THE MINERAL INDUSTRY OF IRAN

By Philip M. Mobbs

The hydrocarbon sector, which included natural gas and oil production, crude oil refining, and hydrocarbon distribution, was a significant factor in the Iranian economy and accounted for 60% of Government revenue and almost 12% of the gross domestic product (GDP) at constant prices. In 2003, the GDP based on purchasing power parity was estimated by the International Monetary Fund (2004§[1]) to be more than $463 billion and the GDP per capita based on purchasing power parity, to be about $6,900. The International Monetary Fund also reported that real GDP increased by about 6.6% in 2003 and revised the 2002 increase to 7.5%. In 2003, Iranian petroleum production averaged about 3.9 million barrels per day (Mbbl/d), and according to the U.S. Energy Information Administration (2004), Iran was the world's fourth leading producer of crude oil after Saudi Arabia, Russia, and the United States.

Trade

In 2003, total Iranian exports were valued at more than $28.2 billion, of which hydrocarbon exports were valued at about $23 billion. Crude oil exports averaged more than 1.95 Mbbl/d and refined petroleum products, 265,000 barrels per day. Natural gas exports were about 1.3 billion cubic meters (Jbili and others, 2004, p. 7, 13, 16).

In September, the Ministry of Industries and Mines and the Tehran Stock Exchange inaugurated the Tehran Metals Exchange (TME). Aluminum, copper, steel, and zinc were traded on the TME. In October, Iran became the 165th state to join the Multilateral Investment Guarantee Agency.

Structure of the Mineral Industry

The overall management of the minerals sector was under the auspices of the Ministry of Industries and Mines. The Ministry's authority covered all mining, smelting, and refining industries except the oil and gas segments, which were administered by the Ministry of Petroleum. The Geological Survey of Iran performed initial geologic and mineral exploration and evaluation of the mineral resources (except hydrocarbons). Most of the country's active mines were privately owned, although the Government retained operational control of many of the larger companies in the minerals sector especially in the aluminum, ammonia, cement, coal, copper, iron and steel, natural gas and petroleum, salt, and sulfur sectors.

Commodity Review

Metals

Aluminum.—In 2003, work on the planned expansion of Al Mahdi Aluminium Corp.'s 110,000-metric-ton-per-year (t/yr)-capacity smelter in Bandar Abbas continued. A two-stage capacity expansion in 55,000-t/yr increments was scheduled to come online in 2004 and 2005. Under study was an additional two-stage capacity expansion of 55,000-t/yr proposed for completion in 2007 and 2008, at which time the plant would have a total capacity of 330,000 t/yr. Aluminum also was produced at the Iran Aluminum Co.'s smelter in Arak and Badee Maftool Industries Co.'s 20,000-t/yr recycling plant in Kashan (Middle East Economic Digest, 2003b).

Copper.—In 2003, construction of the Meiduk and the Songun copper mines and the copper smelter at Khatounabad continued. The expected commissioning of the Meiduk Mine and the copper smelter at Khatounabad in 2003 was rescheduled for late 2004. The Songun Mine was expected to be operational in 2005 (Tehran Kansar Co., 2004§).

Gold.—Much of the gold recovered in Iran was a byproduct of state-owned National Iranian Copper Industries Co.'s Sar Cheshmeh copper complex operations. Additional gold was recovered from the Mouteh Mine and from gold placer mines in the Neyshabour area. The construction of the Zarshouran gold mine in West Azarbaijan Province was expected to be completed in 2004.

There were several gold exploration projects underway, which included Rio Tinto plc's evaluation of the Dashkesan gold exploration project in Kurdestan Province. Zarcan Minerals Inc. of Canada sold its 80% interest in the Pouya Zarcan Agh Darreh Co. (PZA) joint venture to Naseem Commercial Brokerage LLC. IRAMCO Aluminum Raw Material Co. retained 20% interest in PZA, which continued to evaluate the Agh Darreh gold prospect in northwestern Iran.

In addition to using locally produced gold, the 70,000 or so goldsmiths and jewelers in Iran processed gold imported primarily from Turkey and the United Arab Emirates. The Government's Mines and Mineral Industries Development and Renovation Organization (IMIDRO) forecast that Iranian gold production would reach 2,200 kilograms (kg) by 2008 from about 500 kg in 2002. The Central Bank of Iran recommended that gold be exported as value-added finished products instead of as ingots (Iran Daily, 2003a§).

Iron and Steel.—Chador Malu Mining and Industrial Co. [a subsidiary of state-owned National Iranian Steel Co. (NISCO)] expected the construction of the 3.4-million-metric-ton-per-year (Mt/yr)-capacity iron-ore-pelletizing plant at Ardakan to be

[1] References that include a section mark (§) are found in the Internet References Cited section.

completed in 2004. In 2003, another NISCO subsidiary, Gol-e-Gohar Iron Ore Co., awarded a construction contract for a 4-Mt/yr iron-ore-pelletizing plant at Sirjan, and operations were expected to begin in 2007. Gol-e-Gohar also requested bids on the construction of a plant to recover 350,000 t/yr of hematite from dry tailings and a plant to recover 220,000 t/yr from wet tailings (Middle East Economic Digest, 2003c, d; Outokumpu Oyj, 2004; ABB Ltd., undated§).

NISCO's subsidiary, Khuzestan Steel Co., proposed to increase capacity of three of its Midrex direct-reduction iron (DRI) modules at its Ahwaz plant and to expand the capacity of its steel plant to 3.2 Mt/yr from 1 Mt/yr. In 2003, there was a dispute between Midrex Technologies, Inc. of the United States and the Iranian Government concerning the technology used in Khuzestan Steel's 800,000-t/yr-capacity DRI plant (Iran Daily, 2003b§, f§).

The 300,000-t/yr-capacity cast iron facility of the Meibod Steel Complex was inaugurated in 2003. NISCO subsidiary Mobarekeh Steel Co. started a 100,000-t/yr-capacity tinplate line; the plant was designed to be expanded to 200,000 t/yr. A 150,000-t/yr-capacity tin plate line was proposed for a steel plant in Tabriz (Metal Bulletin, 2003a, b; Iran Daily, 2003d§; MESteel.com, 2004§).

Zinc.—In 2003, Mehdiabad Zinc Co. was registered as the operating company for the joint venture of state-owned Iranian Mining Procurement and Supply Co. (IMPSCO), Itok GmbH of Austria, and Union Capital Ltd. of Australia. The Government transferred its 50% interest in the Mehdiabad zinc project to IMPSCO, which was authorized to hold equity interest in a private Iranian company, from IMIDRO, which had managed the Government's interest in the project since 2001. The joint venture completed and submitted an open pit mining plan and continued an infill diamond drill program and metallurgical testwork.

A feasibility study for the proposed 100,000-t/yr-capacity Angouran zinc refinery was completed for Iran Zinc Mines Development Co. The plant would produce High Grade and Special High Grade zinc metal (Bateman Globe, 2003).

Industrial Minerals

Cement.—Faraz Firouzkuh Cement Co. awarded a $26.4 million contract to FL Smidth A/S of Denmark for machinery and equipment for a new 3,300-metric-ton-per-day-capacity cement clinker plant. The Firouzkuh plant was expected to be operational in 2006. Smidth also was contracted to supply equipment for the renovation of Khazar Cement Co.'s facilities, where the installation of a cement mill, electrostatic precipitators, a raw mill, and upgraded kilns was expected to be completed in 2005, and for a new raw mill and cement mill at the Kermanshah plant of Gharb Cement Industries. In late 2003, Aybek Cement Co., which was owned by Fars and Khuzestan Cement Co., acquired 96% of the equity shares of Khuzestan Cement Co., which formerly was controlled by Ehdasse Sanat Co. (the cement holding company subsidiary of IMIDRO) (International Cement Review, 2004a-c; Middle East Economic Digest, 2003a).

Phosphate Rock.—Iran Phosphate Co. operated a 40,000-t/yr dicalcium phosphate plant in Semnan. Production was used domestically as animal feed (Davy Process Technology Ltd., 2003§).

Mineral Fuels

Natural Gas.—In 2003, Turkey requested renegotiation of the price of natural gas that it imported from Iran under a long-term contract. Gas exports had begun in 2001, but had been temporarily suspended by Turkey for part of 2002. Iran continued negotiations on the construction of an Iran-Pakistan natural gas pipeline and on gas exports to India and the United Arab Emirates. Iran also was involved in talks with Bulgaria and Romania on exporting natural gas to Europe and with Kuwait on the construction of an Iran-Kuwait gas pipeline. Construction continued on Iran Gas Trunkline 3 (also known as IGAT-3), which will connect the South Pars gas facilities at Bandar Assaluyeh to distribution facilities in northwest Iran. In addition to the natural gas pipelines, there were several other natural gas export projects under study; these included gas-to-liquids plants and liquefied natural gas trains (Middle East Economic Digest, 2004; Iran Daily, 2003e§).

The joint venture of Total S.A. of France (formerly TotalFinaElf S.A.), OJSC Gazprom of Russia, and Petroliam Nasional Bhd. of Malaysia completed the development of 20 wells on two offshore platforms and transferred the South Pars phases 2 and 3 projects to South Pars Gas Co. in 2003. Work on the South Pars phase 1 project, and phases 4 to 14 projects continued. Also in 2003, initial production from the onshore Tabnak gasfield began.

Petroleum.—The controversy concerning the development of the Azadegan Field continued. A consortium of Japanese companies, which included Inpex Corp., Japan National Oil Corp., Japan Petroleum Exploration Co., Ltd., and Tomen Corp., had been expected to sign a buyback contract to develop the field in March 2003, but diplomatic pressure by the United States delayed the project. State-owned National Iranian Oil Co. subsequently attempted to drum up interest in development of the giant oilfield near the Iraq border by inviting Asian and European oil companies to review existing exploration data on the field (Iran Daily, 2003c§).

Preliminary reserve additions of 38 billion barrels were announced for three newly discovered onshore oilfields—the Ferdows, the Mound, and the Zagheh Fields (Gavin, 2003, p. 6). Additional coverage of the natural gas and petroleum industry of Iran is available from the U.S. Energy Information Administration (2004§).

References Cited

Bateman Globe, 2003, Feasibility of SHG zinc refinery for Angouran mine: Amsterdam, Netherlands, Bateman BV, no. 38, November, p. 3.
Gavin, James, 2003, War brings feel-good factor: Petroleum Economist, v. 70, no. 9, September, p. 4-12.
International Cement Review, 2004a, Fourth major contract in Iran: International Cement Review, January, p. 27.
International Cement Review, 2004b, Iran-European joint venture chooses F.L. Smidth: International Cement Review, January, p. 25.

International Cement Review, 2004c, Major plant modernisation in Iran: International Cement Review, January, p. 23.
Jbili, Abdelali, Kramarenko, Vitali, Nielsen, Lynge, Bailen, Jose, and Farahbaksh, Mitra, 2004, Islamic Republic of Iran—Statistical appendix: Washington, DC, International Monetary Fund Country Report no. 04/307, September, 54 p.
Metal Bulletin, 2003a, Iranian private company Tabriz Steel invests in tinning line: Metal Bulletin, no. 8811, October 13, p. 32.
Metal Bulletin, 2003b, Iran's first tinplate line starts up: Metal Bulletin, no. 8806, September 15, p. 15.
Middle East Economic Digest, 2003a, FL Smidth wins more Iran cement contracts: Middle East Economic Digest, v. 47, no. 40, October 3, p. 16.
Middle East Economic Digest, 2003b, Prequals announced for Almahdi smelter: Middle East Economic Digest, v. 47, no. 42, October 17, p. 20.
Middle East Economic Digest, 2003c, Prices opened for Gol-e Gohar: Middle East Economic Digest, v. 47, no. 4, January 24, p. 18.
Middle East Economic Digest, 2003d, Tenders: Middle East Economic Digest, v. 47, no. 38, September 19, p. 68.
Middle East Economic Digest, 2004, Stepping on the gas: Middle East Economic Digest, v. 48, no. 19, May 7, p. 4-5.
Outokumpu Oyj, 2004, Outokumpu's technology for the Gol-e-Gohar pelletizing plant in Iran: Espoo, Finland, Outokumpu Oyj press release, August 6, 1 p.
U.S. Energy Information Administration, 2004, Table 11—World crude oil production, in Monthly Energy Review: Washington, DC, U.S. Energy Information Administration, December, p. 150-151.

Internet References Cited

ABB Ltd., [undated], Pelletizing plant Ardakan, accessed January 24, 2005, at URL http://www.abb.com/global/seitp/seitp161.nsf/0/a8ab05f1896c2237c1256c80002896b6?OpenDocument.
Davy Process Technology Ltd., 2003, Iran phosphate fertilizer, accessed January 27, 2007, at URL http://www.davyprotech.com/content.aspx?cid=78.
International Monetary Fund, 2004 (September), Iran, World Economic Outlook Database, accessed September 29, 2004, via URL http://www.imf.org/external/pubs/ft/weo/2004/02/data/index.htm.
Iran Daily, 2003a (December 1), Gold production will quadruple in 5 years, accessed December 3, 2003, via URL http://www.iran-daily.com/2.
Iran Daily, 2003b (December 22), Invitation to international tender—Steel complex expansion project, accessed December 24, 2003, via URL http://www.iran-daily.com.
Iran Daily, 2003c (September 18), Japan cool as Iran widens Azadegan talks, Page 3–Domestic Economy, accessed September 20, 2003, at URL http://www.iran-daily.com/1.
Iran Daily, 2003d (September 25), Steel technology upgraded, Page 3–Domestic Economy, accessed September 25, 2003, at URL http://www.iran-daily.com/daily.shtml.
Iran Daily, 2003e (October 29), Turkey's fresh problem with gas imports under review, Page 3–Domestic Economy, accessed October 29, 2003, at URL http://www.iran-daily.com/daily.shtml.
Iran Daily, 2003f (September 28), US firm claims Iran copying designs, Page 3–Domestic Economy, accessed October 1, 2003, at URL http://www.iran-daily.com/3.
MESteel.com, 2004, Iran—Steel industry overview, accessed January 26, 2004, at URL http://www.mesteel.com/countries/Iran/overview.htm.
Tehran Kansar Co., 2004 (November 9), Iran—Meiduk copper project to become operational next month, accessed January 21, 2005, at URL http://www.iranmining.com/News/eShow.asp?Id=2299&Dir=433.
U.S. Energy Information Administration, 2004 (August), Iran, Country Analysis Brief, accessed January 21, 2005, at URL http://www.eia.doe.gov/emeu/cabs/iran.html.

Major Sources of Information

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TABLE 1
IRAN: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		1999	2000[e]	2001[e]	2002[e]	2003[e]
METALS						
Aluminum:						
Bauxite, gross weight		912,451	400,000	405,000 [r, 4]	420,000	450,000
Alumina		--	--	--	102,000	200,000
Metal, primary ingot		137,421	140,000	160,000 [r, 4]	168,715 [r, 4]	170,000
Arsenic, orpiment and realgar, concentrates[e]		300	400	400	400	400
Chromite, mine output, concentrate[5]						
Gross weight		254,685	153,000	104,900	512,640 [r, 4]	500,000
Cr_2O_3 content[e]		125,000	75,000	51,500	250,000 [r]	250,000
Copper:						
Mine output:						
Ore mined (1% to 1.2% Cu):						
Gross weight	thousand tons	13,770	13,800	14,400	16,100	16,100
Cu content[e]		138,000	138,000	144,000	161,000	161,000
Concentrate (29% to 35% Cu):						
Gross weight		381,346	350,000	390,000	380,000	389,790 [4]
Cu content		131,000	125,000	121,000	121,000	130,000
Metal:						
Smelter output, blister/anode		132,000	135,000	135,000	146,000	150,000
Refined output, cathode		131,700	132,000	132,000	143,000	134,632 [4]
Gold, mine output, Au content[6]	kilograms	930	765	770	650	500
Iron and steel:						
Ore and concentrate:						
Gross weight	thousand tons	10,776	12,370 [4]	10,300	11,300	16,000
Fe content[e]	do.	5,300	6,100	5,100	5,600	7,200
Metal:						
Pig iron	do.	2,147	2,200	2,300	2,400	2,300
Direct-reduced iron	do.	4,120	4,740	5,000	5,280	5,620 [4]
Ferrochromium		13,680	11,505 [4]	8,430	8,000	10,000
Ferrosilicon[e]		46,000	40,000	40,000	40,000	40,000
Steel, crude, ingots and castings	thousand tons	6,277	6,600	6,890	7,293 [4]	7,869 [4]
Lead:						
Mine output, concentrate:						
Gross weight[e]		22,000	27,000	24,000 [r]	18,000 [r]	16,000
Pb content		11,000 [e]	15,000	12,000 [r]	9,000 [r]	8,000
Refinery output, includes secondary		47,000 [r]	50,000 [r, e]	53,000 [r, e]	50,000	50,000
Manganese, mine output, (30% to 35% Mn):						
Gross weight		104,096	105,000	120,994 [r, 4]	123,148 [r, 4]	125,000
Mn content[e]		32,000	32,000	48,000 [r]	49,000 [r]	50,000
Molybdenum, mine output, concentrate:[e]						
Gross weight		4,906 [4]	4,900	4,506 [r, 4]	4,271 [r, 4]	4,300
Mo content		1,600	1,600	1,700	1,700	1,400
Silver, mine output, Ag content		21	22	22	23	23
Zinc:[e]						
Mine output, concentrate:						
Gross weight		160,000	182,000 [4]	240,000 [4]	240,000	240,000
Zn content		80,000	90,000	120,000	120,000	120,000
Metal		31,000 [4]	49,000 [4]	73,000 [4]	100,000	100,000
INDUSTRIAL MINERALS						
Asbestos:[e]						
Concentrate, (3% to 8% marketable fiber)		40,000	40,000	40,000	30,000	30,000
Marketable fiber		2,000	2,000	2,000	1,500	1,500
Barite		183,850	185,000	195,539 [r, 4]	178,652 [r, 4]	180,000
Boron, borax		3,663	3,700	3,212 [r, 4]	2,079 [r, 4]	3,000
Cement, hydraulic	thousand tons	22,080	23,880 [4]	26,640 [r, 4]	28,600 [4]	29,000

See footnotes at end of table.

TABLE 1--Continued
IRAN: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		1999	2000[e]	2001[e]	2002[e]	2003[e]
INDUSTRIAL MINERALS--Continued						
Clays:						
Bentonite		64,957	70,000	80,000	80,000	80,000
Industrial clays[e]		400,000	450,000	485,000 [4]	490,000	490,000
Kaolin		837,277	850,000	806,000 [4]	810,000	800,000
Diatomite[e]		4,350	4,500	4,500	4,500	5,000
Feldspar		239,779	156,000 [4]	204,078 [r, 4]	191,316 [r, 4]	190,000
Fluorspar		18,387	20,000	35,986 [r, 4]	32,006 [r, 4]	32,000
Gemstones, turquoise	kilograms	20,000	20,000	20,000	20,000	20,000
Gypsum	thousand tons	10,834	10,700	10,890 [4]	10,380 [4]	10,500
Industrial or glass sand (quartzite and silica)[e]		1,000,000	1,000,000	1,700,000	1,700,000	1,700,000
Lime	thousand tons	2,138	2,200	2,000	2,200	2,200
Magnesite		141,081	141,000	133,778 [r, 4]	128,565 [r, 4]	130,000
Mica		1,425	2,000	3,255 [r, 4]	2,845 [r, 4]	3,000
Nitrogen:						
N content of ammonia		865,000	965,000 [4]	1,086,700 [4]	1,119,100 [4]	1,120,000
N content of urea		606,000	624,000	651,000	660,000	650,000
Perlite		15,069	15,000	15,000	15,000	20,000
Pigments, mineral, natural iron oxide, ochre[e]		13,300	13,500	13,000	13,000	2,300
Pumice and related volcanic materials[e]		150,000	150,000	760,000 [4]	810,000	1,200,000
Salt		1,600,000	1,560,000 [4]	1,985,000 [4]	1,970,000	1,970,000
Soda ash		120,000	120,000	120,000	120,000	120,000
Sodium compound, caustic soda[e]		20,000	20,000	20,000	22,000	22,000
Stone:[e]						
Construction and building, crushed	thousand tons	11,000	12,000	12,000	12,000	12,000
Dimension and decorative:						
Granite	do.	195 [4]	200	200	200	200
Marble:						
Blocks	do.	6,400	7,000	6,600	7,000	7,000
Crushed	do.	500	550	500	600	600
Slabs	do.	100	110	100	100	100
Travertine:						
Blocks	do.	435 [4]	500	400	500	500
Crushed and slabs	do.	65	100	100	100	100
Total	do.	7,700	8,500	7,900	8,500	8,500
Dolomite	do.	286	300	300	300	300
Limestone	do.	33,000	35,000	41,800	41,100	41,100
Strontium, celesite[e]		1,650 [4]	2,000	2,000	2,000	2,000
Sulfates, natural:[e]						
Aluminum potassium sulfate (alum)		12,000	12,000	10,000	10,000	1,000
Sodium sulfate		308,093 [4]	420,000 [4]	387,000 [4]	580,000	580,000
Sulfur:[e]						
Byproduct of petroleum and natural gas		963,000	963,000	880,000 [r, 4]	1,200,000 [r, 4]	1,310,000
Byproduct of metallurgical processing, S content of acid		47,000	50,000	50,000	50,000	50,000
Total		1,010,000	1,010,000	983,000	1,250,000 [r]	1,360,000
Talc		25,000 [e]	25,000	25,000	25,000	25,000
MINERAL FUELS AND RELATED MATERIALS						
Coal	thousand tons	1,507	1,815 [4]	2,002 [4]	2,020	2,050
Coke	do.	20,000 [e]	25,000	25,000	25,000	25,000

See footnotes at end of table.

TABLE 1--Continued
IRAN: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity[3]		1999	2000[e]	2001[e]	2002[e]	2003[e]
MINERAL FUELS AND RELATED MATERIALS--Continued						
Gas, natural:						
Gross	million cubic meters	90,600 [e]	120,000	120,000	120,000	125,000
Dry	do.	51,000 [e]	57,800	60,000 [r]	63,000	65,000
Natural gas plant liquids[e]	thousand 42-gallon barrels	24,000	25,000	25,000	25,000	25,000
Petroleum:						
Crude	do.	1,300,000 [e]	1,360,000	1,350,000	1,250,000	1,410,000
Refinery products:[e]						
Liquefied petroleum gases	do.	15,000	16,000	16,000	16,000	16,000
Motor gasoline	do.	60,000	65,000	65,000	65,000	65,000
Jet fuel	do.	11,000	12,000	12,000	12,000	12,000
Kerosene	do.	36,000	40,000	40,000	40,000	40,000
Distillate fuel oil	do.	120,000	140,000	140,000	140,000	140,000
Residual fuel oil	do.	140,000	160,000	160,000	160,000	160,000
Other	do.	60,000	67,000	67,000	67,000	67,000
Total	do.	442,000	500,000	500,000	500,000	500,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. -- Zero.

[1]Table includes data available through August 1, 2004.

[2]Data are for Iranian years ending March 21 of that stated, except data for alumina, natural gas, plant liquids, and petroleum, which are for Gregorian calendar years.

[3]In addition to commodities listed, the following may have been produced, but information is inadequte to estimate output: antimony, bromine, ferromolybdenum, nepheline syenite, phosphate rock, selenium, shell, silicomanganese, vermiculite, and zeolite.

[4]Reported figure.

[5]Chromite content of concentrate estimated to be 42% to 45% Cr_2O_3 for 1999.

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