the company increased the capacity to 60,000 t/yr in 2020. Almost all fluorspar mined by GFL was exported by way of Nador Port (table 1; O'Driscoll, 2019; Managem S.A., 2021, p. 104).

**Phosphate Rock.**—Phosphate rock production in Morocco increased by 6% to 37.4 Mt in 2020 from 35.2 Mt in 2019. The OCP was the sole producer of phosphate and phosphate-based products in the country. The company increased its production of phosphoric acid (phosphorous pentoxide equivalent) to 7.15 Mt in 2020 from 6.7 Mt in 2019; it also increased its output of solid fertilizers to 10.6 Mt from 10.0 Mt. The OCP had been working on increasing its phosphate rock capacity to 60 million metric tons per year (Mt/yr) by 2025 from its 2020 capacity of 42 Mt/yr. The OCP's share in the global phosphate trade market in 2020 was 54% for phosphoric acid, 34% for phosphate rock, and 26% for phosphate-based fertilizers. The OCP operated four phosphate rock mining sites at Khouribga, which held 43% of the country's phosphate rock reserves; Youssofia, 37%; Ben Guerir, 18%; and Bou Craa, 2%. The company also operated two phosphate fertilizer manufacturing complexes at Jorf Lasfar and Safi, and four phosphate export ports at Casablanca, Jorf Lasfar, Laayoune, and Safi. In 2019, the OCP employed 19,865 people (table 1; OCP Group, 2020a, p. 10–12).

Phosphate de Bou Craa S.A. (Phosboucraa), which was a wholly owned subsidiary of the OCP, operated the Phosboucraa mining center in Western Sahara. The center, which held 2% of Morocco's phosphate rock reserves, was the main mineral production facility in Western Sahara. Phosboucraa was responsible for mining, beneficiation, transportation, and marketing of phosphate rock at the Phosboucraa Mine; it had the capacity to produce 2.6 Mt/yr of phosphate rock. In 2019 (the latest year for which data were available), Phosboucraa exported 1.0 Mt of phosphate rock compared with 1.9 Mt in 2018, which was the lowest amount of phosphate rock exported in 5 years. The decrease was attributed to the political conflict related to the sovereignty of Western Sahara. Phosboucraa's phosphate rock exports went to India (49%), New Zealand (32%), China (12%), and Brazil (7%).

In 2020, Phosboucraa continued its work on the \$2.2 billion expansion project at the Bou Craa mining site, which started in 2019. The project included expanding the mining site, the construction of a 1-Mt/yr phosphate fertilizer plant, and the improvement of port infrastructure. The new fertilizer plant would include a sulfuric acid production unit, a phosphoric acid unit, and a granulation unit. Additionally, Phosboucraa planned to build a new washing unit and storage facilities, a sheltered port, and a wharf. The expansion project was expected to be completed by 2022 (OCP Group, 2020b, p. 6).

**Potash.**—In 2020, Emmerson PLC 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 Morocco and North Africa. Khemisset's Joint Ore Reserves Committee (JORC)-compliant resources totaled 537 Mt grading 9.34% potassium oxide (K<sub>2</sub>O) in 2019. Emmerson PLC commissioned a scoping study, which confirmed a mining potential of 810,000 t/yr of salable granules containing 60% K<sub>2</sub>O for the first 19 years of the mine's life. In 2019, the ONHYM presented the results of its environmental impact study for the Khemisset project to the National Committee of Environmental Impact (Emmerson PLC, 2022a, b; Office National des Hydrocarbures et des Mines, 2021a, p. 41).

### **Minerals Fuels**

Morocco was dependent on mineral fuel imports in 2020. The country produced a modest volume of petroleum condensate (30,000 barrels) in 2020. Natural gas output increased by 107% in 2020 to 98.25 million cubic meters from a revised 47 million cubic meters in 2019. The increase in natural gas production came from the output increase at the Essaouira Basin and the Gharb Basin Gasfields. Thirty-four petroleum companies were involved in hydrocarbons exploration in Morocco in 2019 that covered an area of 153,000 km<sup>2</sup>. In 2020, the Government issued 70 exploration permits for 34 offshore locations and awarded two natural gas production concessions—the Sidi Al Harati Ouest (Sebu Central) concession to the joint venture of SDX Energy Morocco Ltd. (a subsidiary of SDX Energy; 75% interest) and the ONHYM (25% interest), and the Grand Tendirara concession to the joint venture of Sound Energy Meridja Ltd. (a subsidiary of Sound Energy; 75% interest) and the ONHYM (25% interest). In 2020, the ONHYM signed exploration and production agreements with Eni Maroc B.V. of Italy for the Tarfaya Offshore Shallow area; with Repsol Exploration Tanfit S.L. and Shell Exploration et Production du Maroc GmbH for the Tanfit area; with Sound Energy Morocco East Ltd. and Sound Energy Morocco South Ltd. (subsidiaries of Sound Energy) for the Sidi Mokhtar Onshore area; and with Schlumberger Silk Rout Service Ltd. of the United States for the Grand Tendirara area (table 1; Office National des Hydrocarbures et des Mines, 2021a, p. 21–24).

### **MINERAL INDUSTRY HIGHLIGHTS IN 2021**

In 2021, Morocco remained the world's second-ranked producer of phosphate rock after China and accounted for about 16.9% of world phosphate rock output. Morocco held 50 Gt of phosphate rock reserves in 2021, which represented about 70% of the world's reserves. Excluding the United States, Morocco was the world's third-ranked producer of barite (after China and India), accounting for 16.3% of world output; and the eighth-ranked producer of acid-grade fluorspar, accounting for about 0.9% of world output. Including the United States, Morocco was the world's 3d-ranked producer of arsenic trioxide (after China and Peru), accounting for 11.5% of world output; the 11th-ranked producer of cobalt, 1.4% of world output; and the 15th-ranked producer of silver, 1.1% of world output (table 1; OCP Group, 2022, p. 6, 20–21; Silver Institute, The, 2022, p. 27; George, 2023; Jasinski, 2023; McRae, 2023a, b; Shedd, 2023).

### **Minerals in the National Economy**

In 2021, the nominal GDP of Morocco was \$142.8 billion. The country's real GDP increased by 7.9% compared with a decrease of 6.3% in 2020. In 2021, the mining sector was the leading foreign exchange earner for the Government; it accounted for 30% of the value of total exports, contributed 9% of the nominal GDP, and employed 40,000 people. The value added by the mining sector to real GDP increased by 0.9% in 2021 compared with an increase of 2.6% in 2020 (Bank Al-Maghrib, 2022, p. 29, 30, 253, 277; Ministry of Energy, Mines, and Sustainable Development, 2022).

### **Production**

Notable increases in mineral commodity production in Morocco in 2021 compared with production in 2020 included that of barite, which increased by 168%; feldspar, by an estimated 32%; mined zinc (gross weight), by an estimated 27%; silver, by an estimated 16%; natural gas, by 12%; zinc content of mine output, by an estimated 13%; rock salt, by an estimated 22%; and hot-rolled iron, steel, and lead, by an estimated 11% each. Notable decreases in production in 2021 compared with production in 2020 included that of zinc oxide, which decreased by 53%; iron ore (gross weight), by 51%; manganese, by an estimated 50%; iron ore (iron content), by 38%; refined cobalt metal, by 26%; and arsenic trioxide, by 11% (table 1).

### **Mineral Trade**

In 2021, the total value of exports from Morocco increased to \$36.6 billion from \$27.7 billion in 2020. Natural and chemical fertilizer exports increased to \$5.7 billion from \$3.4 billion; phosphoric acid exports increased to \$2.2 billion from \$1.3 billion; exports of raw products of mineral origin increased to \$1.8 billion from \$1.3 billion; phosphate rock exports increased to \$995 million from \$772 million; copper concentrate exports increased to \$184 million from \$117 million; semifinished silver exports increased to \$103 million from \$93 million; barite (barium sulfate) exports increased to \$99 million from \$39 million; and lead concentrate exports decreased to \$70 million from \$76 million (Bank Al-Maghrib, 2021, p. 270–271).

In terms of tonnage, Morocco exported 10.8 Mt of natural and chemical fertilizers in 2021 compared with 11.5 Mt in 2020; 9.9 Mt of phosphate rock compared with 10.3 Mt; 2.1 Mt of phosphoric acid compared with 1.9 Mt; 130,000 t of copper concentrate compared with 123,000 t; 57,000 t of lead concentrate compared with 61,000 t; and 2.6 Mt of other raw mineral products compared with 2.1 Mt (Bank Al-Maghrib, 2022, p. 270–271).

In 2021, total imports to Morocco increased to \$58.7 billion from \$44.5 billion in 2020. The country imported 6.7 Mt of sulfur valued at \$1.1 billion compared with 7.2 Mt valued at \$514 million in 2020; they originated mainly in the United Arab Emirates (44%), Russia (18%), Poland (9%), and the United States (8%). The country also imported 1.7 Mt of ammonia, 899,000 t of semifinished steel, 869,000 t of steel ingots, 436,000 t of long steel products, 516,000 t of scrap

metal, 350,000 t of flat steel products, and 341,000 t of other raw products of mineral origin (Bank Al-Maghrib, 2022, p. 267–268).

The value of hydrocarbon and other energy product imports increased to \$8.4 billion in 2021 from \$5.3 billion in 2020. Petroleum product and natural gas imports increased to \$5.9 billion from \$3.7 billion. Morocco imported 12.4 Mt of coal, coke, and solid fuels valued at \$1.2 billion in 2021 compared with about 11.3 Mt valued at \$757 million in 2020. Coal imports came from Russia (42%), South Africa (37%), the United States (14%), Poland (4%), Colombia (2%), and Spain (1%) (Bank Al-Maghrib, 2022, p. 267).

## Commodity Review

### *Metals*

In 2021, Managem produced 6,883 t of arsenic, 1,796 t of cobalt cathodes, 110,013 t of copper concentrate, 147 kg of gold, 34,945 t of fluorspar, 12,574 t of lead concentrate, 147 t of nickel derivatives, 117,545 kg of silver, 52,706 t of zinc concentrate, and 2.237 t of zinc oxide. Production of copper concentrates came from three Managem subsidiaries—SOMIFER produced 44,760 t; AGM, 39,458 t; and CMG, 8,471 t (Managem S.A., 2022, p. 115, 211).

In 2021, CMT processed 270,000 t of ore at the Tighza Mining Center, which is located in Middle Atlas mountain range, Draa-Tafilalet Region, and produced 20,105 t of lead concentrate and 2,675 t of zinc concentrate. Research permits for lead, silver, and zinc were held by AMG in Tounfit (6), Itzer (5), the Agadir area (4), Marrakech (3), Gulemin (2), and Aguelmous (1) as well as concessions in Touissit (8) and Marrakech (1) (AuPlata Mining Group, 2021; Compagnie Ménière de Touissit, 2022, p. 70).

### *Industrial Minerals*

The OCP's phosphate rock production increased by 2% to 38.1 Mt in 2021 from 37.4 Mt in 2020. The company also produced 7.1 Mt of phosphoric acid (phosphorus pentoxide equivalent) compared with about 7.2 Mt in 2020; it also increased its output of solid fertilizers to 10.9 Mt from 10.6 Mt in 2020. The OCP's share in the global phosphate trade market in 2021 was 54% for phosphoric acid, 34% for phosphate rock, and 26% for phosphate-based fertilizers (table 1; OCP Group, 2022, p. 13–14).

In 2021, Emmerson continued the development of the Khemisset potash project. The company received a mining permit from the Government in February, completed the environmental and social impact assessment in April, and continued progressing the environmental approval process towards receiving the final permit. The company planned to begin construction of the mine in 2023 (Emmerson PLC, 2022a, b).

### *Mineral Fuels*

In 2021, the ONHYM was working with Longreach Oil & Gas Ltd. And SDX Energy (both of the United Kingdom) to develop the country's natural gas resources following discoveries in the Gharb Basin and at Tandrara onshore and the Boujdour and the Tanger-Larache offshore sites. Dry gas

production from the Gharb Basin increased to 80 million cubic meters in 2021 from 67 million cubic meters in 2020 (Office National des Hydrocarbures et des Mines, 2022b).

## Outlook

Morocco is expected to remain the world's leading exporter of phosphate rock and phosphate-based fertilizers during the next 5 years because the OCP is expected to continue investing in capacity expansion at existing mines and add new mines and new concentrating, floating, and washing units at Contour-Asfi, Khouribga-Jorf, and Bou Craa mining centers by 2030. Managem's cobalt cathode output at the Guemassa complex is expected to increase in 2022 with the beginning of the supply of cobalt raw materials from the company's production share at the Pumpi Mine in Congo (Kinshasa). Managem is expected to increase its output of copper concentrate and silver by developing its existing reserves. Silver production by Aya is expected to increase at the Zgounder Mine following the increase in mining capacity. Morocco's standing as an important world supplier of acid grade fluorspar could be strengthened with the entry of GFL GM Fluorspar into fluorite production in Taourirt Province and exports of the commodity by way of Nador Port. Natural gas production is expected to increase in the next 5 years following Sound Energy's commencement of production at the Tandrara 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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TABLE 1  
MOROCCO: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons, gross weight, unless otherwise specified)

Commodity <sup>2</sup>	2017	2018	2019	2020	2021
METALS					
Cobalt:					
Mine, concentrate:					
Gross weight	32,000 <sup>c</sup>	35,390	33,520 <sup>r</sup>	28,695	29,000 <sup>c</sup>
Co content <sup>c,3</sup>	2,300	2,300	2,300	2,300	2,300
Refinery, metal	1,924	1,806	2,397	2,416	1,796
Copper:					
Mine, concentrate:					
Gross weight	126,060	115,442	101,623	107,600	110,013
Cu content <sup>c</sup>	30,000	29,000	25,000	27,000	28,000
Gold, mine, Au content kilograms	220	386	221	143	147
Iron ore, mine:					
Gross weight	100,300	51,440	19,866 <sup>r</sup>	39,200	19,200
Fe content	55,000	28,300	10,500 <sup>r</sup>	16,500	10,200
Iron and steel:					
Raw steel	550,000	520,000 <sup>r</sup>	500,000 <sup>r</sup>	480,000 <sup>c</sup>	500,000 <sup>c</sup>
Products, hot-rolled <sup>c</sup>	950,000	1,000,000	1,000,000	900,000	1,000,000
Lead:					
Mine, concentrate:					
Gross weight	53,990	43,095 <sup>r</sup>	46,505 <sup>r</sup>	54,208	60,400 <sup>c</sup>
Pb content	38,041	30,382	30,000 <sup>c</sup>	38,000 <sup>c</sup>	42,300
Manganese, mine, largely chemical-grade:					
Gross weight	99,000	79,538	71,210 <sup>r</sup>	80,000 <sup>c</sup>	40,000 <sup>c</sup>
Mn content	59,000	42,000	38,000 <sup>r</sup>	42,000	21,000
Mercury, Hg content	10 <sup>r</sup>	5 <sup>r</sup>	2	2	2 <sup>c</sup>
Nickel, Ni content:					
Mine, concentrate	196	126	131 <sup>r</sup>	142	147
Chemicals, nickel hydroxide	196	126	131 <sup>r</sup>	142	147
Silver, mine, Ag content kilograms	319,000 <sup>r</sup>	243,000 <sup>r</sup>	284,000 <sup>r</sup>	249,000	288,000
Zinc:					
Mine, concentrate:					
Gross weight	101,900	113,812	85,930 <sup>r</sup>	70,623	90,000 <sup>c</sup>
Zn content <sup>c</sup>	51,000	57,000	43,000 <sup>r</sup>	40,000	45,000
Oxide	7,594	8,128	7,962 <sup>r</sup>	4,791	2,237
INDUSTRIAL MINERALS					
Arsenic trioxide	6,879	5,578	5,055 <sup>r</sup>	7,694	6,883
Barite	818,010	899,365	1,100,000 <sup>c</sup>	410,000 <sup>c</sup>	1,100,000 <sup>c</sup>
Cement, hydraulic thousand metric tons	13,850 <sup>r</sup>	13,378 <sup>r</sup>	13,691 <sup>r</sup>	12,314	12,600 <sup>c</sup>
Clay:					
Bentonite	174,546	172,749	188,081 <sup>r</sup>	92,387	92,000 <sup>c</sup>
Fuller's earth	119,070	99,256	93,430 <sup>r</sup>	78,302	78,000 <sup>c</sup>
Montmorillonite, ghassoul	420	1,133	605 <sup>r</sup>	637	650 <sup>c</sup>
Feldspar <sup>c</sup>	100,000 <sup>r</sup>	75,000 <sup>r</sup>	100,000 <sup>r</sup>	190,000	250,000
Fertilizers, solid thousand metric tons	8,600	8,800	10,000	10,600	10,900
Fluorspar:					
Acid grade	56,395	60,000 <sup>r, c</sup>	65,000 <sup>r, c</sup>	54,000 <sup>c</sup>	49,000 <sup>c</sup>
Metallurgical grade	19,105	27,900 <sup>r, c</sup>	28,000 <sup>r, c</sup>	28,000 <sup>c</sup>	28,000 <sup>c</sup>
Phosphate:					
Phosphate rock:					
Gross weight thousand metric tons	32,800	34,400	35,200 <sup>r</sup>	37,400	38,100
P <sub>2</sub> O <sub>5</sub> content do.	10,300	11,000	11,400	11,600	11,800
Compounds, phosphoric acid do.	5,700	6,100	6,700	7,150	7,100
Salt, rock salt	659,260	691,637	854,390 <sup>r</sup>	490,896	600,000 <sup>c</sup>
Sulfur, compounds, sulfuric acid thousand metric tons	16,905	17,900	20,400	22,000	21,000

See footnotes at end of table.

TABLE 1—Continued  
MOROCCO: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons, gross weight, unless otherwise specified)

Commodity <sup>2</sup>	2017	2018	2019	2020	2021
MINERAL FUELS AND RELATED MATERIALS					
Natural gas, dry basis                      million cubic meters	44	46	47	98	110
Petroleum, condensate                      thousand 42-gallon barrels	32 <sup>r</sup>	33	26 <sup>r</sup>	30	30 <sup>e</sup>

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

<sup>1</sup>Table includes data available through December 22, 2022. 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, construction materials, gypsum, lime, mica, perlite, refined silver, secondary lead, and talc 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.

TABLE 2  
MOROCCO: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Arsenic trioxide	Compagnie de Tifnout Tighanimine (CTT) (Managem S.A., 99.77%)	Mine at Guemassa, Marrakech-Safi Region	6,100
Barite:			
Chemical grade	Compagnie Marocaine des Barytes (COMABAR) [Norbar Minerals AS, 55%, and Office National des Hydrocarbures et des Mines (ONHYM), 45%]	Mine at Azzouzet-Tidiennit	5,000
Do.	Central d'Achat et de Développement de la Région Minière duTafilalet et de Figuig (CADETAF) (artisanal miners)	Errachidia, Figuig and Tafilate, Draa-Tafilalet Region	6,000
Do.	North African Industrial Minerals Exploration S.A.R.L.	Trebia Mine, Nador, Oriental Region	NA
Do.	ADO Barite Morocco	Plant at Jorf Lasfar, El Jadida	150,000
Unspecified	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, Er Rachidia 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.	Artisanal miners supervised by Central d'Achat et de Développement de la Région Minière duTafilalet et de Figuig (CADETAF)	Errachidia, Figuig and Tafilate, Draa-Tafilalet Region	600,000
Do.	Joint venture of ADO Barite Morocco and BarakaMining Co.	Mines at Ait El Farsi, Tanger Province and Fom Zguid, Tala Province	150,000
Do.	North African Industrial Minerals Exploration S.A.R.L.	Trebia Mine, Oriental Region	NA
Do.	Société Nord Africaine de Recherches et d'Exploitation des Mines d'Argana (SNAREMA)	Mine at Seksaoua, Marrakech	120,000
Do.	do.	Mine at Argana	30,000
Do.	Société Nouvelle Union des Metaux Maroc (SNUMM)	Mine at Jbel sidi Abdellah, Tanger-Tatouan-Al Hoceima Region	50,000
Cement, hydraulic	Asment de Temara (Cimentos Asment EAA, 63%; PROCIMAR, 21%; Cement Francais, 16%)	Kiln and mill at Temara	1,900,000
Do.	Ciments de L'Atlas (CIMAT)	Beni Mellal kiln and mill	1,600,000
Do.	do.	Settat kiln and mill	1,600,000
Do.	Ciments du Maroc S.A. (HeidelbergCement AG, 58.3%)	Kiln and mill at Ait Baha	2,200,000
Do.	do.	El Jadida clinker mill	450,000
Do.	do.	Jorf Lasfar clinker mill	450,000
Do.	do.	Kiln and mill at Marrakech	1,300,000
Do.	do.	Kiln and mill at Safi	1,000,000
Do.	LafargeHolcim Maroc S.A. (LafargeHolcim Group, 64.68%)	Plant at Bouskoura, near Casablaca	3,000,000
Do.	do.	Cadem clinker mill at Meknes	1,750,000
Do.	do.	Kiln and mill at Ras El Ma, Fes	1,300,000
Do.	do.	Cinker mill at Doukkarat, Fes	600,000
Do.	do.	Grinding unit at Laayoune	500,000
Do.	do.	Clinker mill in Nador	400,000
Do.	do.	Kiln and mill at Oujda	1,300,000
Do.	do.	Tamuda kiln and mill, Tetouan	800,000
Do.	do.	Grinding unit at Tangier	1,000,000
Do.	do.	Plant at Tetouan, Casablanca	2,500,000
Do.	do.	Settat kiln and mill	1,700,000

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
<b>Clay:</b>			
Bentonite	Antonio Reyes Mina Providencia S.A.R.L. (ARMIPRO)	Mine and plant at Haddou Ammar, Oriental Region	60,000
Do.	Minerals Leading Co.	Processing plant in Nador, Oriental Region	200,000
Do.	NAIMEX Co.	Trebia Mine, Oriental Region	NA
Do.	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
Ghassoul	Société du Ghassoul et de ses Derives SEFRIQUI S.A.	Mine at Jebel Rhassoul, Jebel Tamdafelt	2,900
Montmorillonite	Antonio Reyes Mina Providencia S.A.R.L. (ARMIPRO)	Mine and plant at Haddou Ammar, Oriental Region	60,000
<b>Cobalt:</b>			
Ore, gross weight	Compagnie de Tifnout Tighanimine (CTT) (Managem S.A., 99.77%)	Bou-Azzer Mine, Ouarzazate Province	200,000
Metal	do.	Guemassa polymetallic plant, Marrakech	2,500
Copper, mine, concentrate	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.	do.	Ouansimi Mine, Rabat	10,000
Do.	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.	Compagnie Minière de Oumjrane S.A. (CMO) (Managem S.A., 100%)	Oumjrane Mine, Er Rachidia Province	20,000
Do.	Compagnie Minière de Saghro (Managem S.A., 100%)	Bouskour Mine, Saghro, Ouarzazate Region	145,000
Do.	Société Minière de Bou Gaffer (SOMIFER) (Managem S.A., 100%)	Bleida Mine, Zagora Province, Draa-Tafilalet Region	50,000
Fluorspar, concentrate	GFL GM Fluorspar S.A. (Gujarat Fluorochemicals Ltd., 100%)	Mine in Taourirt Province	40,000
Do.	Société Anonyme d'Entreprises Minières (SAMINE) (Managem S.A., 100%)	El Hammam Mine, Khemisset Province	80,000
Gold, mine, Au content kilograms	Compagnie de Tifnout Tighanimine (CTT) (Managem S.A., 99.77%)	Mine at Guemassa, Marrakech	250
<b>Iron ore:</b>			
Crude ore	Société d'Exploitation des Mines du Rif (SEFERIF) [Office National des Hydrocarbures et des Mines (ONHYM), 100%]	Mine at Bouhoua, Nador, Oriental Region	120,000
Concentrate	Compagnie Minière de Guemassa (CMG) [Managem S.A., 70.77%, and Bureau de Recherches de Participations Minières (BRPM), 29.23%]	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

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iron and steel:				
Raw steel		Univers Acier S.A.	Plant at Sidi Hajjaj, Casablanca	500,000
Steel products:				
Bars and sections		Société Nationale de Sidérurgie (Sonasid) (Nouvelles Siderurgies Industrielles, 64.86%, and other investors, 35.14%)	Plant at Jorf Lasfar	300,000
Cold-rolled sheet		Maghreb Steel S.A.	do.	250,000
Rebar and wire rod		do.	Plant at Nador City, Oriental Region	650,000
Do.		Univers Acier S.A.	Plant at Sidi Hajjaj, Casablanca	1,000,000
Lead:				
Mine, concentrate		Artisanal miners supervised by Central d'Achat et de Développement de la Région Minière du Tafilalet et de Figuig (CADETAF)	Mines at Errachidia, Figuig and Tafilate, Draa-Tafilalet Region	6,000
Do.		Compagnie Minière de Guemassa (CMG) [Managem S.A., 70.77%, and Bureau de Recherches de Participations Minières (BRPM), 29.23%]	Douar Hajjar, Draa Sfar, Tighardine Polymetallic Mines, Marrakech-Safi Region	15,000
Do.		Comanie Mienere de Touissit (CMT) (Emerging Capital Partners, 50%, and Truffle Capital, 50%)	Mine at Tighza, Meknes Province	15,000
Metal		Compagnie de Tifnout Tighanimine (CTT) (Managem S.A., 99.77%)	Guemassa polymetal complex Marrakech	8,000
Refinery, secondary		Société des Fonderies de Plomb de Zellidja (SFPZ) <sup>1</sup> (Zellidja S.A., 94.4%)	Plant at Oued El Heimer, Oujda, Oriental Region	70,000
Lime		Lafarge Calincor Maroc (Lafarge Group, 100%)	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 Province	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 and Oulad N'Zala gasfields, onshore	64
Do.	do.	Joint venture of Sound Energy PLC (75%) and Office National des Hydrocarbures et des Mines (ONHYM) (25%)	Greater Tendirra gasfield, onshore	45
Nickel hydroxide		Compagnie de Tifnout Tighanimine (CTT) (Managem S.A., 99.77%)	Guemassa metal complex at Marrakech	250
Petroleum, condensate	thousand 42-gallon barrels	Joint venture of SDX Energy PLC (75%) and Office National des Hydrocarbures et des Mines (ONHYM) (25%)	Sebou gasfield, onshore	30
Phosphate rock		Office Chérifien des Phosphates (OCP) (Government, 100%)	Khouribga mining center (Beni Amir, Khouribga, Merah El ahrach, Sidi Chennane mining sites), Béni Mellal-Khenifra Region	22,600,000
Do.		do.	Gantour mining center (Ben Guerir, Bouchane, Mzinda), Safi Province	14,000,000
Do.		do.	Youssofia Mine, Safi, Marrakech-Safi Region	3,000,000
Do.		Phosphates de Bou Craa S.A. [Office Chérifien des Phosphates (OCP), 100%]	Bou Craa Mine and mining center, Western Sahara	2,600,000

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Phosphoric acid, P <sub>2</sub> O <sub>5</sub>		Bunge Maroc Phosphore [Office Chérifien des Phosphates (OCP), 50%, and Bung Brasil, 50%]	Plant at Jorf Lasfar Industrial Park	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 Industrial Park	430,000
Do.		Jorf Fertilizer Co. V [Office Chérifien des Phosphates (OCP), 100%]	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 and IV plants, Jorf Lasfar Industrial Park	1,500,000
Do.		Office Chérifien des Phosphates (OCP) (Government, 100%)	Maroc Chimie I and II plants, Safi	500,000
Do.		Pakistan Maroc Phosphore [Office Chérifien des Phosphates (OCP), 50%, and Fauji Pakistani Group, 50%]	do.	375,000
Phosphoric acid, P <sub>2</sub> O <sub>5</sub> (purified)		Euro-Maroc Phosphore Co. [Office Chérifien des Phosphates (OCP), 33%; Société Chimique Prayon-Rupel, 33%; Chemische Fabrik Budenheim KG, 33%]	Plant at Jorf Lasfar Industrial Park	150,000
Pozzolan		Minerals Leading Co.	Processing plant at Nador Port, Oriental Region	300,000
Salt:				
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
Rock salt		Société de Sel de Mohammedia (SSM) [Office National des Hydrocarbures et des Mines (ONHYM), 100%]	Mine at Ain Tekki, Mohammedia	226,500
Silver:				
Mine, Ag content	kilograms	Comanie Mienere de Touissit (CMT) (Emerging Capital Partners, 50%, and Truffle Capital, 50%)	Tighza Mining Center, M'irt, Draa-Tafilalet Region	15,000
Do.	do.	Société Metallurgique d'Imlil (SMI) (Managem S.A., 75.72%, and general public, 24.28%)	Guemassa Mine, Marrakech Province; Imlil Mine, Ouarzazate Province; Tizet Mine, Taroudannt Province, Souss-Massa Region	230,000
Do.	do.	Zgounder Millenium Silver Mining [Aya Gold and Silver Inc., 85%, and Office National des Hydrocarbures et des Mines (ONHYM), 15%]	Zgounder Mine, south of Marrakech	18,000
Metal	do.	Société Metallurgique d'Imlil (SMI) (Managem S.A., 75.72%, and general public, 24.28%)	Plant in Ouarzazate Province	30,000
Sulfuric acid		Bunge Maroc Phosphore S.A.	Plant at Jorf Lasfar Industrial Park	1,250,000
Do.		Indo Maroc Phosphore SA (IMACID)	do.	1,200,000
Do.		Maroc Chemei [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.		Maroc Phosphore III-IV [Office Chérifien des Phosphates (OCP)]	Plant at Jorf Lasfar Industrial Park	5,800,000
Do.		Office Chérifien des Phosphates Group (OCP)	do.	3,200,000
Do.		Pakistan Maroc Phosphore S.A. (PMP)	do.	1,300,000

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
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, Draa Sfar, and Tighardine Polymetallic Mines, Marrakech Region	170,000
Do.	Companie Mienere de Touissit (CMT) (Emerging Capital Partners, 50%, and Truffle Capital, 50%)	Tighza Mining Center, M'rirt, Draa-Tafilalet Region	5,000
Do.	Société Mineral et Substances	Mine at Lalla Mimouna, Taza	NA
Ore	Artisanal miners supervised by Central d'Achat et de Développement de la Région Minière duTafilalet et de Figuig (CADETAF)	Mines at Errachidia, Figuig, and Tafilate, Draa-Tafilalet Region	10,000

Do., do. Ditto. NA Not available.

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