

2011 Minerals Yearbook

IRAN [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF IRAN

By Philip M. Mobbs

The mineral industry held a very prominent role in the economy of Iran, especially the hydrocarbon sector, which included the production of natural gas and oil, the refining of crude oil, and the distribution of hydrocarbons. According to BP p.l.c., Iran was the world's fourth ranked producer of crude oil and condensate (natural gas liquids) and accounted for about 5.2% of the world's output. Iran also was the world's fourth ranked producer of natural gas. About 2% of the world's crude oil refining capacity was located in the country, and Iran held 15.9% of proved worldwide natural gas reserves and 9.1% of proved oil reserves in 2011 (BP p.l.c., 2012, p. 6, 10, 16, 20, 22).

Iran held a diverse range of mineral resources. About 40 mineral commodities were mined and about 15 metals and mineral-related commodities were refined or manufactured, respectively. The country was estimated to account for about 9% of the world's output of gypsum and pumice; more than 2% of the world's output of barite, feldspar, nitrogen, and sulfur; and more than 1% of the world's output of cement, industrial (or glass) sand, iron ore, and molybdenum. Mineral-related issues (primarily uranium enrichment) negatively affected Iran's relations with the Governments of many nations (Bureau of Economic, Energy, and Business Affairs, 2011; Apodaca, 2012a, b; Crangle, 2012a, b; Dolley, 2012; Jorgenson, 2012; Miller, 2012; Polyak, 2012; Tanner, 2012; van Oss, 2012).

Minerals in the National Economy

Iran had an extensive mineral production and processing industry. Production, processing, transportation, and sales of crude oil and natural gas accounted for a notable portion of the country's gross domestic product. Cement and steel also were significant components of the domestic mineral industry (tables 1, 2; International Monetary Fund, 2011, p. 31; Antonioli and Saul, 2012).

Various international sanctions had been imposed on Iran during the construction of the Bushehr nuclear powerplant owing to the potential for the diversion of nuclear sector technology and the potential for Iran to recover and disseminate nuclear material (such as plutonium) from spent fuel rods. The issue was thought to be resolved partially in 2005 when Russia agreed to take back and reprocess the spent fuel rods from the Bushehr plant, which began to generate electricity in 2011. The discovery of stand-alone uranium enrichment facilities in Iran, which potentially could produce highly enriched uranium for nuclear weapons, however, generated additional sanctions. The effect of the international sanctions on Iran's mineral sector, which historically has required large investments to develop mineral deposits (especially metal ores and crude petroleum) and to process the minerals, had thus far been mixed. Initially, the petroleum sector was the focus of sanctions owing to its contribution to Iran's economy. In 1995, the President of the United States issued Executive Order 12957, which prohibits United States entities or persons from entering

into certain transactions with respect to the development of Iranian petroleum resources, and Executive Order 12959, which prohibits other types of transactions, including any new investment in entities owned or controlled by the Government of Iran. In the 1990s and 2000s, however, many other nations declined to honor the American sanctions (Katzman, 2007, p. 1; Khlopkov and Lutkova, 2010, p. 8; Fars News Agency, 2011; Cable News Network, 2012).

The United States' Comprehensive Iran Sanctions, Accountability, and Divestment Act of 2010 (CISADA), which amended the Iran Sanctions Act of 1996 and the Iran Freedom Support Act of 2006, targeted (a) international investments with a value of \$20 million or more that were intended to help Iran develop its petroleum resources, (b) sales of petroleum products with a fair market value of more than \$1 million (or with a value of \$5 million or more in a 12-month period), and (c) the provision of goods and services that could enhance Iran's ability to import refined petroleum products, including finance, brokering, insurance, and shipping services. Issued in 2011, Executive Orders 13574 and 13590 authorized the implementation of certain sanctions in response to Iran's nuclear activities (U.S. Department of State, undated a, b; U.S. Department of the Treasury, undated).

In 2010, the United Nations (UN) adopted Resolution 1929 in response to Iran's apparent lack of appropriate response to previous UN resolutions that obliged Iran to suspend uranium reprocessing and enrichment activities. The European Union issued Council Regulation (EU) No. 96/2010, which restricted Iran's access to bonds and insurance markets, also restricted the following: investment in the Iranian uranium mining and nuclear industry, investment in the Iranian oil and gas industry, trade of petroleum industry equipment and technology with Iran, and transfers of funds to and from Iran (European Union, 2010; United Nations Security Council, 2010; Martin and Woolich, 2012).

Government Policies and Programs

The Mining Code of 1998, which was based on Articles 44 and 45 of Chapter 4 of the 1978 Constitution of the Islamic Republic of Iran, and various amendments to the Mining Code, regulate the mining sector. The Petroleum Act of 1987 clarifies the Government's authority in the oil sector. A new mines exploitation law remained under consideration by the National Consultative Assembly of Iran. The Government continued its program to phase out subsidies to several segments of the economy, which, together with international sanctions, made the availability of affordable energy, availability of funding, and access to export markets more difficult for the medium- and small-scale mineral operations than for the larger Government-affiliated mineral companies (Fox News.com, 2011; Donya-e Eqtesad, 2012). The Government's Fifth Development Plan for the years 2011 to 2015 proposed that the production capacities of several mineral commodities be increased by 2015. Owing to international sanctions, the Government continued to emphasize the development of local self-sufficiency in the areas of mine and mineral-processing plant construction, design, and planning. In addition to increased use of domestic consulting engineering services for mine and plant design, the Government promoted local manufacturing of mineral-industry-related equipment, machinery, and parts (Mining & Development, 2010, p. 8).

Production

Data on estimated mineral production in Iran are in table 1.

Structure of the Mineral Industry

The Ministry of Industries and Mines administered all mining, smelting, and refining industries except the oil and gas sectors, which were administered by the Ministry of Petroleum. Basic geologic exploration and most initial evaluations of the Nation's mineral resources (except hydrocarbons) were performed by the Geological Survey of Iran.

Most of the country's more than 5,000 active mines were privately owned. The Government, primarily through the Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), controlled many of the larger capacity mining and mineral-processing companies, especially those that produced aluminum, ammonia, coal, copper, iron and steel, natural gas, petroleum, salt, and sulfur, although the Government anticipated that it would divest some of its interest in mineral-related operations (table 2).

Mineral Trade

The Central Bank of the Islamic Republic of Iran reported that hydrocarbons accounted for about 83% of the total value of exports in 2011. Hydrocarbon exports were valued at about \$118 billion in 2011 compared with \$79 billion in 2010. Increased oil prices contributed to the increase. Crude oil exports accounted for most of the hydrocarbon exports. Iran also imported petroleum condensate, natural gas, natural gas liquids, and refined oil products, which in 2011 were valued at about \$3.5 billion, or about 5% of total imports (Central Bank of the Islamic Republic of Iran, 2011a–d; 2012).

Commodity Review

Metals

Aluminum.—Administration and management functions of the 147,000-metric-ton-per-year (t/yr)-capacity Hormozgan aluminum complex (Hormozal) and the adjacent 110,000-t/yr-capacity Almahdi aluminum complex at Bandar Abbas were unified in 2011. The merger was expected to reduce administrative costs of the resultant entity, Almadi Hormozal Aluminum Co. Also in 2011, an 80,000-t/yr-capacity carbon anode plant was inaugurated at Almahdi (Sadre Sanat Consulting Engineers, 2011).

IMIDRO projected that Iran's aluminum production capacity would reach 1.5 million metric tons by 2025.

United Company RUSAL of Russia entered discussions with IMIDRO about the possibility of building a 375,000-t/yrcapacity smelter. Other aluminum projects in Iran included South Aluminum Co.'s 276,000-t/yr-capacity smelter at Lamerd, a 110,000-t/yr-capacity expansion of Iran Aluminum Co.'s construction of a smelter at Arak, and construction of a 110,000-t/yr-capacity smelter at Masjed Solieman. The construction of a 310,000-t/yr-capacity aluminum smelter, which Kerman Development Organisation and National Aluminium Co. of India proposed in 2007, remained on hold owing to the lack of funding (Alu Product, 2011; Asankin, Kiseleva, and Yegikyan, 2011; Iranian Mines and Mining Industries Development and Renovation Organization, 2011, p. 24–25; Shubhashish, 2011).

Copper and Molybdenum.—National Iranian Copper Industries Co. (NICICO) requested bids on the design and construction of an ore concentrator at Sarcheshmeh that could process 2,200 metric tons per hour of ore with a grade of 0.65% copper to recover (a) 379,000 t/yr of copper concentrate with a grade of 26% copper and (b) 4,100 t/yr of molybdenum concentrate. By 2017, NICICO's second 5-year plan proposed to increase the company's copper production to 700,000 t/yr from 220,000 t/yr. New copper projects mentioned in the 5-year plan included the construction of a mine at Dareh Alo, which would process 7 million metric tons per year (Mt/yr) of ore to produce 100,000 t/yr of copper concentrate with a grade of 26% copper. A 5,000-t/yr-capacity solvent-extraction electrowinning plant, which would produce copper cathode, also was planned to be built at Dareh Alo. Also proposed were the construction of mines and plants at Darreh Zar and at Nochun, each of which would have the capacity to produce 100,000 t/yr of copper concentrate, and the construction of the Chah Firooz, the Chah Mesi, the Haft Cheshmeh, the Ijoo, the Kahang, the Masjed Daghi, and the Taft copper mines. The conversion of the Sarcheshmeh smelter to a flash smelting process from a reverberatory furnace, the expansion of the output capacity of the Khatoon Abad smelter to 200,000 t/yr of copper anode from 80,000 t/yr, and the construction of a 200,000-t/yr-capacity copper smelter at Sungun also were planned (Iran Daily, 2011; Iranian Mines and Mining Industries Development and Renovation Organization, 2011, p. 9; MEED, 2011).

Gold.—Persian Gold plc of Ireland divested its interest in the Dalli copper/gold project in 2011. The company subsequently changed its name to Clontarf Energy plc and shifted its focus to international petroleum exploration, but retained royalty interest in the Chah-e Zard gold project in Iran. Construction of the Zarshoran gold mine continued; the mine was expected to start commercial operations in late 2012 (Clontarf Energy plc, 2012, p. 3–4).

Zinc.—Mehdiabad Zinc Co., which was a joint venture of Karoun Dez Dasht (45.6% equity interest), Itok GmbH of Austria (24.5% interest), UCL Resources Ltd. of Australia (formerly Union Resources Ltd.) (24.5% interest), and minority shareholders (5.4% interest), continued negotiations to develop the Mehdiabad zinc prospect with IMIDRO, which held the exploitation license for the deposit. The project had effectively been on care-and-maintenance status since 2006 owing to IMIDRO's claims of alleged breaches of contract by Mehdiabad Zinc, although Union Resources had undertaken studies of various development options during the interim period. Future foreign investment in the project remained subject to UN sanctions, which could delay additional exploration and development activity (UCL Resources Ltd., 2012, p. 2, 11–12).

Mineral Fuels and Related Materials

Helium.—In 2011, Pars Oil and Gas Co. authorized a study of the feasibility of recovering helium from the South Pars gasfield, which is the northern section of the North Field that is located in Iranian territorial waters. Helium had been produced from the North Field in Qatar since 2005, and a second helium plant was expected to become operational in Qatar in 2013 (Offshore Magazine, 2012; Chemicals Technology, undated).

Outlook

Numerous production-capacity expansion projects and new mineral commodity development projects in Iran's mineral sector are planned. There has been some foreign investment in the mineral sector in the past few years; however, the availability of international funding for capital-intensive development of mineral-related projects by Government-controlled and private companies operating in Iran is expected to remain impaired owing, in part, to international sanctions. Consequently, most large-scale mineral resource development programs will be even more dependent on the availability of scarce Government funding.

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TABLE 1 IRAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1, 2, 3}

(Metric tons unless otherwise specified)

Commodity ⁴		2007	2008	2009	2010	2011
METALS						
Aluminum:						
Bauxite, gross weight		520,800 ⁵	715,339 ⁵	522,018 ⁵	681,235 ^{r, 5}	600,000
Alumina		250,000	250,000	250,000	250,000	250,000
Metal, primary ingot		215,981 ⁵	200,000 ^r	200,000 ^r	192,000 ^r	223,554 5
Arsenic, orpiment and realgar, concentrates		100	100	100	100	100
Chromite, mine output, concentrate:						
Gross weight		185,760 ⁵	268,586 5	225,129 5	45,000 ^{r, 5}	100,000
Cr ₂ O ₃ content		90,000	130,000	110,000	22,000 ^r	50,000
Copper:						
Mine output:						
Ore mined (0.6% to 1.2% Cu):						
Gross weight thou	sand metric tons	26,500	26,500	27,000	27,500	27,500
Cu content		244,000	248,000	263,000 ^r	257,000 ^r	259,000
Concentrate (29% to 35% Cu):						
Gross weight		731,000	740,000	750,000	760,000	760,000
Cu content		235,000	240,000	250,000	255,000	255,000
Metal:						
Smelter output, blister or anode		250,000	248,000	262,000 ^r	279,000 ^r	270,000
Refined output, cathode		204,000 r	201,000 r	210,254 5	220,000 ^r	227,000
Gold, mine output, Au content ⁶	kilograms	1,000 ^r	1,000 ^r	2,000 ^r	2,000 ^r	2,000
Iron and steel:						
Ore and concentrate:						
Gross weight thou	sand metric tons	31,538 5	32,000	34,034 5	35,000	35,000
Fe content	do.	15,000	15,000	16,000	16,500	16,500
Metal:						
Pig iron	do.	2,572 5	2,200	2,400	2,500	2,500
Direct-reduced iron	do.	7,440 5	7,500	8,200	9,400	10,400
Ferrochromium		8,000	8,000	8,000	8,000	8,000
Ferrosilicon		45,000	45,000	45,000	45,000	45,000
Steel, crude, ingots and castings thou	sand metric tons	10,100	9,960	10,000	12,000	13,000
Lead:						
Mine output, concentrate:						
Gross weight		40,000	53,000	39,254 5	70,000	70,000
Pb content		20,000	26,905 5	20,000	35,000	35,000
Refinery output, includes secondary		70,000	75,000	75,000	75,000	75,000
Manganese, mine output (30% to 35% Mn):					-	
Gross weight		103,441 5	115,000	125,506 5	131,561 ^{r, 5}	130,000
Mn content		35,000	40,000	45,000	46,000	46,000
Molybdenum, mine output, concentrate:						
Gross weight		6,644 5	6,597 ⁵	4,447 ⁵	7,000	7,000
Mo content		3,600	3,700	2,500	3,900	3,900
Silver, mine output, Ag content		20	15	15	15	15
Zinc:						
Mine output, concentrate:						
Gross weight		190,000	130,000	150,000	160,000	160,000
Zn content		100,000	69,267 5	72,048 5	80,000	80,000
Metal		90,000	60,000	65,000	65,000	65,000

TABLE 1—Continued IRAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1, 2, 3}

(Metric tons unless otherwise specified)

		2007	2008	2000	2010	2011
		2007	2008	2009	2010	2011
Barite		249 495 5	226 590 5	361 217 5	326 275 ^{r, 5}	330,000
Boron borax		1.603^{-5}	1.020^{-5}	388 5	500	500
Cement hydraulic thou	sand metric tons	41 000	44 400	50,000	55,000	66,000
Clavs:	sand metric tons	41,000	44,400	50,000	55,000	00,000
Bentonite	;	254.084 5	375.898 5	387,437 5	350.208 ^{r, 5}	350,000
Industrial clays	;	550,000	530,000	530,000	550,000	550,000
Kaolin	;	350.000	320.000	907.487 ⁵	1.480.291 ^{r, 5}	1.400.000
Diatomite	;	300	2.000 5			
Feldspar		512.261 5	501.821 5	634.503 ⁵	652.020 ^{r, 5}	650.000
Fluorspar		68,192 ⁵	61.592 5	71.409 5	72.000	70.000
Gemstones, turquoise	kilograms	20.000	19.000	19.000	20.000	20.000
Gypsum thous	sand metric tons	12,000	11.251 5	13,000	11,914 ^{r, 5}	12,000
Industrial or glass sand (quartzite and silica)	do.	2,000	2.000	1,500	1,500	1,500
Lime	do.	2,600	2,700	2,600	2,700	2,700
Magnesite		112.229 5	115.987 5	130.575 5	130.000	130.000
Mica		1.800 5	1.510 5	6.797 ⁵	2.860 ^{r, 5}	2.900
Nepheline svenite		70.000	70.000	70.000	70.000	70.000
Nitrogen:		,	,	,	,	,
N content of ammonia		2.000.000	2.000.000	2.000.000	2.500.000	2.500.000
N content of urea		1.300.000	1.300.000	1.300.000	1,600,000	1,600,000
Perlite		30.000	30.000	30,000	30.000	30.000
Phosphate rock:		,	,		,	,
Ore		330.000	325,000	330,000	330.000	330.000
P_2O_5 content		40.500	37.000	39.000	39.000	39,000
Pigments mineral natural iron oxide ochre		2 600	2 600	2 600	2 600	2 600
Pumice and related volcanic materials thous	sand metric tons	1 500	1,500	1,500	1 500	1 500
Salt	<u>sand metric tons</u>	2.564.871 5	2,158,280 5	2.816.235 5	3.291.063 ^{r, 5}	3.000.000
Soda ash	;	140.000	140.000	140.000	140.000	140.000
Sodium compound, caustic soda		20.000	20.000	20.000	20.000	20.000
Stone:		- ,	- ,	- ,	- ,	- ,
Construction and building crushed ⁷ thous	sand metric tons	26.000	25.000	25.000	26.000	26.000
Dimension and decorative:			,	,		_ 0,0 0 0
Granite	do	1 100	1.000	1.000	1.000	1.000
Marble, blocks and slabs ⁸	do.	4 200	4 000	4 000	4 000	4 000
Travertine blocks	do.	4,200	1,500	1,500	1,500	1,500
Total	do.	6 800	6 500	6 500	6 500	6 500
	do.	650	600	600	600	600
Limestone	do.	55 000	50,000	50,000	50,000	50,000
Strontium celesite	40.	2 000	2 000	15 396 ⁵	16,000	16,000
Sulfates natural:		2,000	2,000	15,570	10,000	10,000
Aluminum potassium sulfate (alum)		1.000	1.000	1.000	1.000	1.000
Sodium sulfate		600,000	600,000	600,000	600,000	600,000
Sulfur:		000,000	000,000	000,000	000,000	000,000
Byproduct of petroleum and natural gas		1.500.000	1.500.000	1.500.000	1,700,000	1.700.000
Byproduct of metallurgical processing. S content of acid		70,000	70.000	70.000	80.000	80.000
Total	,	1.570.000	1.570.000	1.570.000	1.800.000	1.800.000
Talc	,	90.889 5	89.110 ⁵	66.383 ⁵	95.767 ^{r, 5}	90.000
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TABLE 1—Continued IRAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1, 2, 3}

(Metric tons unless otherwise specified)

Comm	odity ⁴	2007	2008	2009	2010	2011
MINERAL FUELS AND RI	ELATED MATERIALS					
Coal	thousand metric tons	2,000	1,800	2,181 5	2,300	2,300
Coke	do.	1,200 5	1,300	1,300	1,350	1,350
Gas, natural:						
Gross	million cubic meters	170,000	175,000	200,000	210,000	220,000
Dry	do.	112,000	116,000	131,000	138,000	145,000
Gas plant liquids	thousand 42-gallon barrels	150,000	140,000	140,000	145,000	145,000
Petroleum:						
Crude	do.	1,470,000 5	1,490,000	1,450,000 5	1,470,000	1,440,000
Refinery products:						
Liquefied petroleum gases	do.	53,000	55,000	56,000	57,000	57,000
Motor gasoline	do.	103,000	102,000	105,000	106,000	106,000
Jet fuel	do.	7,900	8,000	8,100	8,200	8,200
Kerosene	do.	51,000	49,000	50,000	50,500	50,500
Distillate fuel oil	do.	187,000	196,000	200,000	203,000	203,000
Residual fuel oil	do.	168,000	178,000	180,000	182,000	182,000
Other	do.	17,000	19,000	20,000	20,000	20,000
Total	do.	586,900	607,000	619,000	627,000	627,000

^rRevised. do. Ditto. -- Zero.

¹Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through December 12, 2012.

³Data are for Iranian years ending March 20 of that stated, except data for alumina, natural gas, natural-gas-plant liquids, and petroleum, which are for Gregorian calendar years.

⁴In addition to the commodities listed, the following may have been produced, but information is inadequte to estimate output: antimony, bromine, crude construction materials (such as sand and shell), ferromolybdenum, hafnium oxide, ilmenite, selenium, silicomanganese, uranium, zeolite, and zirconium metal. ⁵Reported figure.

⁶Includes gold recovered from the Mouteh gold mine and from the Sarcheshmeh copper complex.

⁷Includes marble and travertine.

⁸Includes marmarite.

TABLE 2 IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011^{1, 2}

(Thousand metric tons unless otherwise specified)

			Annual
Commodity	Major operating companies and major equity owners	Location of main facilities	capacity
Alumina	Iran Alumina Co. (Government)	Northeast of Jajarm, Khorasan Province	280
Aluminum	Iran Aluminium Co. [Iranian Mines and Mining Industries	Arak, Markazi Province	190
	Development and Renovation Organization (IMIDRO) ³ majority		
	interest, and a joint venture of Industrial Development Investment		
	Co. and a subsidiary of Mehr Finance & Credit Institution, 40%]		
Do.	Almahdi Hormozal Aluminium Co.	Bandar Abbas, Hormozgan Province	257
Bauxite	Iran Alumina Co. (Government)	Jajarm Mine, about 15 kilometers northeast of Jajarm	500
Cement	Abadeh Cement Co.	Abadeh, Fars Province	175
Do.	Abyek Cement Co. (Fars & Khouzestan Cement Co.)	Abyek, Qazvin Province, 80 kilometers northwest	5,100
		of Tehran	
Do.	Anarak Special Cement Co.	Anarak, Markazi Province	500
Do.	Ardebil Cement Co. (Espandar Cement Investment Co.)	Namin, Ardebil Province	1,050
Do.	Ardestan Cement Co.	North of Esfahan, Esfahan Province	1,000
Do.	Behbahan Cement Co. (Fars & Khouzestan Cement Co.)	Behbahan, Khuzestan Province	960
Do.	Benvid White Cement Co. (Bank Melli Iran Investment Co.)	Benvid, Esfahan Province	175
Do.	Bojnourd Cement Plant (Fars & Khouzestan Cement Co.)	About 37 kilometers from Bojnourd, Khorasan	700
		Province	
Do.	Bushehr Cement Co. (Dashtestan Cement)	Borazjan, Bushehr Province	1,000
Do.	Darab Cement Co. [General public (Justice shares), 50%, and Bank	About 190 kilometers southeast of Shiraz, Fars	1,100
	Melli Iran Imvestment Co., 29%]	Province	
Do.	Doroud Cement Co. (Fars & Khouzestan Cement Co.)	Doroud, Lorestan Province	1,400
Do.	Ekbatan Cement Co. (Espandar Cement Investment Co.)	Ekbatan, Tehran Province	175
Do.	Estahban Cement Co.	20 kilometers west of Estahban, Fars Province	350
Do.	Faraz Firouzkhuh Cement Co. (Espandar Cement Investment Co.)	About 180 kilometers northeast of Tehran	1,200
Do.	Fars Cement Co. (Fars & Khouzestan Cement Co.)	Shiraz, Fars Province	2,000
Do.	Fars Nov Cement Co. (Fars & Khouzestan Cement Co.)	About 65 kilometers southeast of Shiraz, Fars Province	1,000
Do.	Firozkuh	Firouzkoh	1,100
Do.	Ghaen Cement Co. (Cement Investment and Development Co.,	Qayen (Ghaen), Khorasan Province	770
	26%, and Bank Melli Iran Investment Co., 14%)		
Do.	Gharb Cement Co. (Fars & Khouzestan Cement Co.)	Kermanshah, Kermanshah Province	700
Do.	Hegmatan Cement Co. (Tehran Cement Co., 79%)	East of Razan, Hamedan Province	1,000
Do.	Hormozgan Cement Co. (OMID Investment Co.)	About 75 kilometers west of Bandar Abbas	2,200
Do.	Ilam Cement Co. (Tehran Cement Co., 47%)	Northeast of Ilam, Ilam Province	700
Do.	Isfahan Cement Co.	Esfahan, Esfahan Province	1,100
Do.	Karoon Cement Co.	Near Masjed Soleyman, Khozestan Province	1,100
Do.	Kavir Kashan Cement Co. (Espandar Cement Investment Co.)	Near Kashan, Esfahan Province	660
Do.	Kerman Cement Co. (Bank Melli Iran Investment Co., 38%)	Kerman, Kerman Province	1,260
Do.	Khash Cement Co. (Fars & Khouzestan Cement Co.)	Khash, Sistan va Baluchestan Province	730 ^e
Do.	Khazar Cement Co. (Fars & Khouzestan Cement Co.)	About 80 kilometers northwest of Qazvin, Qazvin	1,200
		Province	
Do.	Khouzestan Cement Co. (Fars & Khouzestan Cement Co.)	Ramhormoz, Khuzestan Province	1,100 e
Do.	Kohkiloye Yasuj Cement (State Retirement Organization ³ and	Behbehan, near Deh Dasht, Kohkiloye, Kohgiluyeh	240
	Fars & Khouzestan Cement Co.)	va Bowyer Ahmad Province	
Do.	Kordestan Cement Co. (Ghadir Investment Co.)	North of Bijar, Kurdistan Province	1,000
Do.	Lar-e Sabzevar Cement Co.	Sabzevar, Khorasan Province	1,100
Do.	Loshan Cement Co. (Tehran Cement Co., 66%)	Loshan, Gilan Province	100
Do.	Mazandaran Cement Co. (Bank Melli Iran Investment Co., 60%)	Neka, Mazandaran Province	1,600
Do.	Neyriz White Cement Co. (Fars & Khouzestan Cement Co.)	Neyriz, Fars Province	160
Do.	Omran Anarak Cement Co.	Delijan, Markazi Province	1,030

TABLE 2—Continued IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011 $^{1,\,2}$

(Thousand metric tons unless otherwise specified)

			Annual
Commodity	Major operating companies and major equity owners	Location of main facilities	capacity
Cement—Continued	Qeshm Cement Co.	Qeshm Island, Hormozgan Province	250
Do.	Sarooj Bushehr International Co.	Kangan, Bushehr Province	1,600
Do.	Saveh Grey Cement Co. (Fars & Khouzestan Cement Co.)	Saveh, Markazi Province	2,200
Do.	Saveh White Cement Co. (Fars & Khouzestan Cement Co.)	do.	350
Do.	Sepahan Cement Co. (Ghadir Investment Co.)	Mobarekeh, Esfahan Province	2,300
Do.	Shahroud Cement Co. (Fars & Khouzestan Cement Co.)	Shahroud, Semnan Province	600
Do.	Sharg Cement Co. (Ghadir Investment Co.)	Mashhad, Khorasan Province	1,600
Do.	Shemal Cement Co. (Bank Melli Iran Investment Co., 59%)	Pardis, Tehran Province	880
Do.	Soufian Cement Co. (Fars & Khouzestan Cement Co. and Social	About 33 kilometers northwest of Tabriz, East	1,500
	Security Organization Investment Co.)	Azerbaijan Province	
Do.	Tehran Cement Co. (Ghadir Investment Co.)	Tehran, Tehran Province	6,000
Do.	Urmia Cement Co. (Fars & Khouzestan Cement Co.)	Orumiyeh, West Azerbaijan Province	740
Do.	Urumieh White Cement Co.	do.	180
Do.	Yazd Bohrouk Cement Co.	Yazd, Yazd Province	1,100
Do.	Zanjan Cement Co. (Fars & Khouzestan Cement Co.)	Zanjan, Zanjan Province	600
Do.	Zarveh Torbat Cement Co.	Torbat-Heydareh, Khorasan Province	1,100
Chromite	Faryab Mining Co.	Faryab Mine and processing plant, Minab,	180 e
		Hormozgan Province	
Do.	Esfandaghe Mines Co.	Abdasht Mine, Kerman Province; Sugan (Saboughan)	30
	6	Mine. Kerman Province: Processing plant at	
		Esfandaghe, Kerman Province	
Do.	NA	Furumad Mine, Shahrud, Semnan Province: Gaft	6
		processing plant. Semnan Province	
Do.	NA	Mir Mahmud Mine, Mayami, Semnam Province	6
Do.	NA	Dumak Mine, Zahedan, Sistan ya Baluchestan	2
		Province	
Coke	Isfahan Steel Co. [Iranian Mines and Mining Industries	Plant about 40 kilometers southwest of Esfahan.	900
	Development and Repovation Organization ($(MIDRO)$) ³	Esfahan Province	
Do	Zarand Iranian Steel Co	Zarand Kerman Province	400
Copper:	Zarand Iranian Steel Co.	Zarand, Kerman Province	400
Concentrate	National Iranian Conner Industries Co. (NICICO) [Iranian Mines	Sarcheshmeh Mine, south of Rafsanian, Kerman	670
Concentrate	and Mining Industries Development and Renovation	Province	070
	$\Omega_{\text{rescription}}$ (DJDDO)1 ³	Tiovinee	
	do	Suppur connermine East Agenhaiien Province	150
Do.	do.	Midult copper mine, East Azerbaijan Province	150
Do.	do.	Oal'ab Zari Mina, about 120 kilometers southwast	130
D0.	dð:	of Piriand Khoresen Province	10
De	do	Chah Eirozah, Chah Massi, Darahzar, and Eiro	NA
D0.	dð:	chan Filozen, Chan Messi, Datenzai, and Eijo	INA
De	Private aconstatives	Cheb Muse Mine and Oal'sh Sukhteb. Semnan Province	. 5
D0.	National Junion Common Industries Co. (NICICO) (Inspire Mines	Smalter Sarahashmah conner complex south of	145
Smeller output	National Irainan Copper Industries Co. (NICICO) [Irainan Mines	Defension Kennen Dressioner	145
	and Mining industries Development and Renovation	Kaisanjan, Kerman Province	
	Organization (IMIDRO)]		
Do.	do.	Smelter near Khatoonabad, Kerman Province	80
Refined metal	do.	Retinery, Sarcheshmeh copper complex, south of	210
	1	Ratsanjan, Kerman Province	
Do.	d0.	Electrowon plant, Sarcheshmeh copper complex,	14
		south of Rafsanjan, Kerman Province	
Gemstones, turquoise	NA	Neyshabur Mine, Khorasan Province	6 °

TABLE 2—Continued IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN $2011^{1,2}$

(Thousand metric tons unless otherwise specified)

				Annual
Comn	nodity	Major operating companies and major equity owners	Location of main facilities	capacity
Gold: Ore	kilograms	Iran Gold Co.	Muteh 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)] ³	Coproduct of production from various copper mines	600
Do.	do.	Pooya Zarcan Agh Darreh	Agh Darreh	1,000 4
Do.	do.	Artisanal placer operations	Neyshabur area, Khorasan Province	NA
Metal ⁵	do.	National Iranian Copper Industries Co. (NICICO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] ³	Sarcheshmeh copper complex, south of Rafsanjan, Kerman Province	500
Iron and steel:				
Iron ore		Iran Central Iron Ore Co. [National Iranian Steel Co. (NISCO), 100%] ⁶	Choghart Mine, Bafgh, Yazd Province	7,400
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). ³ 8%]	Chadormalu Mine, 80 kilometers north of Bafgh, Yazd Province	6,500
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), ³ 18%]	Gol-e-Gohar Mine, about 50 kilometers southwest of Sirjan, Kerman Province	3,800
Do.		Sangan Iron Ore Co. (National Iranian Steel Co., 100%) ³	Sangan (Songun) Mine, about 140 kilometers southeast of Torbat e-Heydariyeh, Khorasan Province	2,000
Do.		Iranian Minerals Production and Supply Co. (IMPASCO) [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO) ³]	Jalal Abad Mine, about 40 kilometers northwest of Zarand	1,700
Do.		About 20 small privately owned mines	NA	1,000 e
Iron:				
Cast iron		Zagros Steel Co. (Government, majority interest)	Foundry in Kurdistan Province	70
Iron metal		Mobarekeh Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] ³ majority interest; Social Security Organization, ³ 10%; a subsidiary of Mehr Finance & Credit Institution, 5%, and the Steel Employees Fund, 5%]	Direct-reduction iron plant (Midrex® process) about 50 kilometers southwest of Esfahan, Esfahan Province	4,000
Do.		Khouzestan Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), ³ majority interest]	Direct-reduction iron plant (HYL I, Midrex®, and Purofer processes), Ahwaz, Khuzestan Province	3,200
Do.		Hormozgan Steel Complex [National Iranian Steel Co. (NISCO) ⁶ and partners]	Direct-reduction iron plant (Midrex® process)	850
Do.		Isfahan Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] ³	Direct-reduction iron plant (Ghaem process) about 40 kilometers southwest of Esfahan, Esfahan Province	600
Steel, crude		Mobarekeh Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] ³ majority interest; Social Security Organization, ³ 10%; a subsidiary of Mehr Finance & Credit Institution, 5%;	Plant about 50 kilometers southwest of Esfahan, Esfahan Province	4,200
Do.		the Steel Employees Fund, 5%] Khouzestan Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), ³ majority interest]	Plant at Ahwaz, Khuzestan Province	2,600
Do.		Isfahan Steel Co. [Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)] ³	Plant about 40 kilometers southwest of Esfahan, Esfahan Province	2,200

TABLE 2—Continued IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN $2011^{1,2}$

(Thousand metric tons unless otherwise specified)

				Annual
Commo	odity	Major operating companies and major equity owners	Location of main facilities	capacity
Iron and steel-O	Continued:			
Steel, crude—O	Continued	Khorasan Steel Co. [Iranian Mines and Mining Industries	Plant at Neyshabur, Khorasan Province	650
		Development and Renovation Organization (IMIDRO) ³		
		majority interest, and a Government pension fund, 40%]		
Do.		Vian Steel Melting and Casting Co.	Plant, about 42 kilometers of Hamadan, Hamadan	600
			Province	
Do.		Meibod (Maybod) Steel Co. (Iranian Mines and Mining Industries	About 15 kilometers southwest of Meybod, Yazd	300
		Development and Renovation Organization (IMIDRO)], ³ 50%	Province	
Magnesite		Birjand Refractory Mining Co. (Iranian Refractories Procurement	Hoz Sefid, Shirkuhak, and Torshak Mohammadi Mine	s, NA
		& Production Co.)	about 50 kilometers southeast of Birjand, South	
			Khorasan Province	
Natural gas	billion	National Iranian Oil Co. (Government, 100%)	Associated gas from company oilfields	96
cu	bic meters			
Do.	do.	do.	Aghar, Dalan, Kangan, and Nar gasfields	57
Do.	do.	Pars Oil and Gas Co. (National Iranian Oil Co., 100%) ³	South Pars gasfields, offshore	32 /
Petroleum:				
Crude	million	National Iranian Oil Co. (Government, 100%)	Onshore oilfields include the Agha Jari, the	1,400
42-gal	lon barrels		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	
Do.	do.	National Iranian Oil Co. and buyback contract joint venture of	Nowrooz and Soroosh fields, offshore	75
		Shell Iran Nowrooz/Soroosh Development (70%), JJI S&N		
		B.V. (20%), and Iranian Offshore Engineering &		
		Construction Co. (10%)		
Do.	do.	National Iranian Oil Co. and buyback contract joint venture of	Doroud field, offshore	65
		Total S.A. (55%) and Eni SpA (45%)		10
Do.	do.	National Iranian Oil Co. and buyback contract joint venture of	Sirri A and E fields, offshore	40
		Total S.A. (70%) and PETRONAS Carigali International Sdn		
		Bhd (30%)		
Do.	do.	National Iranian Oil Co. and buyback contract joint venture of	Darquain field, onshore	17
		Total S.A. (60%) and Naftiran Intertrade Co. (40%)	8	
Refined	thousand	National Iranian Oil Refining and Distribution Co. (NIORDC)	Refineries at Abadan, Arak, Bandar Abbas, Esfahan,°	1,728
products	42-gallon	(Government, 100%)	Kermanshah, Lavan, Shiraz, Tabriz, and Tehran	
barro	els per day			
Phosphate rock		Estordi Phosphate Complex (Iran Minerals Production & Supply	About 35 kilometers northeast of Bafgh, Yazd	500
		Co.) ³	Province	
Titanium, ilmeni	te	Kahnuj pilot plant [Iranian Mines and Mining Industries	Daregaz placer and Kahnuj titanium dioxide	NA
		Development and Renovation Organization (IMIDRO)] ³	processing plant	
Uranium r	netric tons	Atomic Energy Organization of Iran (Government)	Saghand Mine, about 125 kilometers northeast of	50 ^e
			Yazd, Yazd Province	
Do.	do.	do.	Gchine Mine, near Bandar Abbas, Hormozgan	21 ^e
			Province	
Zinc:				
Ore		Iran Zinc Mine Development Co.	Angouran open pit mine, Dandi, Zanjan Province	500 ⁹
Do.		BAMA Co. (IranKooh)	Irankouh complex (Gooshfil and Tappeh Sorkh open	190 ⁹
			pit mines, about 20 kilometers southeast of Esfahan,	
			Esfahan Province, and Kolah Darvazeh Mine, south	
			of Esfahan, Esfahan Province)	
Do.		Bafgh Mining Co.	Kushk Mine, Yazd Province	120 9
Do.		Beroner Tehran Co.	Emarat Mine, about 25 kilometers southwest of Arak.	100 9
			Markazi Province	

TABLE 2—Continued IRAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2011^{1, 2}

(Thousand metric tons unless otherwise specified)

			Annual
Commodity	Major operating companies and major equity owners	Location of main facilities	capacity
Zinc—Continued:			
Refined metal	Bafgh Zinc Co. (Iran Zinc Mine Development Co.)	West of Bafgh, Yazd Province	30
Do.	Qeshm Zinc Smelter Co. (affiliate of Calcimine Co.)	Kaveh Industrial Zone, Qeshm Island, Hormozgan	20
		Province	
Do.	Calcimine Co. (Iran Zinc Mine Development Co.)	Dandi (Angouran) plant, Zanjan Province	18
Do.	Faravari Mavad Madani Iran Co. (Iran Zinc Mine	Dandi, Zanjan Province	18
	Development Co.)		
Do.	National Iranian Lead and Zinc Co. (Iran Zinc Mine	About 12 kilometers east of Zanjan, Zanjan Province	15
	Development Co.)		
Do.	Bandar Abbas Zinc Production Co. (affiliate of Calcimine Co.)	Bandar Abbas, Hormozgan Province	13
Do.	Zanjan Zinc Smelter Co. (affiliate of Calcimine Co.)	Zanjan, Zanjan Province	5

^eEstimated. Do., do. Ditto. NA Not available.

¹About 3,000 mines that are located in Iran are active. About 65% of the active mines and quarries produce building and construction materials, such as aggregate, sand, and stone.

²Data was augmented by input from the Iranian National Committee of the World Mining Congress.

³Government owned.

⁴Operations suspended.

⁵Recovered from Sar Chemesh copper plant slimes.

⁶A subsidiary of state-owned Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO).

⁷May include basic sediment and condensate.

⁸Held 95% equity interest.

⁹Includes lead and zinc ores.