

IRAN

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The Islamic Republic of Iran covers an area of 1,648,000 km², has a population of over 67 million and is located in an important strategic position; it serves as a bridge linking the Caspian Sea to the Persian Gulf and a crossroads on the 'Silk Road' from East to West. Iran's GNP currently amounts to some US\$104 billion (US\$1,600 per capita).

A variety of factors are hampering economic growth: misguided economic policies within the past decade; allegations by the conservative opposition that foreign interests have had a negative influence on the economy (which has deterred investment in new production units); the impact of US sanctions; the country's self-imposed isolation from Western countries; an increase in migration of villagers to cities; an influx of foreign workers, mainly Afghan-refugees; inefficiencies in the banking system; and a youthful population of whom two-thirds are under 30. All these factors have served to intensify unemployment (now running at over 15%).

The goal of President Khatami is to achieve economic stability and implement economic reforms that would open the doors for private sector activity and give greater incentives to investors in order to provide much needed employment. Both the reformist parliament (Majlis) and the 59-year-old president, who is an intellectual, liberal and senior cleric, are seeking to remove the obstacles to dialogue with the outside world and open the country to more foreign trade. This is deemed essential if the country is to realise its ambitious industrial development goals. However, a recent bill in the Majlis, which aims at attracting more foreign investment ventures, has been rejected by the country's religious authority, the Constitutional Guardian Council.

Iran relies heavily on oil revenue, cautiously estimated at around US\$6 billion per year. Oil

provides about 80% of foreign currency earnings and has led the government planners to rebuild the country's economic structure and allocate oil revenues for development projects and repayment of foreign debts. The aim is to increase non-oil exports, currently worth around US\$5 billion annually. In accordance to a directive for the implementation of the budget for the current year, great emphasis has been placed on job creation, and more investment in mining, with priority being given to the establishment of small-and medium-sized operations.

Oil and Gas

Oil and gas reserves, located principally in the southern part of the country and offshore in the Persian Gulf, amount to some 90,000 Mbbl of oil and 26,000 billion m³ of natural gas, representing 9.5% and 17%, respectively, of the world's known reserves.

Iran's output of crude oil averaged 3.68 Mbbl/d in 2000, of which about 2.1 Mbbl/d were exported, and 3.7 Mbbl/d in 2001. Natural gas production last year totalled some 60 billion m³.

The country expects to generate US\$100 billion in revenues over the coming decade from the South Pars natural gas field, and from Iran's maritime frontier with Qatar in the Persian Gulf. The long-term, multi-phase offshore development project, has 13,500 billion m³ of gas, accounting for 10% of the world's total gas reserves. It includes, as well as transfer of the sour gas, the construction of refineries 105 km away at the port of Assalouyeh. The first three phases of project will cost US\$2.12 billion and involves TotalFinaElf of France in partnership with Petronas of Malaysia, Russia's Gazprom and South Korea's Hyundai. Operations began in January 2001. The giant South Pars gas field would be developed under a buy-back contract with the TotalFinaElf consortium. Once the

current project is completed, the consortium is in the running for a further development phase, along with British Petroleum and Italy's ENI.

Through a connected trunk line to Dogu-Bayazit on the Iran-Turkey border, the export of natural gas to Turkey came on stream last January, and some 60 cities and industrial operations in western and southern Turkey are now consuming Iranian gas. The export contract covers a period of 22 years and the delivery of 2 billion m³/y of gas to be increased to some 10 billion m³/y within the next decade.

The state-owned Gas Authority of India (GAIL) and National Iranian Oil Co. (NIOC) will commission a fresh feasibility study for bringing Iranian gas to India. The 2,775 km onshore pipeline, worth US\$4.1 billion would connect Assalouyeh in Iran to the GAIL's HBJ pipeline near Delhi and should have a throughput of 1.5 - 3 billion ft³/y. With respect to the US military presence in the region, Russia is co-operating to establish the first phase of a nuclear power plant at Bushehr, which is expected to go on stream by 2004.

Mineral and Metals

Although Iran is one of the world's major oil and gas producers, it also has a significant mining sector and a diversity of mineral resources.

Currently, the mining and metals sector contributes about 6% to GNP and the annual export value of mineral production is about US\$605 million. Nevertheless, despite huge mineral reserves, Iran accounts for only 0.05% of the world's mineral production.

In 2001, almost 112 Mt of raw mineral commodities of over 50 different types (excluding sand and gravel) were mined from 2,060 active operations, of which 66% were for construction materials and dimensional stones. The size of operations is not precisely defined and undoubtedly the majority are only small-scale quarries. About 90% of them are privately owned, although most large-scale mines, as well as large metallurgical industries are partially or totally state-owned.

At present, Iran's private sector lacks the capability to invest in large mines and accounts for only 20% of output in terms of weight and value. There are plans to boost production and productivity by modernising and equipping the mines, reducing the finished prices, employee training, further privatisation, reducing government control and dismantling monopolies.

Iron and Steel

In 2000, state-owned National Iranian Steel Co. (NISCO) produced some 7 Mt of steel products; there is a production target of 10 Mt/y by 2005. Iran possesses in excess of 1,800 Mt of proven iron ore reserves, and three main deposits are currently being exploited. Tchoghart, at Bafq near Yazd, is the main operation, supplying about 5 Mt/y of lumpy ore (56-60% Fe) to the Russian-made blast furnaces (built in 1965) at the steelworks in Isfahan. An expansion of ore-processing capacity at Bafq is in progress, involving Voest-Alpine of Austria, ABB of Switzerland and Taim-TFG of Spain. The project is worth US\$115 million. Elsewhere, the Gol-e Gohar iron-ore complex at Sirjan in Kerman Province is providing 2.6 Mt/y of iron-ore concentrates to the Mobarakeh direct reduced iron (DRI) plant near Isfahan. At Chadormalu, Iran's largest and newest iron-ore mine in Yazd Province, operations have begun, but owing to some teething problems at the concentrator, the nominal capacity of 5 Mt/y of concentrates has yet to be achieved.

Still under development is the Sangan iron ore project in the Province of Khorassan near the border with Afghanistan, where there will be an initial concentrate capacity of 3.4 Mt/y. The concentrate will feed the Neyshaboor steel mill near Mashad. It is due on stream shortly and is scheduled to produce 550,000 t/y of cast iron.

Steel projects include the 600,000 t/y Qa-em sponge plant at Meybod near Yazd; a similar project in Kurdistan; a 30,000 t/y capacity ferromanganese plant at Isfahan; and a 160,000 t/y rolling mill at Nowshar on the Caspian Sea.

Coal

Coal is one of Iran's most abundant but least developed mineral commodities. Proven reserves amount to some 2,000 Mt, mainly coking and bituminous coal. NISCO, apart from its iron-ore mines, also operates a number of coal mines to meet the requirements of its blast furnaces at Isfahan. Total production amounts to some 1.2 Mt/y of washed coal which is railed from four main operations (Zarand near Kerman, and Zirab, Shahroud and Sangroud located in northern Iran at the foot of Elborz Mountains). NISCO is obliged to augment its supply of coking coal by importing about 800,000 t/y.

A major new coal project in the Parvadeh coalfield, near Tabas in a remote part of southern Khorassan, will be Iran's first fully mechanised underground coal mine. Cementation Skanska has been awarded a US\$17 million contract to provide specialist mining services and assistance in the purchasing of equipment, and will also arrange and co-ordinate UK-based training for NISCO's staff. The UK Government's Exports Credits Guarantee Department (ECGD) is to provide reinsurance and also separately expects some US\$25 million of cover to UK-equipment suppliers.

Non-Ferrous Metals

Output from the Iralco aluminum smelter at Arak in central Iran totalled 120,000 t of ingots last year, and the semi-private Al-Mahdi smelter at the Gulf port of Bandar Abbas was producing at an annual rate of 15,000 t. The US\$300 million first phase of Al-Mahdi complex has not achieved its annual capacity of 110,000 t/y because of funding problems. Construction of the new Al-Qadir aluminium smelter at Kermanshah in western Iran, to be financed by state-owned companies, has started. The initial phase of Al-Qadir will produce 25,000 t/y and some US\$50 million have been earmarked for this project.

The most important operation by far in the base metals sector is the Sar Cheshmeh open-pit copper mine, concentrator, smelter

and refinery near Rafsanjan in Kerman Province, wholly-owned by National Iranian Copper Industries Co. (NICICO). Last year, it processed 14.4 Mt of supergene ore averaging 0.8% Cu, and produced (with some imported concentrates) about 170,000 t of anode copper. Refined output, with additional heap-leach SX-EW production, amounted to 150,000 t of cathodes. Sar Cheshmeh also produced 3,250 t of molybdenum concentrate plus 410 kg of gold and 15,500 kg of silver as by-products.

About 110 km northwest of Sar Cheshmeh, the Meydoun copper mine is the current focus of attention and should coming into operation within the next three years. Svedala of Sweden is building the concentrator, which will provide 150,000 t/y of copper concentrates in 2005 as feed for the Sar Cheshmesh smelter. Meydoun will also supply a US\$30 million, 80,000 t/y copper smelter at Khatoonabad located 40 km south of Sar Cheshmeh and being built by NFC of China.

NICICO is also continuing with pre-mining, construction and equipping of the Songoun mine, in northwest Iran, near the town of Ahar and close to the border with Azerbaijan. It is receiving assistance from Svedala and from China under a barter-trade agreement. The US\$350 million project is based on a resource of 860 Mt averaging 0.6% Cu and 0.1% Mo, and should produce 45,000 t/y of copper concentrates, rising eventually to 170,000 t/y.

There are three main lead-zinc mining operations in Iran. They are centred on Angouran near Zanjan in the northwest, Irankuh on the outskirts of Isfahan and Kushk-Barq east of Yazd. Last year, a total of 1.4 Mt of ore was processed to yield 70,000 t of zinc in concentrates and 15,500 t of lead in concentrates. A number of small zinc smelters in the vicinity of Zanjan produced a total of 18,500 t of zinc ingots.

Canada's Cominco Ltd is co-operating with Iranian Zinc Mines Development Co. (IZMDC) for construction of a leaching plant to treat the

Angouran run-of-mine oxide ore. At Bafq, east of Yazd, pre-production trials for a 27,000 t/y capacity zinc smelter have begun.

Brisbane-based Union Capital Ltd is exploring for zinc on the East Ridge at the Black Hill area of the Mehdiabad property south of Yazd. The zinc-lead-silver resource is estimated at some 218 Mt of ore averaging 7% Zn, 2.3% Pb and 54 g/t of silver. The Australian company is also involved in the Taknar - polymetallic project in Khorassan and in a titanium project at Khanooj north east of Bandar Abbas.

Toronto-based consultant Watts, Griffis and McOuat has been awarded an exploration contract with IZMDC at Angouran for an area covering 1,400 km².

In southern Iran there are a number of small chromite deposits associated with ophiolite belts. Two mining operations centred on these dispersed occurrences are Esfandagheh, south of Kerman, and Faryab, northeast of Bandar Abbas. Additionally, there are some small chromite operations in the northeastern Province Kohrassan at Sabzewar and east of Shahroud.

Last year, total output of chromite concentrate and lumpy ore (44-48% Cr₂O₃) amounted to 161,000 t. About 60% of the output feeds the ferroalloy refinery at Abaden where annual production of ferrochrome amounts to some 10,000 t.

In the gold sector, Iran has only minor production. Apart from the estimated 450 kg/y of by-product output at the Sar Cheshmeh copper smelter, the Muteh mine, 145 km north of Isfahan, produced 320 kg in 2001. However, there are several new gold exploration projects, and one of them, at Zare-Shouran southwest of Zanjan, is moving to the development stage.

Finally, Iran is a major producer of industrial minerals and dimension stone. It is one of the world's largest producers of gypsum, with an

annual production of 11 Mt, and the output of dimension and decorative stones, mainly travertine, onyx, marble and granite, totalled some 8 Mt last year.

New mining projects, either recently commenced or under feasibility study, concern potash, phosphate, ilmenite, extraction of magnesia from seawater and salt-brine in various playa lakes.

Iran's Mineral Production

('000 t except where stated)

Commodities	1999	2000	2001
Crude oil	191,700	193,300	193,500
Natural gas (bn m ³)	51	57	60
Hard coal	1,820	1,815	2,002
Iron ore	12,400	12,370	12,208
Copper ore	14,400	14,500	14,415
Manganese ore	205	160	101
Chromite conc.	160	151	161
Lead - zinc ore	1,605	1,260	1,450
Gold bar (kg)	760	765	770
Barytes	205	183	218
Bentonite	355	735	790
Kaolin	810	860	806
Bauxide	175	440	405
Refractory clays	380	400	485
Magnesite	145	140	143
Dolomite	280	285	303
Feldspar	140	156	168
Salt	1,500	1,560	1,985
Quartzite & silica	1,050	960	1,710
Sodium sulphate	510	420	387
Gypsum	9,850	10,700	10,890
Limestone	34,500	35,000	41,800
Dimension stone	6,480	7,810	7,930
Pumice	510	600	760
Others+	9,000	14,800	10,800

(+ Except sand & gravel)