



# 2019 Minerals Yearbook

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**IRAN [ADVANCE RELEASE]**

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# THE MINERAL INDUSTRY OF IRAN

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In 2019, Iran's hydrocarbon sector, which included the production of natural gas and crude petroleum, the refining of crude petroleum, and the distribution of hydrocarbons, played a significant role in the country's economy. Among mineral fuels, Iran was the world's third-ranked producer of natural gas after the United States and Russia, accounting for 6.1% of world output. In addition, Iran was the world's eighth-ranked producer of crude petroleum and condensate, accounting for a combined 3.7% of output. Iran was a member of the Organization of the Petroleum Exporting Countries (OPEC). Iran was the world's 2d-ranked producer of direct-reduced iron (DRI) (accounting for 26.4% of the world's output); the world's 2d-ranked producer of mined gypsum (accounting for 10.8% of output); 6th-ranked producer of cement (1.5%) and feldspar (3.3%); 8th-ranked producer of bentonite (2.2%) and molybdenum (1.2%); 9th-ranked producer of barite (2.3%); 10th-ranked producer of kaolin (1.8%); and 11th-ranked producer of iron ore (1.4%) (table 1; BP p.l.c., 2020, p. 16, 34; Midrex, 2020, p. 8; Organization of the Petroleum Exporting Countries, 2020, p. 5; Brioche, 2021; Crangle, 2021; Hatfield, 2021; McRae, 2021; Polyak, 2021; Simmons, 2021; Tuck, 2021).

Among those countries for which estimates of reserves were available, Iran was estimated to hold the world's second largest (behind Russia) natural gas reserves, accounting for 16.1% of proven worldwide natural gas reserves, and the world's fourth-largest crude petroleum reserves, accounting for 9.0% of proven worldwide crude petroleum reserves in 2019. Iran also held the world's 2d largest feldspar reserves, the 6th largest barite reserves, the 9th largest iron ore reserves, and the 10th largest fluor spar reserves (BP p.l.c., 2020, p. 14, 32; Ghalayini, 2020; McRae, 2020a, b; Tuck, 2020).

## Minerals in the National Economy

In 2019, the real gross domestic product (GDP) of Iran decreased by 6.5% compared with a decrease of 5.4% (revised) in 2018. The World Bank estimated Iran's nominal GDP to be \$440 billion. In 2019, the hydrocarbon sector contributed 7.4% of the GDP compared with 13.0% in 2018; the mining and manufacturing's sector share of the GDP was 16.1% compared with 14.7% in 2018. During the year, the hydrocarbon and mining and manufacturing sectors were negatively affected by a decrease in international commodity prices and by the reimposition of international sanctions by the United States that started in November 2018 [the United States pulled out of the Joint Comprehensive Plan of Action (JCPOA) of 2015 in May 2018]. Several Executive orders by the United States Government for additional economic sanctions on Iran during the year also contributed towards a decrease in Iran's exports and production. The JCPOA had stipulated the removal of some economic sanctions, such as those that prohibited foreign companies from investing in mineral-related facilities and fields, as well as trade in petroleum, petroleum products, gold and

other precious metals, graphite, raw and semifinished metals (such as aluminum and steel), and coal (Central Bank of the Islamic Republic of Iran, 2020, p. 2; Congressional Research Service, 2020, p. 3, 19, 31–32, 39–40, 52–54; International Monetary Fund, 2020, p. 146; World Bank, The, 2020).

## Government Policies and Programs

The Government-owned holding company Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), which was established in 2001, is responsible for the formulation and implementation of the country's policies on mineral exploration and mining, mine and plant construction and development, and royalty rates on mineral production. The Ministry of Industry, Mine, and Trade (MIMT) issues mineral exploration and mining licenses. The Mining Act of 1998 based on Articles 44 and 45 of Chapter 4 of the 1978 Constitution of the Islamic Republic of Iran and amendments to the Mining Act of 2013 govern the activities of the mineral sector in Iran. The Ministry of Petroleum (MOP), which was established in 1979, is responsible for supervising exploration, extraction, marketing, and selling of crude petroleum, natural gas, and petroleum products. The Petroleum Act of 1987 and amendments in 2011 define the Government's authority in the petroleum sector (Kardel, 2017, p. 141, 148; Iran International Magazine, 2018, p. 12; Extractiveshub, 2020, p. 7–8; Iran Ministry of Petroleum, 2020; Iranian Mines and Mining Industries Development and Renovation Organization, [undated]; Iran Ministry of Industry, Mine, and Trade, 2015, [undated]).

The Iranian Integrated Petroleum Contract (IPC) was adopted in 2016 to attract foreign investment and technology to spur development of upstream crude petroleum and natural gas projects, although Iran's Constitution prohibits foreign or private majority ownership of natural resources. Under the IPC, new contract terms are set for a maximum of 20 years, with the possibility of a 5-year extension for enhanced petroleum recovery projects. The IPC requires that contracts involving the exploration, development, or production phases have Iranian ownership of at least 51% (U.S. Energy Information Administration, 2019, p. 3).

## Production

Notable increases in Iran's mineral production in 2019 compared with that in 2018 included that of bituminous and metallurgical coal, both of which increased by 22%; refined secondary copper, by 16%; and DRI and natural gas liquids, by 11% each. Notable decreases in production included smelted primary magnesium, which decreased by 100% (to zero); magnesite, by 81%; molybdenum, by 59%; crude petroleum, by 26%; and primary aluminum metal, by 17%. Data on mineral production are in table 1.

## Structure of the Mineral Industry

The Government controlled most large-capacity mineral companies through IMIDRO. The leading IMIDRO subsidiaries were Almahdi Aluminium Co. (aluminum and lime), Esfahan Steel Co. (ESCO) (steel), Iran Alumina Co. (alumina), Iranian Aluminium Co. (IRALCO) (aluminum), Iran Minerals Production and Supply Co. (IMPASCO) (multiple minerals), Iran Zinc Mines Development Co. (lead and zinc), Khouzestan Steel Co. (KSC) (steel), Mobarakeh Steel Co. (MSC) (steel), and National Iranian Copper Industries Co. (NICICO) (copper and molybdenum). The National Iranian Oil Co. (NIOC) was responsible for exploration and production of petroleum and natural gas. The Atomic Energy Organization of Iran (AEOI) was engaged in the exploration, mining, and treatment of uranium. Table 2 is a list of major mineral industry facilities (Iran International Magazine, 2017, p. 34, 46, 50, 90, 102–103; U.S. Energy Information Administration, 2019, p. 2; World Nuclear Association, 2020).

## Mineral Trade

Mineral fuels accounted for about 49% of Iran's total exports of \$59.4 billion in 2019 compared with 65% of the \$93.4 billion total in 2018; the decrease in the value of mineral fuel exports and their percentage of total exports was a response to the re-imposition of international sanctions by the United States and a decrease in global crude petroleum prices. Iran's crude petroleum exports decreased to 0.651 million barrels per day (Mbb/d) in 2019 from 1.850 Mbb/d in 2018; the Asia and the Pacific region was the leading destination for Iran's crude petroleum exports. Iran exported 16.9 billion cubic meters of natural gas in 2019 compared with 12.1 billion cubic meters in 2018; Turkey was the leading destination for Iran's natural gas exports. Imports of natural gas and petroleum products were valued at \$6 million in 2019 compared with \$1.4 billion in 2018. Iran's total imports were valued at \$52.2 billion in 2019 compared with \$60.8 billion in 2018 (table 1; BP p.l.c., 2019, p. 41; 2020, p. 43; Central Bank of the Islamic Republic of Iran, 2020, p. 14; Organization of the Petroleum Exporting Countries, 2020, p. 46).

Iran's nonfuel mineral exports were valued at \$8.5 billion in 2019 compared with \$9.2 billion in 2018. Steel and steel products accounted for a significant share of nonfuel mineral exports and were valued at about \$4.5 billion in 2019, which was an increase of about 10% compared with the nonfuel mineral export value of \$4.1 billion in 2018. Iran's exports of copper and copper products increased by about 35% to \$1.2 billion from \$0.9 billion in 2018. Other noteworthy mineral commodities that Iran exported included antimony, alumina, aluminum, cement, clay, lead, mica, nickel, precious metals (such as gold and silver), titanium, and zinc (Thomson Reuters, 2019; Eghtesadonline, 2020b).

## Commodity Review

### Metals

**Bauxite and Alumina and Aluminum.**—Bauxite production in Iran in 2019 decreased by 3.1% to an estimated 780,000 metric tons (t) compared with about 805,000 t (revised) in 2018.

During the year, the Government remained focused on developing its bauxite interests in Guinea, namely the Société des Bauxites de Dabola-Tougué (SBDT) bauxite project. In 2018, Mines and Metals Engineering GmbH (an Iranian firm registered in Germany) started the process of prequalification of bidders for the SBDT bauxite project, which was a joint venture between IMIDRO (51%) and the Government of Guinea (49%). The project required engineering design, machinery supply, and construction work—including crushing, storing, and grinding units—and transferring slurry through a 325-kilometer pipeline. By the end of 2019, no announcement had been made of the winning bid for the project. IMIDRO planned to start up the mine by 2025 with an annual production capacity of from 4 to 6 million metric tons per year (Mt/yr) of bauxite; IMIDRO planned to export the bauxite back to Iran for use in Iran's aluminum industry (Thomson Reuters, 2016; Financial Tribune, 2018).

Aluminum production in Iran in 2019 decreased by 17% to 290,000 t (estimated); alumina production was unchanged from that of 2018 at a revised estimate of 235,000 t. Iran's total aluminum and alumina production capacity was about 530,000 metric tons per year (t/yr) and 280,000 t/yr, respectively. Iran Alumina Co. completed construction and started production of aluminum at its Jajarm Aluminum Complex in March 2019 (officially inaugurated in July 2019). The new plant, which was constructed at a cost of \$136 million, had an annual production capacity of 40,000 t/yr of aluminum and was located in North Khorasan Province. South Aluminum Co. (SALCO) continued to develop an aluminum smelter in Bushehr Province; the smelter's first phase, which would have an aluminum capacity of 300,000 t/yr, was delayed until 2020. SALCO's ownership in the plant was 51% by Iran's Ghadir Investment Co and 49% by IMIDRO. Two additional phases, which would increase the smelter's capacity to 1 Mt/yr, were targeted for completion by 2025 (Onstad, 2018; Financial Tribune, 2019a; Iran-Daily.com, 2019; MiningNewsPro, 2019; Economist, The, 2020).

**Copper.**—Iran produced 295,800 t of copper from concentrate in 2019, which was a decrease of 1.7% from the 300,800 t (revised) produced in 2018. NICICO's copper concentrate production capacity in 2019 was 1.2 Mt/yr, and was mostly accounted for by its three largest mines—Miduk (located in Kerman Province), Sarcheshmeh (located in Kerman Province), and Sungun (located in Azerbaijan Province). During the year, NICICO continued to develop the Der Alo copper mine, which was also located in Kerman Province. The mine was expected to have the capacity to produce 130,000 t/yr of copper concentrate and had a planned start date of between March 2021 and early 2022. NICICO planned to expand its copper concentrate production capacity to 2.5 Mt/yr by 2025 (table 2; Iran-daily.com, 2018; Financial Tribune, 2020c; Flanagan, 2020).

**Iron and Steel.**—In 2019, Iran's iron ore production decreased by 9.2% to 33.1 Mt from 36.4 Mt in 2018. In September, the Government imposed a 25% export duty on unprocessed raw materials, such as unprocessed iron ore exports. As a result, iron ore exports decreased to 6.0 Mt, which was a decrease of 65% from the 17.0 Mt exported in 2018. China remained the leading export destination for Iran's iron ore exports in 2019, receiving

nearly 90% of Iran's iron ore exports (Financial Tribune, 2020a; Iran-daily.com, 2020; Zhang and Singh, 2020).

Iran's production of DRI increased by 10.8% to 28.5 Mt from 25.8 Mt in 2018. In October, Pasargad Steel Complex Co. (PASCO) started a 1.5-Mt/yr DRI plant in Shiraz, Fars Province. The plant, which was designed to have a production capacity of 1.8 Mt/yr of DRI, was expected to be commissioned in 2021. PASCO also had a second DRI plant under construction in 2019; production from this plant was for export. In November, Baft Steel Co. inaugurated a 0.8 Mt/yr DRI plant in Baft, Kerman Province (table 1; Eghtesadonline, 2019a; Midrex, 2020, p. 12–13; Pasargad Steel Complex Co., 2020).

Iran's production of raw steel increased by about 1.1 Mt, or 4%, to 25.6 Mt in 2019, which was a record-high level. The increase in steel production was primarily owing to an increase in international demand for steel, which helped to increase Iran's steel exports by 22% to 10.4 Mt. The leading destinations of Iran's steel exports were China and countries in Southeast Asia. Iranian steel companies that together accounted for more than 60 percent of the steel exports were KSC, which exported 1.8 Mt of steel; MSC, 1.5 Mt; ESCO, 1.2 Mt; Hormozgan Steel Co., 0.8 Mt; and Kish South Kaveh Steel Co. (SKS), 0.7 Mt. According to Iran's MIMT, Iran's total steel production capacity at the end of 2019 was about 35 Mt/yr; the Government's goal was to reach 55 Mt/yr of steel production capacity by 2025. The Organisation for Economic Co-operation and Development reported that Iran had about 28 steel plants either under construction or in the planning stages during 2019 (Organisation for Economic Co-operation and Development, 2019, p. 23–24; Eghtesadonline, 2020a; Financial Tribune, 2020b; SteelOrbis, 2020).

**Lead and Zinc.**—In 2019, lead (Pb content) production increased slightly to 50,000 t (estimated) and zinc (Zn content) production was unchanged at 140,000 t (estimated). The two largest zinc and lead mines in Iran were the Mehdiabad Mine and the Angouran Mine. The Mehdiabad Mine had reserves of about 75 Mt at an average grade of 6% zinc and 2.7% lead, whereas the Angouran Mine had reserves of about 16 Mt of ore at an average grade of 26% zinc and 6% lead; reserves data are from 2017, which was the latest year for which data were available. In 2019, IMIDRO and a consortium of six private companies continued to develop a \$1 billion expansion of the Mehdiabad Mine that would increase its production capacity to 800,000 t/yr of zinc concentrate and 80 t/yr of lead and silver concentrate. The project to expand Mehdiabad had been under consideration since the 1990s but had faced multiple delays. The Mehdiabad Mine was expected to become the main supplier of zinc and lead after zinc deposits in the Angouran Mine become depleted, and Mehdiabad was projected to be in operation for about 20 years (Angel, 2017; Iran International Magazine, 2017, p. 52–53, 102–103; Mehdiabadmin, 2019).

### *Industrial Minerals*

**Barite.**—Iran's production of barite increased slightly to an estimated 202,000 t in 2019. The increase in production was likely owing to an increase in demand for drilling material by the domestic crude petroleum and natural gas industries, and an increase in demand for exports in the Middle East region,

especially to Qatar. In 2019, Mehdiabad Zinc Co., which had a production capacity of 500,000 t/yr, was the primary producer of barite in Iran; the Mehdiabad Mine was located in Yazd Province in central Iran (table 2; Mehdiabadmin, [undated]).

**Cement.**—Iran's production of cement increased by more than 3% to an estimated 60 Mt in 2019. In March, the Monde Dashti cement plant was inaugurated in Bushehr Province. The plant, which was owned by Ghadir Investment Co., was built at a cost of \$90 million and had an annual production capacity of 1.2 Mt/yr of cement. The largest cement producer in Iran was Fars and Khuzestan Cement Co., which had a production capacity of about 31 Mt/yr of cement. Other leading cement producers in Iran were Tehran Cement Co., which had the capacity to produce about 15 Mt/yr of cement capacity; Bank Melli Iran Investment Co. and Ghadir Investments Co., each with about 9 Mt/yr of cement production capacity; and Espandar Cement Investment Co., with about 5 Mt/yr of cement production capacity. Iranian officials planned to expand the country's total cement production capacity to 120 Mt/yr by 2025 (table 2; Eghtesadonline, 2019b; Global Cement, 2019).

**Gypsum.**—Iran's production of gypsum was estimated to be 16 Mt in 2019. The leading Province for gypsum production in Iran was Semnan Province in north-central Iran, which was estimated to produce about 10 Mt/yr of gypsum. Other leading Provinces for gypsum production in Iran were Bushehr Province and Hormozgan Province in southern Iran and Tehran Province in northern Iran, which, together, were estimated to produce nearly 6 Mt/yr of gypsum (table 2; Semnan Gypsum Co., 2017; Financial Tribune, 2019b; Jonoub Gypsum Co., [undated]).

### *Mineral Fuels, Related Materials, and Other Sources of Energy*

Iran's primary energy supply sources for consumption continued to be natural gas (65.2%) and crude petroleum and petroleum products (31.8%) in 2019. Coal, hydroelectricity, and nuclear energy sources accounted for the remaining 3.0% of the country's energy supply. In April 2019, Iran's Power Generation and Distribution Company (TAVANIR) reported that heavier than normal rainfall earlier in the year had contributed to a significant increase of hydroelectric power. TAVANIR also noted that Iran's power generation capacity was about 81,000 megawatts (MW), of which the share of hydroelectric power was nearly 20%. In May, Iran's Energy Ministry announced plans to inaugurate 22 additional hydroelectric units with a total capacity of 3,933 MW during the year as well as upgrade and increase the efficiency of existing hydropower plants to add another 461 MW of new capacity (Tehran Times, 2019; BP p.l.c., 2020, p. 9).

**Coal.**—In 2019, Iran's coal production was estimated to be 2.00 Mt, which was an increase of 20% compared with an estimated 1.64 Mt (revised) produced in 2018. During the year, construction continued on the Tabas power station, which was a billion-dollar coal-fired plant that began to be constructed in 2012. The powerplant was expected to have two units with a combined capacity of 650 MW. The plant, which was located near Tabas, was expected to source about 2 Mt of coal annually from the nearby Mazino coal deposit in the Tabas coal region. The new plant was a partnership between Iran's MAPNA Group

and China's Shanghai Electric Group Co. Ltd. (Modern Power Systems, 2018; U.S. Energy Information Administration, 2018a; Financial Tribune, 2020d).

**Natural Gas.**—Iran remained the third-ranked producer of natural gas in the world in 2019 as its production increased by 2.1% to 253.8 billion cubic meters; the production increase was owing primarily to the continued development of phases in the South Pars offshore (Persian Gulf) natural gas field. South Pars accounted for more than 50% of Iran's gross natural gas output and held about 40% of its total proven natural gas reserves. The field was managed by Pars Oil and Gas Co., which was a subsidiary of NIOC. In March 2019, the Minister of Petroleum inaugurated South Pars Phases 13, 22, 23, and 24. Overall, 22 of the planned 24 phases (about 90%) of the South Pars project were operating by the end of 2019. Phase 14 of the South Pars project was expected to start operating in 2020 and Phase 11 was expected by 2022. In December 2018, China National Petroleum Company (CNPC), which Iran had selected to develop Phase 11, announced that it had suspended its investments in Phase 11. In October 2019, the Government of Iran confirmed that CNPC had officially exited from the \$5 billion project in response to the United States reimposing sanctions on Iran as part of the United States withdrawal from the JCPOA. The Minister of Petroleum announced that domestic company Petropars Co. had taken full control of developing Phase 11 (table 2; Aizhu, 2018; Mehr News Agency, 2019; Oil and Gas Journal, 2019; U.S. Energy Information Administration, 2019, p. 11–12; Organization of the Petroleum Exporting Countries, 2020, p. 79).

In September 2019, NIOC signed a \$440 million contract with Petropars for the development of the Bilal offshore natural gas field. The Bilal field, which is located east of the South Pars field in the Persian Gulf and shared equally with Qatar, was estimated to contain about 183 million barrels (Mbbbl) of recoverable gas condensate reserves. In October 2019, NIOC announced the discovery of a significant natural gas deposit in Pars Province in southern Iran. NIOC estimated that the Eram reservoir holds as much as 538 billion cubic meters (19 trillion cubic feet) of natural gas and 385 (Mbbbl) of condensates with an estimated value of \$40 billion. NIOC expected to begin development on the Eram reservoir during the next 2 to 3 years (Offshore Energy, 2013; Eqbali, 2019; Sourav, 2019).

**Petroleum and Petroleum Refinery Products.**—Iran's production of crude petroleum (including condensates) decreased by 26.4% to 1.29 billion barrels (Gbbl) in 2019 from 1.75 Gbbl (revised) in 2018. Iran's ranking among the world's largest crude petroleum producers declined to eighth; Iran ranked fourth in the Middle East behind Saudi Arabia, which produced 4.32 Gbbl in 2019; Iraq, 1.74 Gbbl; and the United Arab Emirates, 1.46 Gbbl. Iran's decrease in production was primarily owing to a decrease in exports related to the United States withdrawal from the JCPOA (U.S. Energy Information Administration, 2018b; BBC, 2019b; BP p.l.c., 2020, p. 16).

In November 2019, the Ministry of Petroleum announced a significant petroleum discovery at the Namavaran oilfield located in Khuzestan Province in southwestern Iran. The discovery increased the estimated reserves at the Namavaran oilfield to 53 Gbbl of crude petroleum, which was an increase

of 22 Gbbl. The Ministry noted that the newly discovered petroleum was very dense and heavy, which could make it difficult to extract. The Namavaran oilfield could become Iran's second-largest oilfield after the Ahvaz oilfield, which contains 65 Gbbl (BBC, 2019a; Gupta, 2019).

Iran's total crude refinery capacity was 2.20 Mbbbl/d in 2019, and its refineries produced 1.71 Mbbbl/d, which was an increase of 0.9% compared with the 1.69 Mbbbl/d produced in 2018. The top three locations with refinery capacity in Iran were Abadan, 0.40 Mbbbl/d; Esfahan, 0.38 Mbbbl/d; and Bandar Abbas, 0.34 Mbbbl/d. In May 2019, the Ministry of Petroleum announced that a new unit at the Esfahan refinery would be built to process mazut (a heavy, low-quality fuel oil) at a cost of \$670 million and was expected to be completed within 3 years; the new unit would be built by Nargan Co. The Ministry noted that a similar unit was already operating at the Abadan refinery and that others were being planned at the Bandar Abbas, Tabriz, and Tehran refineries. Iran's refinery production capacity ranked second among the OPEC member countries; Saudi Arabia ranked first with 2.9 Mbbbl/d of refinery capacity. Other leading OPEC countries with refinery production capacity in 2019 were Venezuela, 1.89 Mbbbl/d; the United Arab Emirates, 1.12 Mbbbl/d; Iraq, 0.76 Mbbbl/d; Kuwait, 0.74 Mbbbl/d; and Algeria, 0.66 Mbbbl/d. OPEC's overall total refinery capacity in 2019 was 11.2 Mbbbl/d, which represented about 11% of the world total of 101.0 Mbbbl/d (Financial Tribune, 2019c; Organization of the Petroleum Exporting Countries, 2020, p. 32–34, 36).

**Uranium.**—Iran's total uranium production was estimated to be 71 t of uranium content. The AEOI's uranium mining operations in Iran in 2019 were at the Gachin Mine (open pit) and the Saghand Mine (underground). The Bandar Abbas uranium plant produced about 21 t/yr of uranium from the Gachin Mine through acid leaching, which was then delivered to the Esfahan conversion plant. Uranium ore was also extracted at the Saghand Mine, which had resources of 500 t of contained uranium at a grade of 0.0385% uranium; the associated Ardakan uranium plant was expected to produce 50 t/yr of uranium from Saghand ore using acid leaching. The Saghand-Ardakan operation produced an estimated 40 t of uranium in 2017 (the most recent year for which data were available). The Nuclear Energy Agency and International Atomic Energy Agency estimated Iran's recoverable uranium resources in early 2019 to be 3,200 t of contained uranium. Iran's uranium mining operations and processing facilities were part of its broader nuclear program, which also included nuclear powerplants, nuclear research sites, a research reactor, and uranium enrichment plants (Nuclear Energy Agency and International Atomic Energy Agency, 2020, p. 20; World Nuclear Association, 2020).

## Outlook

Iran's real GDP is projected to decrease to 5.0% in 2020 and to 3.2% in 2021, according to the International Monetary Fund (2020, p. 146). The economy is expected to continue to be negatively affected by international sanctions as well as weak international demand for crude petroleum and natural gas in 2020. Nonetheless, production of mineral commodities is

expected to increase owing to numerous production-capacity-expansion projects, especially for metals and mineral fuels, which are either currently in progress or are planned. Noteworthy increases in production are expected from the SALCO aluminum smelter, the Der Afo copper mine, the PASCO's DRI plants, and the Mehdiabad lead-silver-zinc mine. Notable increases are also expected in the production of coal to power the Tabas power station, and in the South Pars natural gas field. Maintenance of current levels of hydrocarbon output in the country will depend on technological upgrades, development of new fields, and the full lifting of international sanctions on Iran to allow increased exports (International Monetary Fund, 2020, p. 146).

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TABLE 1  
IRAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons, gross weight, unless otherwise specified)

Commodity <sup>2</sup>	2015	2016	2017	2018	2019
<b>METALS</b>					
<b>Aluminum:</b>					
Bauxite	861,604	860,000 <sup>r,c</sup>	1,046,634 <sup>r</sup>	805,231 <sup>r</sup>	780,000 <sup>c</sup>
Alumina	241,000	233,000 <sup>r,c</sup>	240,000 <sup>c</sup>	235,000 <sup>r,c</sup>	235,000 <sup>c</sup>
Metal, primary	355,000	341,000 <sup>r,c</sup>	338,000 <sup>r,c</sup>	350,000 <sup>c</sup>	290,000 <sup>c</sup>
Antimony, mine, Sb content <sup>c</sup>	330	500	300	600	600
<b>Chromium, mine, chromite, concentrate:</b>					
Gross weight	391,618 <sup>r</sup>	419,859 <sup>r</sup>	292,209 <sup>r</sup>	119,456 <sup>r</sup>	122,083
Cr <sub>2</sub> O <sub>3</sub> content <sup>c</sup>	173,000 <sup>r</sup>	185,000 <sup>r</sup>	129,000 <sup>r</sup>	53,000 <sup>r</sup>	54,000
<b>Copper:</b>					
Mine, ore, 0.6% to 1.2% Cu:					
Gross weight	44,500,000	47,000,000 <sup>c</sup>	50,500,000 <sup>r,c</sup>	53,000,000 <sup>r,c</sup>	52,000,000 <sup>c</sup>
Cu content	246,400	289,300	295,600	316,500 <sup>r</sup>	315,000 <sup>c</sup>
Concentrates, 29% to 35% Cu, Cu content	233,400	275,900	288,900	300,800	295,800
Solvent extraction <sup>3</sup>	13,000	13,400	13,200	15,700	16,400
Smelter					
Primary	153,500	153,400	114,200	204,100	201,100
Secondary	82,100	72,200	70,900	100,300	109,100
Refinery:					
Primary:					
Leaching, electrowon	13,000	13,400	13,200	15,700	16,400
Other	113,900	125,700	90,000	149,600	160,400
Total	127,000	139,000	103,000	165,000	177,000
Secondary	59,900	61,700	57,000	73,300	84,700
Gold, mine, Au content <sup>c</sup>	3,500	4,500 <sup>r</sup>	7,000 <sup>r</sup>	7,600 <sup>r</sup>	7,600
<b>Iron ore, mine:</b>					
Gross weight	48,427	45,890	33,967	36,435	33,093
Fe content	31,800	30,100	22,200	23,900	21,700
<b>Iron and steel:</b>					
Direct-reduced iron	14,546	16,013	19,401	25,750	28,520
Pig iron	2,459	2,251	2,293	2,362	2,530
Raw steel, ingots and castings	16,146	17,895	21,236	24,520 <sup>r</sup>	25,609
<b>Lead:<sup>c</sup></b>					
Mine, concentrate					
Gross weight	87,000	90,000	92,000	92,000	96,000
Pb content	40,800	47,000	48,000	48,000	50,000
Refinery:					
Primary	30,000 <sup>r</sup>	22,000 <sup>r</sup>	29,000 <sup>r</sup>	25,000 <sup>r</sup>	24,000
Secondary	100,000 <sup>r</sup>	108,000 <sup>r</sup>	103,000 <sup>r</sup>	100,000 <sup>r</sup>	98,000
Magnesium, metal, primary <sup>c</sup>	1,000	2,000	3,000	1,000	--
<b>Manganese, mine:<sup>c</sup></b>					
Gross weight	86,500	79,000	101,000 <sup>r</sup>	129,000 <sup>r</sup>	134,000
Mn content <sup>c</sup>	35,000	31,900	38,800	44,900	45,000
Mercury, Hg content	14	2 <sup>r</sup>	3 <sup>r</sup>	-- <sup>c</sup>	-- <sup>c</sup>
<b>Molybdenum, mine, concentrate:</b>					
Gross weight <sup>c</sup>	7,000 <sup>r</sup>	6,200 <sup>r</sup>	6,400 <sup>r</sup>	3,400 <sup>r</sup>	1,400
Mo content	3,600 <sup>r</sup>	3,100 <sup>r</sup>	3,300 <sup>r</sup>	1,700 <sup>r</sup>	700
Silver, mine, Ag content <sup>c</sup>	48,000 <sup>r</sup>	50,000 <sup>r</sup>	50,000 <sup>r</sup>	50,000 <sup>r</sup>	50,000
<b>Zinc:</b>					
Mine, concentrate:					
Gross weight	252,000	270,000 <sup>c</sup>	280,000 <sup>c</sup>	260,000 <sup>c</sup>	270,000 <sup>c</sup>
Zn content	124,000	135,000	140,000 <sup>c</sup>	140,000 <sup>c</sup>	140,000 <sup>c</sup>
Smelter					
	138,000	135,000	140,000	140,000 <sup>r,c</sup>	140,000 <sup>c</sup>

See footnotes at end of table.

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

(Metric tons, gross weight, unless otherwise specified)

Commodity <sup>2</sup>	2015	2016	2017	2018	2019
<b>INDUSTRIAL MINERALS</b>					
Arsenic trioxide <sup>c</sup>	110	-- <sup>r</sup>	400 <sup>r</sup>	-- <sup>r</sup>	--
Barite	340,318	399,750	239,132 <sup>r</sup>	201,721 <sup>r</sup>	202,000 <sup>e</sup>
Boron, borates	675	-- <sup>r,e</sup>	1,150 <sup>r</sup>	1,200 <sup>r</sup>	1,200 <sup>e</sup>
Celestite	36,760	37,000 <sup>e</sup>	37,000 <sup>e</sup>	37,000 <sup>e</sup>	37,000 <sup>e</sup>
Cement, hydraulic	thousand metric tons	58,600	55,000 <sup>e</sup>	55,000 <sup>e</sup>	58,000 <sup>e</sup>
Clay: <sup>c</sup>					
Bentonite	436,000	356,000	518,000 <sup>r</sup>	424,000 <sup>r</sup>	425,000
Kaolin	792,000 <sup>r</sup>	870,000 <sup>r</sup>	860,000 <sup>r</sup>	1,160,000 <sup>r</sup>	1,160,000
Diatomite <sup>c</sup>	9,500	9,500	2,660 <sup>r</sup>	3,000 <sup>r</sup>	3,000
Feldspar <sup>c</sup>	1,000,000 <sup>r</sup>	1,120,000 <sup>r</sup>	1,340,000 <sup>r</sup>	2,060,000 <sup>r</sup>	2,100,000
Fluorspar	39,286	70,820	55,297 <sup>r</sup>	55,000 <sup>r,e</sup>	55,000 <sup>e</sup>
Gemstones, turquoise <sup>c</sup>	kilogram	21,000	21,000	21,000	21,000
Gypsum	thousand metric tons	20,000	16,377	16,000 <sup>e</sup>	16,000 <sup>e</sup>
Lime <sup>c</sup>	do.	2,800	2,900	3,100	3,450
Magnesite	165,073	151,881	155,916	130,000 <sup>r,e</sup>	25,000 <sup>e</sup>
Mica <sup>c</sup>	5,600	1,500	1,500	1,500	1,500
Nitrogen, N content:					
Ammonia	2,641,900	3,000,000 <sup>e</sup>	3,400,000	3,700,000 <sup>r,e</sup>	3,500,000 <sup>e</sup>
Urea <sup>c</sup>	1,800,000	2,200,000	2,400,000	2,800,000	2,800,000
Perlite	63,030	17,083	24,000 <sup>r,e</sup>	72,000 <sup>r,e</sup>	72,000 <sup>e</sup>
Phosphate rock:					
Gross weight <sup>c</sup>	200,000	250,000	280,000 <sup>r</sup>	340,000 <sup>r</sup>	340,000
P <sub>2</sub> O <sub>5</sub> content	65,300	77,900 <sup>e</sup>	89,000 <sup>r,e</sup>	106,000 <sup>r,e</sup>	106,000 <sup>e</sup>
Salt	thousand metric tons	4,450	3,000 <sup>e</sup>	2,800 <sup>r,e</sup>	2,500 <sup>r,e</sup>
Sulfur, byproduct, natural gas and petroleum, S content <sup>c</sup>	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000
Talc <sup>c</sup>	137,000 <sup>r</sup>	119,000 <sup>r</sup>	82,000 <sup>r</sup>	85,000 <sup>r</sup>	85,000
Vermiculite	1,000	1,000 <sup>e</sup>	-- <sup>r,e</sup>	-- <sup>r,e</sup>	-- <sup>e</sup>
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Coal: <sup>c</sup>					
Bituminous	thousand metric tons	109 <sup>r</sup>	121 <sup>r</sup>	138 <sup>r</sup>	164 <sup>r</sup>
Lignite	do.	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	--
Metallurgical	do.	1,100	1,210	1,380	1,480
Coke, metallurgical <sup>c</sup>	do.	1,140 <sup>r</sup>	1,160 <sup>r</sup>	1,240 <sup>r</sup>	1,300 <sup>r</sup>
Natural gas, dry basis <sup>4</sup>	million cubic meters	226,673	226,905	238,003	248,524
Petroleum:					
Crude <sup>5</sup>	thousand 42-gallon barrels	1,406,345	1,675,548 <sup>r</sup>	1,827,555 <sup>r</sup>	1,752,365 <sup>r</sup>
Natural gas liquids	do.	71,175 <sup>r</sup>	79,056 <sup>r</sup>	83,220 <sup>r</sup>	69,715 <sup>r</sup>
Refinery: <sup>4</sup>					
Distillate fuel oil	do.	182,172	179,084	198,852	201,188
Gasoline, motor	do.	141,109	138,714	143,701	145,124
Kerosene	do.	43,034	41,907	43,472	44,640
Residual fuel oil	do.	152,935	147,425	140,051	141,109
Other	do.	88,190	84,985	87,053	84,972
Total	do.	607,000	592,000	613,000	617,000
Uranium, mine, U content <sup>c</sup>		38 <sup>r</sup>	-- <sup>r</sup>	40 <sup>r</sup>	71 <sup>r</sup>

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

<sup>1</sup>Table includes data available through December 22, 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, bromine, caustic soda, clay (unspecified), crude construction materials (such as sand and shell), crushed stone, dimension stone, dolomite, ferroalloys, hafnium oxide, ilmenite, iron oxide pigments, limestone, nepheline syenite, pumice, quartzite, selenium, silica, silicomanganese, soda ash, titanium, uranium, zeolites, and zirconium metal may have been produced, but available information was inadequate to make reliable estimates of output.

<sup>3</sup>The copper content of solvent extraction output at the mine level is the same as electrowinning output because copper produced in the solvent extraction and electrowinning process is typically reported only at the refinery level.

<sup>4</sup>Source: Organization of the Petroleum Exporting Countries, 2020.

<sup>5</sup>Source: BP, p.l.c., 2020.

TABLE 2  
IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina	Iran Alumina Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Plant northeast of Jajarm, Khorasan-e Shomali Province	280
Aluminum	Almahdi Aluminium Co. [(Iranian Mines and Mining Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Plant at Bandar Abbas, Hormozgan Province	257
Do.	Iranian Aluminium Co. (IRALCO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), <sup>1</sup> 60%, and a joint venture of Industrial Development Investment Co. and a subsidiary of Mehr Finance & Credit Institution, 40%]	Arak Aluminium Smelter, Markazi Province	230
Do.	Iran Alumina Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Jajarm Aluminum Complex, North Khorasan Province	40
Barite	Mehdiabad Zinc Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Mehdiabad Mine, Yazd Province	500
Bauxite	Iran Alumina Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Jajarm Mine, about 15 kilometers northeast of Jajarm	900
Celestite	Kani Goharan Kimia Co.	Mine in Bandar Abbas, Hormozgan Province	72
Cement	Abadeh Cement Co.	Plant at Abadeh, Fars Province	393
Do.	Abyek Cement Co. (Fars & Khouzestan Cement Co.)	Plant at Abyek, Qazvin Province, 80 kilometers northwest of Tehran	7,600
Do.	Anarak Special Cement Co.	Plant at Anarak, Markazi Province	500
Do.	Ardebil Cement Co. (Espandar Cement Investment Co.)	Plant at Namin, Ardabil Province	1,220
Do.	Ardestan Cement Co.	Plant north of Esfahan, Esfahan Province	1,300
Do.	Asia West Cement Complex Co. (AWCC)	Plant at Torbat-e-Jam, Khorasan Razavi Province	1,500
Do.	Azar-Abadegan Khoy Cement Co.	Plant at West Azerbaijan Province	1,095
Do.	Behbahan Cement Co. (Fars & Khouzestan Cement Co.)	Plant at Behbahan, Khuzestan Province	800
Do.	Benvid White Cement Co. (Bank Melli Iran Investment Co.)	Plant at Benvid, Esfahan Province	219
Do.	Bojnourd Cement Plant (Fars & Khouzestan Cement Co.)	Plant, about 37 kilometers from Bojnourd, Khorasan-e Shomali Province	1,654
Do.	Bushehr Cement Co. (Dashtestan Cement)	Plant at Borazjan, Bushehr Province	1,095
Do.	Darab Cement Co. [General public (Justice shares), 50%, and Bank Melli Iran Investment Co., 29%]	Plant, about 190 kilometers southeast of Shiraz, Fars Province	1,123
Do.	Dashtestan Cement Co. (Ghadir Investment Co.)	Plant at Borazjan, Bushehr Province	1,400
Do.	Doroud Cement Co. (Fars & Khouzestan Cement Co.)	Plant at Doroud, Lorestan Province	1,245
Do.	East White Cement Co.	Plant, unknown location	330
Do.	Ekbatan Cement Co. (Espandar Cement Investment Co.)	Plant at Ekbatan, Tehran Province	108
Do.	Estahban Cement Co.	Plant, 20 kilometers west of Estahban, Fars Province	350
Do.	Faraz Firouzkhuh Cement Co. (Espandar Cement Investment Co.)	Plant, about 180 kilometers northeast of Tehran	1,205
Do.	Fars Cement Co. (Fars & Khouzestan Cement Co.)	Plant at Shiraz, Fars Province	819
Do.	Farsnov Cement Co. (Fars & Khouzestan Cement Co.)	Plant, about 65 kilometers southeast of Shiraz, Fars Province	1,000
Do.	Firoz Kuh Co. (Bank Melli Iran Investment Co.)	Plant at Tehran, Tehran Province	1,100
Do.	Ghaen Cement Co. (Cement Investment and Development Co., 26%, and Bank Melli Iran Investment Co., 14%)	Plant at Qayen (Ghaen), Khorasan-e Jonubi Province	811
Do.	Gharb Cement Co. (Fars & Khouzestan Cement Co.)	Plant at Kermanshah, Kermanshah Province	1,248
Do.	Gilan Sabz Cement Co. (Tehran Cement Co.)	Plant at Deylaman, Gilan Province	1,200
Do.	Hegmatan Cement Co. (Tehran Cement Co., 79%)	Plant east of Razan, Hamadan Province	2,059
Do.	Hormozgan Cement Co. (Omid Investment Management Corp.)	Plant, about 75 kilometers west of Bandar Abbas, Hormozgan Province	1,872
Do.	Ilam Cement Co. (Tehran Cement Co., 50%; Omid Investment Management Corp., 47%; other private, 3%)	Plant northeast of Ilam, Ilam Province	1,750
Do.	Esfahan Cement Co.	Plant at Esfahan, Esfahan Province	1,168
Do.	Jovein Cement Co.	Plant at Khorasan Province	1,400
Do.	Karoun Cement Co.	Plant near Masjed Soleyman, Khuzestan Province	1,100
Do.	Kavan Boukan Cement Co.	Plant at Bukan, Azarbaijan Gharbi Province	1,250
Do.	Kavir Kashan Cement Co. (Espandar Cement Investment Co.)	do.	690

See footnotes at end of table.

TABLE 2—Continued  
 IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement—Continued	Kerman Cement Co. (Bank Melli Iran Investment Co., 38%)	Plant at Kerman, Kerman Province	1,314
Do.	Khamseh Cement Co.	Plant at Zanjan Province	1,061
Do.	Khash Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Khash, Sistan and Baluchestan Province	811
Do.	Khazar Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Loshan, Gilan Province	1,248
Do.	Khuzestan Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Ramhormoz, Khuzestan Province	2,496
Do.	Kiasar Cement Co. (Espandar Cement Investment Co.)	Plant at Mazandaran Province	690
Do.	Kordestan Cement Co. (Ghadir Investment Co.)	Plant north of Bijar, Kordestan Province	1,500
Do.	Lamerd Cement Co.	Plant at Lamerd, Fars Province	1,250
Do.	Lar-e Sabzevar Cement Co.	Plant at Sabzevar, Khorasan-e Razavi Province	1,030
Do.	Larestan Cement Co.	Plant at Fars Province	1,000
Do.	Loshan Cement Co. (Tehran Cement Co., 66%)	Plant at Loshan, Gilan Province	200
Do.	Margoon Cement Co.	Plant at Kohgiluyeh and Boyer-Ahmad Province	1,000
Do.	Mazandaran Cement Co. (Bank Melli Iran Investment Co., 60%)	Plant at Neka, Mazandaran Province	2,270
Do.	Mehriz Tejarat Cement Co.	Plant, 55 kilometers southeast of Mehriz, Yazd Province	1,460
Do.	Momtazan Cement Co.	Plant at Kerman, Kerman Province	1,030
Do.	Monde Dashti Cement Co. (Ghadir Investment Co.)	Plant at Bushehr Province	1,200
Do.	Nacen Cement Co. (Tehran Cement Co.)	Plant at Esfahan Province	1,650
Do.	Nahavand Cement Co. (Tehran Cement Co.)	Plant at Hamadan Province	1,205
Do.	Neyriz White Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Neyriz, Fars Province	164
Do.	Neyzar Qom Cement Co. (Espandar Cement Investment Co.)	Plant at Qom Province	1,150
Do.	Omran Anarak Cement Co.	Plant at Delijan, Markazi Province	1,030
Do.	Qeshm Cement Co.	Plant at Qeshm Island, Hormozgan Province	510
Do.	Peyvand Golestan Cement Co. (Tehran Cement Co.)	Plant at Golestan Province	1,241
Do.	Safaeh Cement Co.	Plant, unknown location	624
Do.	Saman Gharb Cement Co.	Plant at Kermanshah Province	2,300
Do.	Sarooj Bushehr International Co. (Bank Melli Iran Investment Co.)	Plant at Kangan, Bushehr Province	1,650
Do.	Sarooj Esfahan Cement Co.	Plant at Esfahan Province	600
Do.	Saveh Grey Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Saveh, Markazi Province	2,738
Do.	Saveh White Cement Co. (Fars & Khuzestan Cement Co.)	do.	365
Do.	Sepahan Cement Co. (Ghadir Investment Co.)	Plant at Mobarakeh, Esfahan Province	3,200
Do.	Shahrekor Cement Co.	Plant at Chaharmahal and Bakhtiari Province	1,030
Do.	Shahroud Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Shahroud, Semnan Province	1,872
Do.	Shargh Cement Co. (Ghadir Investment Co.)	Plant at Mashhad, Khorasan-e Razavi Province	2,500
Do.	Shomal Cement Co. (Bank Melli Iran Investment Co., 59%)	Plant at Pardis, Tehran Province	1,550
Do.	Shomal White Cement Co. (Bank Melli Iran Investment Co., 59%)	do.	89
Do.	Soufian Cement Co. (Fars & Khuzestan Cement Co., 50%; and Social Security Organization Investment Co., 50%)	Plant, about 33 kilometers northwest of Tabriz, East Azerbaijan Province	2,184
Do.	Tehran Cement Co.	Plant at Tehran, Tehran Province	5,400
Do.	Urmia Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Orumiyeh, West Azerbaijan Province	1,966
Do.	Urmia White Cement Co.	do.	164
Do.	Yasuj Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Kohgiluyeh and Boyer-Ahmad Province	230
Do.	Yazd Bohrouk Cement Co.	Plant at Yazd, Yazd Province	1,100
Do.	Zabol Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Sistan and Balochestan Province	1,030
Do.	Zanjan Cement Co. (Fars & Khuzestan Cement Co.)	Plant at Zanjan, Zanjan Province	660
Do.	Zarrin Rafsanjan Cement Co.	Plant at Kerman Province	230
Do.	Zaveh Torbat Cement Co.	Plant at Torbat e-Heydariyeh, Khorasan-e Razavi Province	1,092
Chromite, concentrate, Cr <sub>2</sub> O <sub>3</sub> content	Esfandaghe Mines Co.	Abdasht Mine, Kerman Province; Suqan (Saboughan) Mine, Kerman Province; Processing plant at Esfandaghe, Kerman Province	30
Do.	Faryab Mining Co.	Faryab Mine and processing plant, Minab, Hormozgan Province	180 <sup>c</sup>
Do.	Kani Goharan Kimia (KGK)	Mine in Kerman Province	12
Do.	Shahab Sang Co.	Sabzan Mine, Faryab, Kerman Province	5

See footnotes at end of table.

TABLE 2—Continued  
 IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Chromite, concentrate, Cr <sub>2</sub> O <sub>3</sub> content— Continued	NA	Furumad Mine, Shahroud, Semnan Province; Gaft processing plant, Semnan Province	6
Do.	NA	Mir Mahmud Mine, Mayami, Semnan Province	6
Do.	NA	Dumak Mine, Zahedan, Sistan and Baluchestan Province	2
Coal	Iran Minerals Production and Supply Co. (IMPASCO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Eastern Parvadeh Mine, Tabas Province	600
Do.	do.	Khomroud Mine, Kerman Province	450
Do.	do.	Parvadeh 4 Mine, Tabas Province	600
Do.	do.	Parvadeh 2 and 3 Mines, Tabas Province	500
Do.	do.	Kordobad Mine, Savadkouh Province	325
Do.	do.	Hashouni and Pabdana Mines, Kerman Province	150
Do.	do.	Takht and Vatan Mines, Alborz Province	150
Do.	do.	Zemestanyurt Mine, Golestan Province	100
Do.	Kerman Coal Co.	Eshkli Mine and Hamkar Mine, Kerman Province	620
Coke	Esfahan Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Plant about 40 kilometers southwest of Esfahan, Esfahan Province	900
Do.	Middle East Coke Production Co. [[Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Plant at Zanjan, Zanjan Province	800
Do.	Tabas Coke Production Co. [Iranian Mines and Mining Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Plant near Tehran	450
Do.	Zarand Iranian Steel Co. (ZISCO) [The Middle East Mines and Minerals Industries Development Holding Company (MIDHCO)]	Plant at Zarand, Kerman Province	800
Copper:			
Concentrate, Cu content	National Iranian Copper Industries Co. (NICICO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Sarcheshmeh copper complex, south of Rafsanjan, Kerman Province	720
Do.	do.	Sungun Mine and Plant, East Azerbaijan Province	325
Do.	do.	Miduk Mine, Kerman Province	150
Do.	do.	Qal'eh Zari Mine, about 120 kilometers southwest of Birjand, Khorasan-e Jonubi Province	10
Do.	do.	Chah Firozeh, Chah Messi, Darehzar, and Eijo copper mines, Kerman Province	NA
Do.	Private cooperatives	Chah Musa and Qal'eh Sukhteh mines, Semnan Province	5
Smelter output	National Iranian Copper Industries Co. (NICICO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Smelter, Sarcheshmeh copper complex, south of Rafsanjan, Kerman Province	200
Do.	do.	Smelter near Khatoonabad, Kerman Province	120
Refined metal	do.	Refinery, Sarcheshmeh copper complex, south of Rafsanjan, Kerman Province	210
Do.	do.	Refinery, Sungun copper complex in East Azarbaijan Province	100
Do.	do.	Electrowinning plant, Sarcheshmeh copper complex, south of Rafsanjan, Kerman Province	14
Do.	do.	Electrowinning plant, Miduk copper complex, Kerman Province	5
Do.	The Middle East Mines and Minerals Industries Development Holding Company (MIDHCO)	Refinery, Kerman province, 20 km north of Babak City	50
Ferrochrome	Iran Minerals Production and Supply Co. (IMPASCO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Joghatai ferrochrome complex, Khorasan-e Razavi Province	25
Do.	Top Echo Co.	Plant at Rafsanjan in Kerman Province	60

See footnotes at end of table.

TABLE 2—Continued  
 IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Ferrosilicon		The Middle East Mines and Minerals Industries Development Holding Company (MIDHCO)	Plant at Glass Industrial Estate, Malayer, Hamedan Province	12
Gemstones, turquoise		NA	Neyshabur Mine, Khorasan-e Razavi Province	6 <sup>c</sup>
<b>Gold:</b>				
Ore, Au content	kilograms	Iran Minerals Production and Supply Co. (IMPASCO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Moutheh Mine (Chah Khaton and Senjedeh pits), Esfahan Province, and Kuh-e-Zar Mine, Semnan Province	600
Do.	do.	National Iranian Copper Industries Co. (NICICO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Combined production from various copper mines	600
Do.	do.	Zar Kuh Mining Co.	Sari Gunay Mine, 90 kilometers east of Sanandaj, Kordestan Province	2,000
Do.	do.	Zarshouran Gold Mine and Mining Industries Development Company [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Zarshouran Mine, 40 kilometers northeast of Takab, West Azerbaijan Province	3,000
Do.	do.	Artisanal placer operations	Mines in Neyshabur area, Khorasan-e Razavi Province	NA
Metal		do. Zarshouran Gold Mine and Mining Industries Development Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Zarshouran complex, near Takab West Azerbaijan Province	NA
Gypsum		Various local operators	Quarries in Bushehr, Hormozgan, Semnan, and Tehran Provinces	16,000
<b>Iron and steel:</b>				
Iron ore		Ario Iron Ore Mining Group	Ghadir, Kosar, Meshkat, Noor & Farsineh Mines Yazd Province	2,500
Do.		Chadormalu Mining and Industrial Co. [Omid Investment Management Corp., 37%; Mines and Metals Development Investment Co., 15%; Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), <sup>1</sup> 8%]	Chadormalu Mine, 80 kilometers north of Bafq, Yazd Province	16,000
Do.		Gol-e-Gohar Iron Ore Co. [Omid Investment Management Corp., 39%; Mines and Metals Development Investment Co., 28%; Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), <sup>1</sup> 18%]	Gol-e-Gohar Mine, about 50 kilometers southwest of Sirjan, Kerman Province	14,000
Do.		Iran Central Iron Ore Co. [National Iranian Steel Co. (NISCO), 100%]	Choghart Mine, Bafq, Yazd Province	3,250
Do.		Iranian Minerals Production and Supply Co. (IMPASCO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Jalal Abad Mine, about 40 kilometers northwest of Zarand, Kerman Province	2,000
Do.		Do.	Chah Gaz Mine, Yazd Province	700
Do.		Do.	Mishdovan Mine, Yazd Province	500
Do.		Sangan Iron Ore Co. [National Iranian Steel Co. (NISCO)] <sup>2</sup>	Sangan (Songun) Mine, about 140 kilometers southeast of Torbat e-Heydariyeh, Khorasan-e Razavi Province	2,600
Do.		Small privately owned mines (about 20)	Mines in various locations	1,000 <sup>c</sup>
Cast iron		Zagros Steel Co. (Government, majority interest)	Foundry in Kordestan Province	70
Direct-reduced iron		Baft Steel Co. [Iranian Mines and Mining Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Direct-reduction iron plant, Baft, Kerman Province	800
Do.		Chadormalu Mining and Industrial Co. [Omid Investment Management Corp., 37%; Mines and Metals Development Investment Co., 15%; Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), <sup>1</sup> 8%]	Direct-reduction iron plant, Ardakan, Yazd Province	1,550
Do.		Esfahan Steel Co. (ESCO) [National Iranian Steel Co. (NISCO)] <sup>2</sup>	Direct-reduction iron plant about 40 kilometers southwest of Esfahan, Esfahan Province	600
Do.		Gol-e-Gohar Mining and Industrial Co.	Direct-reduction iron plant, Kerman Province	3,260
Do.		Hormozgan Steel Co. [National Iranian Steel Co. (NISCO)] <sup>2</sup> and partners]	Direct-reduction iron plant, Gachin, Hormozgan Province	1,660

See footnotes at end of table.

TABLE 2—Continued  
 IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
<b>Iron and steel:—Continued</b>			
Direct-reduced iron— Continued	Khorasan Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO) <sup>1</sup> majority interest, and a Government pension fund, 40%]	Direct-reduction iron plant, Khorasan-e Razavi Province	1,600
Do.	Khuzestan Steel Co. (KSC) [National Iranian Steel Co. (NISCO)] <sup>2</sup>	Direct-reduction iron plant, Ahwaz, Khuzestan Province	3,820
Do.	Mobarakeh Steel Co. (MSC) [National Iranian Steel Co. (NISCO)] <sup>2</sup>	Direct-reduction iron plant about 50 kilometers southwest of Esfahan, Esfahan Province	8,990
Do.	Pasargad Steel Complex Co. (PASCO) (private, 100%)	Direct-reduction iron plant in Shiraz, Fars Province	1,500
Do.	Persian Gulf Saba Steel Co.	Direct-reduction iron plant, Hormozgan Province	1,500
Do.	Sabzevar Pars Steel Co. (SPSCO)	Direct-reduction iron plants in Khorasan-e Razavi Province	800
Do.	Sirjan Iranian Co.	Direct-reduction iron plant, Kerman Province	1,700
Do.	South Kaveh Steel Co.	Direct-reduction iron plant in Bandar Abbas, Hormozgan Province	1,860
Steel, crude	Arfa Steel Co.	Plant at Ardakan, Yazd Province	800
Do.	Bardsir Steel Co. [The Middle East Mines and Minerals Industries Development Holding Company (MIDHCO)]	Bardsir steel plant, 60 km west of Kerman, Kerman Province	1,000
Do.	Chadormalu Mining and Industrial Co. [Omid Investment Management Corp., 37%; Mines and Metals Development Investment Co., 15%; Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), <sup>1</sup> 8%]	Plant at Ardakan, Yazd Province	1,000
Do.	Esfahan Steel Co. (ESCO) [National Iranian Steel Co. (NISCO)] <sup>2</sup>	Plant about 40 kilometers southwest of Esfahan, Esfahan Province	3,600
Do.	Khorasan Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO) <sup>1</sup> majority interest, and a Government pension fund, 40%]	Plant at Neyshabur, Khorasan-e Razavi Province	1,000
Do.	Khuzestan Steel Co. (KSC) [National Iranian Steel Co. (NISCO)] <sup>2</sup>	Plant at Ahwaz, Khuzestan Province	3,600
Do.	Kish South Kaveh Steel Co. (SKS)	Plant in Hormozgan Province	1,200
Do.	Meibod (Meybod) Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), <sup>1</sup> 50%]	Plant, about 15 kilometers southwest of Meybod, Yazd Province	300
Do.	Mobarakeh Steel Co. (MSC) [National Iranian Steel Co. (NISCO)] <sup>2</sup>	Plant about 50 kilometers southwest of Esfahan, Esfahan Province	7,200
Do.	Saba Steel Co. [National Iranian Steel Co. (NISCO)] <sup>2</sup>	Plant in Esfahan Province	1,600
Do.	Sepid Dasht Steel Co. [National Iranian Steel Co. (NISCO)] <sup>2</sup>	Plant in Lorestan Province	1,000
Do.	Vian Steel Melting and Casting Co.	Plant, about 42 kilometers from Hamadan, Hamadan Province	600
<b>Lead:</b>			
Concentrate, Pb content	Calcimin Co. (Iran Zinc Mines Development Co.)	Dandi zinc and lead concentrator plant, Zanjan Province	30
Do.	Zanjan Zinc Khales Sazan Industrial Group	Zanjan plant, Zanjan Province	20
Refined metal, primary	National Iranian Lead and Zinc Co. (Iran Zinc Mines Development Co.)	Refinery about 12 kilometers east of Zanjan, Zanjan Province	40
Refined metal, secondary	NIRU Manufacturing Co. Ltd.	Several refineries in Tehran	65
<b>Lead and zinc:</b>			
Ore	Bafq Mining Co.	Koushk Mine, Yazd Province	120
Do.	BAMA Co.	Irakouh complex (Gooshfil underground and Tappeh Sorkh open pit mines, about 20 kilometers southeast of Esfahan, Esfahan Province, and Kolah Darvazeh Mine, south of Esfahan, Esfahan Province)	100
Do.	Beroner Tehran Co. (Kahanroba Industrial Group, 100%)	Emarat Mine, about 25 kilometers southwest of Arak, Markazi Province	150
Do.	Iran Zinc Mines Development Co.	Angouran open pit mine, Dandi, Zanjan Province	1,000
Do.	Mehdiabad Zinc Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Mehdiabad Mine, Yazd Province	700

See footnotes at end of table.

TABLE 2—Continued  
 IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Lime	Espandar Lime Complex Co.		Azarshahr plant in Tabriz, East Azerbaijan Province	131
Do.	Do.		Alborz plant in Firoozkooh, Tehran Province	55
Do.	Shargh Industrial Lime Co.		Plant in Mashhad, Khorasan-e Razavi Province	NA
Do.	The Middle East Mines and Minerals Industries Development Holding Company (MIDHCO)		Plant 30 km northwest of Kerman city, Kerman Province	400
Do.	Zangan Zinc Industry LLP (Iran Zinc Mine Development Co.)		Angouran Mine, Dandi, Zanjan Province	40
Magnesite	Birjand Refractory Mining Co. (Iranian Refractories Procurement & Production Co.)		Hoz Sefid, Shirkuhak, and Torshak Mohammadi Mines, about 50 kilometers southeast of Birjand, Khorasan-e Jonubi Province	100
Do.	Kani Goharan Kimia (KGK)		Mine, unknown location	60
Do.	Nokabad Magnesite Co.		Nokabad Mine, Sistan and Baluchestan Province	30
Do.	Persia Payan Madan Co.		Chasiah and Soltan Abad Mines, Tehran Province	50
Magnesium	Royal Metal Ingot Co.		Plant in South Khorasan Province	6
Molybdenum, concentrate	National Iranian Copper Industries Co. (NICICO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>		Molybdenum plant, Sarcheshmeh copper complex, south of Rafsanjan, Kerman Province	8
Do.	do.		Molybdenum plant, Sungun copper complex, East Azerbaijan Province	3
Natural gas	billion cubic meters	National Iranian Oil Co. (NIOC) <sup>1</sup>	Associated gas from company oilfields, onshore	96
Do.	do.	do.	Aghar, Dalan, Kangan, and Nar gasfields, onshore	57
Do.	do.	Pars Oil and Gas Co. [National Iranian Oil Co. (NIOC), 100%] <sup>1</sup>	South Pars gasfields, offshore	227
Petroleum:				
Crude	million 42-gallon barrels	National Iranian Oil Co. (NIOC) <sup>1</sup>	Onshore oilfields include the Agha Jari, the Ahwaz-Asmari, the Bangestan, the Hakimeh, the Gachsaran, the Karanj, the Marun, the Pazanan, and the Rag-e-Safid. Offshore oilfields include the Abouzar and the Salman	1,400
Do.	do.	National Iranian Oil Co. (NIOC) <sup>1</sup> and buyback contract joint venture of Shell Iran Nowrooz/Soroosh Development (70%), JJI S&N B.V. (20%), and Iranian Offshore Engineering & Construction Co. (10%)	Nowrooz and Soroosh fields, offshore	75
Do.	do.	National Iranian Oil Co. (NIOC) <sup>1</sup> and buyback contract joint venture of Total S.A. (55%) and Eni SpA (45%)	Doroud field, offshore	65
Do.	do.	National Iranian Oil Co. (NIOC) <sup>1</sup>	South Azadegan field, Khuzestan Province	52
Do.	do.	National Iranian Oil Co. (NIOC) <sup>1</sup> and buyback contract joint venture of Total S.A. (70%) and PETRONAS Carigali International Sdn Bhd (30%)	Sirri A and E fields, offshore	40
Do.	do.	National Iranian Oil Co. (NIOC) <sup>1</sup> and China National Petroleum Co. (CNPC)	North Azadegan field, Khuzestan Province	27
Do.	do.	National Iranian Oil Co. (NIOC) <sup>1</sup> and buyback contract joint venture of Total S.A. (60%) and Naftiran Intertrade Co. (40%)	Darquain field, Khuzestan Province	17
Refined products	thousand 42-gallon barrels per day	National Iranian Oil Refining and Distribution Co. (NIORDC) <sup>1</sup>	Refinery at Abadan	400
Do.	do.	do.	Refinery at Esfahan	375
Do.	do.	do.	Refinery at Bandar Abbas	340
Do.	do.	do.	Refinery at Tehran	250
Do.	do.	do.	Refinery at Arak	250
Do.	do.	do.	Refinery at Borzuyeh	120
Do.	do.	do.	Refinery at Tabriz	110
Do.	do.	do.	Refinery at Shiraz	60

See footnotes at end of table.

TABLE 2—Continued  
 IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Petroleum:—Continued				
Refined products— Continued	thousand 42-gallon barrels per day	National Iranian Oil Refining and Distribution Co. (NIORDC) <sup>1</sup>	Refinery at Lavan	60
Do.	do.	do.	Refinery at BooAli Sina	34
Do.	do.	do.	Refinery at Kermanshah	22
Do.	do.	do.	Refinery at Aras 2	10
Do.	do.	do.	Refinery at Bushehr	10
Do.	do.	do.	Refinery at Aras 1	5
Do.	do.	do.	Refinery at Yazd	3
Do.	do.	do.	Refinery at Zaranf	1
Phosphate rock		Esfordi Phosphate Complex [Iran Minerals Production and Supply Co. (IMPASCO)] <sup>1</sup>	Mine, about 35 kilometers northeast of Bafq, Yazd Province	360
Potash		Khur and Biabanak Potash Complex [Iran Minerals Production & Supply Co. (IMPASCO)] <sup>1</sup>	Near Khur and Biabanak Mines, Esfahan Province	50
Silver	kilograms	Zarshouran Gold Mine and Mining Industries Development Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Zarshouran Mine, 40 kilometers northeast of Takab, West Azerbaijan Province	2,500
Stone and sand and gravel:				
Limestone		Gohar Khak Bushehr Co.	Quarry in Bushehr Province	730
Do.		IMPASCO [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Pirbakran Limestone Complex, Esfahan Province	2,000
Do.		Iran Alumina Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Jajarm Mine, about 15 kilometers northeast of Jajarm	NA
Do.		Morvarid Bandar Pol (MBP)	Quarry in Bandar Abbas, Hormozgan Province	NA
Limestone and marble		Farzin Rock Stone Co.	Quarry in ShamsAbad Industrial Zone, Tehran	NA
Marble		MGT Stone Co.	Quarry in Sanandaj, Kurdistan Province	NA
Titanium, ilmenite		Kahnuj pilot plant [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Daregaz placer and Kahnuj titanium dioxide processing plant	NA
Uranium	metric tons	Atomic Energy Organization of Iran (AEOI) <sup>1</sup>	Saghand Mine, about 125 kilometers northeast of Yazd, Yazd Province	58
Do.	do.	do.	Gachin Mine, near Bandar Abbas, Hormozgan Province	21
Do.	do.	Atomic Energy Organization of Iran (AEOI) (Government)	Esfahan nuclear conversion plant, Esfahan, Esfahan Province	200
Do.	do.	do.	Fordow nuclear fuel enrichment plant, 20 kilometers north of Qom, Qom Province	21
Do.	do.	do.	Bandar Abbas uranium plant, Bandar Abbas, Hormozgan Province	21
Do.	do.	do.	Natanz nuclear fuel enrichment plant, 80 kilometers southeast of Qom, Qom Province	3
Do.	do.	do.	Esfahan enriched uranium powder plant, Esfahan, Esfahan Province	2
Do.	do.	do.	Arak heavy water reactor, Arak, Markazi Province	NA
Zinc:				
Concentrate, Zn content		Calcimin Co. (Iran Zinc Mines Development Co.)	Dandi (Angouran) plant, Zanjan Province	500
Do.		Zangan Zinc Industry (LLP) (Iran Zinc Mines Development Co.)	Zanjan plant, Zanjan Province	250
Do.		Zanjan Zinc Khales Sazan Industrial Group	do.	200
Do.		Mehdiabad Zinc Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] <sup>1</sup>	Mehdiabad plant, Yazd Province	200

See footnotes at end of table.

TABLE 2—Continued  
 IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Zinc:—Continued			
Refined metal	Calcimin Co. (Iran Zinc Mines Development Co.)	Dandi (Angouran) refinery, Zanjan Province	80
Do.	Zanjan Zinc Khales Sazan Industrial Group	Refinery at Zanjan, Zanjan Province	35
Do.	Bafq Zinc Co. (Iran Zinc Mines Development Co.)	Refinery west of Bafq, Yazd Province	30
Do.	Qeshm Zinc Melting and Reduction Co. (affiliate of Calcimin Co.)	Refinery at Kaveh Industrial Zone, Qeshm Island, Hormozgan Province	20
Do.	Bandar Abbas Zinc Production Co. (affiliate of Calcimin Co.)	Refinery at Bandar Abbas, Hormozgan Province	18
Do.	Faravari Mavad Madani Iran Co. (Iran Zinc Mines Development Co.)	Refinery at Dandi, Zanjan Province	18
Do.	BAMA Co.	Refinery at Esfahan	15
Do.	National Iranian Lead and Zinc Co. (Iran Zinc Mines Development Co.)	Refinery about 12 kilometers east of Zanjan, Zanjan Province	15
Do.	Sane Rooy Zanjan Co.	Refinery at Zanjan, Zanjan Province	11
Do.	Calcimin Co. (Iran Zinc Mines Development Co.)	do.	4

<sup>e</sup>Estimated. Do., do. Ditto. NA Not available.

<sup>1</sup>Government owned.

<sup>2</sup>A subsidiary of state-owned Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO).