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Iran

Iran is OPEC's second largest oil producer and holds 10% of the world's proven oil reserves. It also has the world's second largest natural gas reserves (after Russia).

Information contained in this report is the best available as of August 2004 and is subject to change.



GENERAL BACKGROUND

Iran's economy, which relies heavily on oil export revenues (around 80% of total export earnings, 40%-50% of the government budget, and 10%-20% of GDP), was hit hard by the plunge in oil prices during 1998 and early 1999, but with the rebound in oil prices since then, has recovered to a great degree. For 2003, Iran's real GDP grew by around 4.5%; for 2004 it is expected to grow at slightly slower, but still healthy, 4.4% rate.

Iran's \$127 billion budget for 2004/2005 reportedly was based on a price assumption for Iranian oil of around \$19.90 per barrel. This compares to an average price for Iranian crude oil in 2003 of around \$26 per barrel, and a forecast price for 2004 of around \$30 per barrel. Iranian budget deficits have been a chronic problem, in part due to large-scale state

subsidies -- totaling some \$4.7 billion per year -- including foodstuffs and especially gasoline. Higher oil export revenues the past couple of years have helped ameliorate this situation, as Iran gains around \$900 million in revenues for every \$1 per barrel increase in the price of its oil. Excess revenues above \$15 billion or so are slated to go into an "oil stabilization fund."

Despite relatively high oil export revenues, Iran continues to face budgetary pressures, a rapidly growing, young population with limited job prospects and high levels of unemployment; heavy dependence on oil revenues; significant (but declining) external debt; high levels of poverty; expensive state subsidies (billions of dollars per year) on many basic goods; a large, inefficient public sector and state monopolies (bonyads, which control at least a quarter of the economy and constitutionally are answerable only to supreme leader Ayatollah Ali Khamenei); international isolation and sanctions.

Iran is attempting to diversify by investing some of its oil revenues in other areas, including petrochemicals. Iran also is hoping to attract billions of dollars worth of foreign investment to the country by creating a more favorable investment climate (i.e., reduced restrictions and duties on imports, creation of free-trade zones). In May 2002, the country's Expediency Council approved the "Law on the Attraction and Protection of Foreign Investment," which aims at encouraging foreign investment by streamlining procedures, guaranteeing profit repatriation, and more. This Law, which was sent to the government for implementation in January 2003, represents the first foreign investment act passed by Iran's legislature since the 1978/79 revolution. The legislation was delayed for several years due to disagreements between reformers and conservatives.

In late February 2004, Iran held parliamentary elections in which conservatives staged a strong comeback. Just four years earlier, reformists had won an overwhelming victory, but their attempted reform measures were largely blocked by the Council of Guardians. In addition, the Council of Guardians disqualified around 2,500 candidates, mostly reformers, for the February 2004 parliamentary elections. The last presidential elections in Iran were held in June 2001, with President Khatami winning reelection by a wide margin. The next Presidential election is scheduled for June 2005.

Sanctions

In March 2004, President Bush extended sanctions originally imposed in 1995 by President Clinton for another year, citing the "unusual and extraordinary threat" to U.S. national security posed by Iran. The 1995 executive orders prohibit U.S. companies and their foreign subsidiaries from conducting business with Iran, while banning any "contract for the financing of the development of petroleum resources located in Iran." In response, U.S.-based Conoco was forced to abrogate a \$550 million contract to develop Iran's offshore Sirri A and E oil and natural gas fields. Following this, France's Total and Malaysia's Petronas were awarded the contract. On August 19, 1997, Executive Order 13059 reaffirmed that virtually all trade and investment activities by U.S. citizens in Iran are prohibited. In March 2000, U.S. Secretary of State Albright announced that the United States would lift certain sanctions against Iranian luxury goods. Other sanctions remain in effect, however. These include the U.S. Iran-Libya Sanctions Act (ILSA) of 1996 (renewed for 5 more years in July 2001) imposes mandatory and discretionary sanctions on non-U.S. companies investing more than \$20 million annually in the Iranian oil and natural gas sectors.

OIL

According to the Oil and Gas Journal (1/1/04), Iran holds 125.8 billion barrels of proven oil reserves, roughly 10% of the world's total, up from 90 billion barrels in 2003 (note: in July 2004, Iran's oil minister stated that the country's proven oil reserves had increased again, to 132 billion barrels, following new discoveries in the Kushk and Hosseineih fields in Khuzestan province). The vast majority of Iran's crude oil reserves are located in giant onshore fields in the southwestern Khuzestan region near the Iraqi border and the Persian Gulf. Iran has 32 producing oil fields, of which 25 are onshore and 7 offshore. Major onshore fields include the following: Ahwaz-Asmari (700,000 bbl/d); Bangestan (around 245,000 bbl/d current production, with plans to increase to 550,000 bbl/d), Marun (520,000 bbl/d), Gachsaran (560,000 bbl/d), Agha Jari (200,000 bbl/d), Karanj-Parsi (200,000 bbl/d); Rag-e-Safid (180,000 bbl/d); Bibi Hakimeh (130,000 bbl/d), and Pazanan (70,000 bbl/d). Major offshore fields include: Dorood (130,000 bbl/d); Salman (130,000 bbl/d); Abuzar (125,000 bbl/d); Sirri A&E (95,000 bbl/d); and Soroush/Nowruz (60,000 bbl/d). Iran's crude oil is generally medium in sulfur, with gravities mainly in the 28°-35° API range.

During the first six months of 2004, Iran produced 4.1 million bbl/d of oil (of which 3.9 million bbl/d was crude oil), up from 3.9 million bbl/d in 2003. Iran's current sustainable crude oil production capacity is estimated at around 3.9 million bbl/d, which is around 0.1 million bbl/d above Iran's latest (August 1, 2004) OPEC production quota of 3.817 million bbl/d. Some analysts believe that Iran's capacity is lower, and that it could fall even further until new oilfield developments (Azadegan, Bangestan -- see below) come online in a few years. Iran's existing oilfields have a natural decline rate estimated at 200,000-250,000 bbl/d annually and are in need of upgrading and modernization.

With sufficient investment, it is widely believed that Iran could increase its crude oil production capacity significantly. Iran produced 6 million bbl/d of crude oil in 1974, but has not surpassed 3.9 million bbl/d on an annual basis since the 1978/79 Iranian revolution. During the 1980s, it is believed that Iran may have maintained production levels at some older fields only by using methods which have permanently damaged the fields. Despite these problems, Iran has ambitious plans to double national oil production -- to more than 5 million bbl/d by 2009 and 7 million bbl/d by 2024. The country is counting on billions of dollars in foreign investment to accomplish this, but this is unlikely to be achieved without a significant change in policy to attract such investment. To date, the Economist Intelligence Unit (EIU) estimates that Iran has attracted some \$15-\$20 billion in foreign investment for its hydrocarbons sector (the largest being Eni's investment in the South Pars gas field).

Iran exports around 2.6 million bbl/d, with major customers including Japan, China, South Korea, Taiwan, and Europe. Iran's main export blends include Iranian Light (34.6° API, 1.4% sulphur); Iranian Heavy (31° API, 1.7% sulphur); Lavan Blend (34°-35° API, 1.8%-2% sulphur); and Foroozan Blend/Sirri (29-31° API). Iran is also the largest heavy fuel oil exporter in the Middle East.

Iran's domestic oil consumption, 1.4 million bbl/d in 2003, is increasing rapidly as the economy and population grow. Iran subsidizes the price of oil products heavily, to the tune of \$3 billion or so per year, resulting in a large amount of waste and inefficiency in oil consumption. Iran also is forced to spend over \$2 billion per year to import oil products (mainly gasoline) which it cannot produce

locally. In April 2004, as part of an effort to curtail the rise in gasoline subsidy expenditures, gasoline consumption and imports (both of which are growing rapidly), Iran's parliament voted to more than double gasoline prices, to around 95 cents per gallon. Currently, Iran's gasoline prices are amongst the cheapest in the world. In November 2003, Iran announced that it might even be forced to start rationing gasoline.

State-owned National Iranian Oil Company (NIOC)'s onshore field development work is concentrated mainly on sustaining output levels from large, aging fields. Consequently, enhanced oil recovery (EOR) programs, including natural gas injection, are underway at a number of fields, including Marun, Karanj, and the presently inactive Parsi fields. EOR programs will require sizeable amounts of natural gas, infrastructure development, and financing. Overall, Iran's oil sector is considered old and inefficient, needing thorough revamping, advanced technology, and foreign investment.

In May 2004, the Iranian parliament concluded a probe into a kickback and corruption scandal involving Statoil and various Iranian officials, including Mehdi Hashemi Rafsanjani, son of the country's former President and Chairman of an NIOC subsidiary. The probe determined that no Iranian officials were involved in the case. In July 2004, Oil Minister Zanganeh said that Iran would sue Statoil over the allegations.

In October 1999, Iran announced that it had made its biggest oil discovery in 30 years, a giant onshore field called Azadegan located in the southwestern province of Khuzestan, a few miles east of the border with Iraq. Reportedly, the Azadegan field contains proven crude oil reserves of 26 billion barrels, but the field is also considered to be geologically complex, making the oil more challenging and more expensive to extract. In January 2001, the Majlis approved development of Azadegan by foreign investors using the so-called "buyback" model (see below). In February 2004, a Japanese consortium led by Inpex signed a final agreement on the \$2-\$2.8 billion project. Inpex, which has no upstream experience of its own, hopes to bring in an international partner -- possibly Total, Statoil, Sinopec, or Lukoil (while Shell has indicated that it is not interested) -- as the field's operator. One Japanese partner in the Inpex consortium -- Tomen -- has pulled out of the

project (possibly under U.S. pressure), while another member -- Japex -- is considering pulling out as well. Initial production of medium-sour crude oil from Azadegan could come in 2007, ramping up from 50,000 bbl/d to 260,000 bbl/d by 2012. At its peak, Azadegan production could account for as much as 6% of Japan's oil imports.

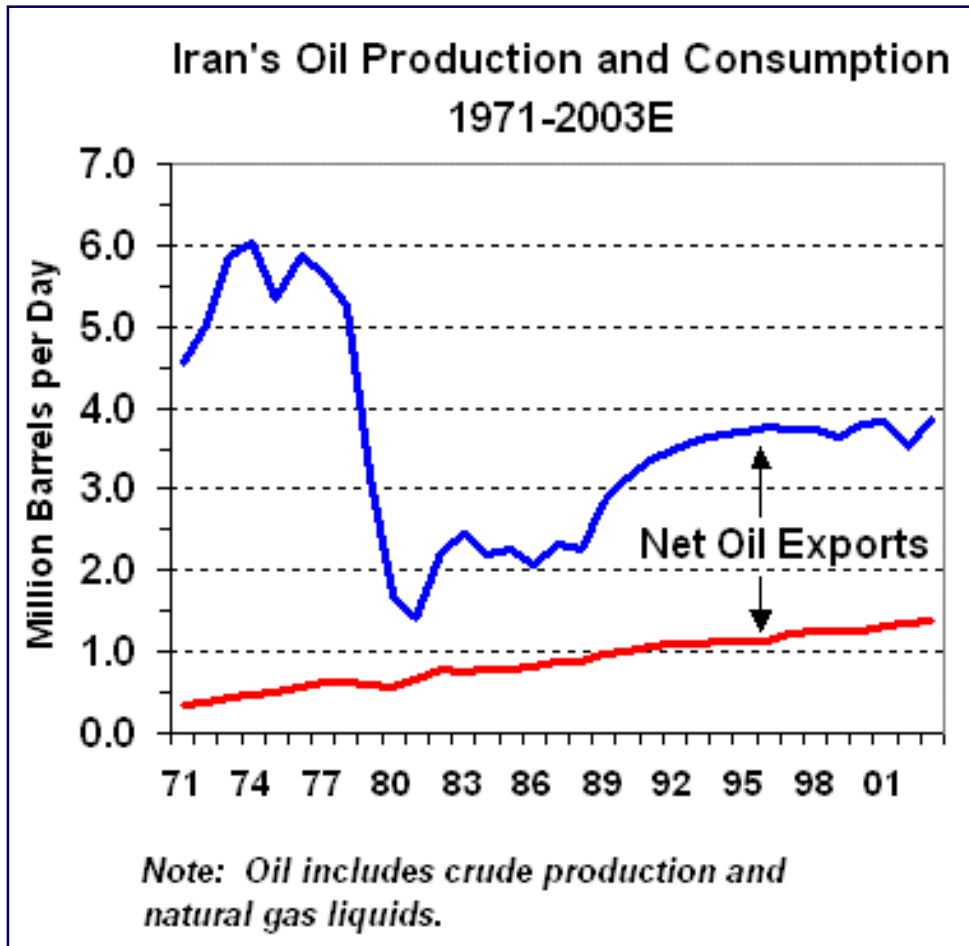
Since 1995, NIOC has made several other sizable oil discoveries, including the 3-5-billion-barrel Darkhovin onshore oilfield, located near Abadan and containing low sulfur, 39° API crude oil. In late June 2001, Eni signed a nearly \$1 billion, 5 1/2-year buyback deal to develop Darkhovin, with the added incentive of a limited risk/reward element (payment is to be linked to production capacity). Eni has a 60% stake in the project, with NIOC holding the remaining 40%. Ultimately, production at Darkhovin is expected to reach 160,000 bbl/d.

NIOC also would like to develop five oil and natural gas fields in the Hormuz region: Henjam A (known as West Bukha by Oman; the two countries are discussing possible joint development); the A field near Lavan Island; the Esfandir field near Kharg Island; and two structures near the South Pars natural gas field. According to NIOC, the five Henjam fields hold an estimated 400 million barrels of oil and have a production potential of 80,000 bbl/d. Other Iranian oil fields slated for increases include Doroud, Nosrat, Farzam, and Salman.

In February 2001, NIOC announced the discovery of a very large offshore oil field, named Dasht-e Abadan, in shallow waters near the port city of Abadan. According to a top NIOC official, Dasht-e Abadan could contain reserves "comparable" in size to Azadegan.

Foreign Investment/Buybacks

The Iranian constitution prohibits the granting of petroleum rights on a concessionary basis or direct equity stake. However, the 1987 Petroleum Law permits the establishment of contracts between the Ministry of Petroleum, state companies and "local and foreign national persons and legal entities." "Buyback" contracts, for instance, are arrangements in which the contractor funds all



investments, receives remuneration from NIOC in the form of an allocated production share, then transfers operation of the field to NIOC after the contract is completed. This system has drawbacks for both sides: by offering a fixed rate of return (usually around 15%-18%), NIOC bears all the risk of low oil prices. If prices drop, NIOC has to sell more oil or natural gas to meet the compensation figure. At the same time, companies have no guarantee that they will be permitted to develop their discoveries, let alone operate them. Finally, companies do not like the short terms of buyback contracts.

The first major project under the buyback investment scheme became operational in October 1998, when the offshore Sirri A oil field (operated by Total and Malaysia's Petronas) began production at 7,000 bbl/d (Sirri A currently is producing around 20,000 bbl/d). The neighboring Sirri E field began production in February 1999, with production at the two fields expected to reach 120,000 bbl/d.

In March 1999, France's Elf Aquitaine and Italy's Eni/Agip were awarded a \$1

billion contract for a secondary recovery program at the offshore, 1.5-billion-barrel Doroud oil and natural gas field located near Kharg Island. The program is intended to boost production from around 136,000 bbl/d to as high as 205,000 bbl/d. Total is operator of the project, with a 55% share, while Eni holds the other 45%.

In April 1999, Iran awarded TotalFinaElf (46.75% share), along with Canada's Bow Valley Energy (15% share), a buyback contract to develop the offshore Balal field. Eni is also involved, with a 38.25% stake. The field, which contains some 80 million barrels of reserves, started producing at a 20,000-bbl/d rate in early 2003, and reportedly reached 40,000 bbl/d in February 2004.

A much-sought-after deal to develop the giant Bangestan field has been delayed several times after an expected award in 2001. Bangestan includes three oilfields (Anwaz, Mansuri, Ab-Teymour) which currently produce about 250,000 bbl/d of oil, but the field is one of the oldest in the country and requires investment and technology to compensate for natural decline. In April 2003, Shell stated that it was frustrated with the slow pace of negotiations on Bangestan, including numerous changes to terms of the project. Currently, bidders on the project include Total and BP, with Total considered the favorite. Development of Bangestan could cost \$3 billion over 10 years, and aims to raise output to 600,000 bbl/d.

In May 2002, Iran's Oil Ministry signed a \$585 million buyback contract with NIOC subsidiary PetroIran to develop the Foroozan and Esfandiar offshore oilfields. PetroIran is expected to increase production at the fields from around 40,000 bbl/d at present to 105,000 bbl/d by late 2005. The two oilfields straddle the border with Saudi Arabia's Lulu and Marjan fields.

In other news related to "buyback" deals, the Cheshmeh-Khosh field, which previously had been awarded to Spain's Cepsa for \$300 million, was re-awarded in January 2004 to state-owned Central Iranian Oil Fields Company (CIOFC). In December 2003, Cepsa and OMV withdrew from lengthy negotiations after a reported failure to agree on development costs and buyback terms. It remains possible, however, that Cepsa and OMV could still be involved at Cheshmeh-Khosh in some way. The objective is to raise crude production at the field from

40,000 bbl/d currently to 80,000 bbl/d within four years.

Recently, Iran appears to have had some second thoughts about buybacks (including charges of corruption, insufficient benefits to Iran, and also worries that buybacks are attracting too little investment), and reportedly is considering substantial changes in the system. In late May 2002, Canada's Sheer Energy became the first foreign company since Eni's Darkhovin deal to reach agreement (\$80 million to develop the Masjed-I-Suleyman, or MIS, field) under the Eni terms. Sheer's goal was to boost MIS production from 4,500 bbl/d to 20,000 bbl/d, but the company was replaced by China's CNPC after reported delays and difficulties in fulfilling contract terms. In general, the addition of a limited risk/reward element has not attracted the flood of foreign energy investment which Iran both needs and wants. In January 2004, Iran announced modifications to the "buy-back" model, extending the length of such contracts from the current 5-7 years to as many as 25 years, while allowing for continued involvement of oil companies after the field is handed over to NIOC.

In early November 2003, NIOC announced the launch of a new tender for 16 oil blocks. The contracts reportedly are to be based on the buyback model, but for the first time will cover exploration, appraisal, and development. In September 2003, Russia's Lukoil said it had been granted approval by NIOC to explore for oil in the Anaran block along the border with Iraq. Norsk Hydro is currently in charge of the project.

Offshore Developments

The Doroud 1&2, Salman, Abuzar, Foroozan, and Sirri fields comprise the bulk of Iran's offshore oil output. Iran plans extensive development of existing offshore fields and hopes to raise its offshore production capacity to 1.1 million bbl/d (from around 675,000 bbl/d currently). It is estimated that development of new offshore Persian Gulf and Caspian Sea oil fields will require investment of \$8-\$10 billion. In early October 2003, Iran re-launched a tender for eight exploration blocks in the Persian Gulf after receiving little interest from a January 2003 announcement. One area considered to have potential is located near the Strait of Hormuz. Another interesting area is offshore near Bushehr, where Iran claimed in July 2003 to have discovered three fields with potentially huge -- 38 billion

barrels oil reserves. In May 2004, Brazil's Petrobras signed a 3-year, \$32-\$34 million deal to develop the Tousan fields of the Persian Gulf.

In late 2001 and early 2002, Shell brought part of the \$800 million Soroush-Nowrooz development online, with production of around 60,000 bbl/d. The two fields are located offshore, about 50 miles west of Kharg Island, and contain estimated recoverable reserves of around 1 billion barrels of mainly heavy oil. Although Soroush was shut down briefly in March 2003 at the outset of war with Iraq, output from the field is still expected to reach 190,000 bbl/d in the next few months (the original target had been May 2004, and in late July 2004 NIOC's managing director said he believed Shell should be fined for the delay). In early 2003, a consortium of three Japanese companies bought a 20% share in the Soroush/Nowrooz development project. In March 2004, the Iranian Offshore Oil Company (IOOC) awarded a \$1.26 billion contract for recovery of NGLs and natural gas from Soroush, Nowrooz, Foroozan, and Abuzar to Japan's JGC Corporation. Ethane from the gas will feed an ethylene complex at the Kharg petrochemical complex.

Caspian Sea Region

Aside from acting as a transit center for other countries' oil and natural gas exports from the Caspian Sea, Iran has potentially significant Caspian reserves of its own, although nothing has been "proven" at this point to be recoverable. Currently, Iran has no oil or natural gas production in the Caspian region. In early 2004, a 3-D seismic survey of the southern Caspian was being conducted by Iran's Oil Survey Co.

At the present time, Iran continues to maintain that regional treaties signed in 1921 and 1940 between Iran and the former Soviet Union, which call for joint sharing of the Caspian's resources between the two countries, remain valid. Iran has rejected as invalid all unilateral and bilateral agreements on the utilization of the Sea. As such, Iran is insisting that either the Sea should be used in common, or its floor and water basin should be divided into equal (20%) shares. Under this plan, the so-called "condominium" approach, the development of the Caspian Sea would be undertaken jointly by all of the littoral states. However, using the equidistant method of dividing the seabed on which Kazakhstan, Azerbaijan, and

Russia have agreed, Iran would only receive about 12%-13% of the Sea. In March 2002, Iran's Oil Minister Zanganeh asserted that Iran would begin exploiting its fifth of the Sea within a short time, and would not permit "any other party to engage in oil exploration" in this area. In January 2003, Iranian Foreign Minister Kamal Kharrazi reiterated the country's claim to a 20% share of the Caspian..

As of July 2004, no agreement has been reached among Caspian Sea region states on this matter. In March 2003, Iran and Turkmenistan noted "the need to achieve a consensus between the five [littoral] countries," while the two countries reportedly moved ahead in charting their common border in the Sea. In late April 2002, a meeting between the five Caspian littoral states ended without agreement on a new treaty. On May 20, 2002, Iran and Azerbaijan also failed to reach agreement on Caspian Sea division. On July 23, 2001, tensions flared in the Caspian Sea region when an Iranian gunboat intercepted two BP oil exploration vessels off Azerbaijan's coast. Following the incident, BP suspended exploration in the disputed block (which Iran calls Alborz).

Crude Swaps

Iran's desire to become a player on the Caspian oil front has led it to push forward in the area of oil "swaps." This arrangement involves the delivery of Caspian oil to refineries in northern Iran for local consumption, while an equivalent amount of Iranian oil is exported through Persian Gulf terminals such as Kharg Island. Shippers normally pay a "swap fee" of \$1.50-\$2.00 per barrel, with swaps handled by Naftiran Intertrade Co. (Nico), the Swiss-based trading arm of NIOC. As of May 2004, about 130,000 bbl/d of Russian, Turkmen, and Kazakh oil were being shipped to Neka, and then on to Tehran by the existing 170,000-bbl/d capacity Neka-Tehran pipeline. Eventually, Iran hopes to upgrade its facilities in order to greatly expand oil swaps, partly in order to compete with the 1-million-bbl/d Baku-Tbilisi-Ceyhan (BTC) pipeline, scheduled to open in late 2005. Iran plans to boost capacity at its northern refineries at Arak, Tabriz, and Tehran to about 800,000 bbl/d in order to process additional Caspian oil, to boost Neka-Tehran pipeline capacity to 500,000 bbl/d, and also to increase port capacity at Neka to 500,000 bbl/d. In August 2003, a \$500 million tender was issued to upgrade the Tehran and Tabriz refineries in order to handle 370,000 bbl/d of Caspian crude. This

follows a \$330 million project, completed in late 2003, to expand storage at Neka and to upgrade the Tehran and Tabriz refineries. Among other issues, Caspian crude oil has a high sulfur content (specifically, a substance known as "mercaptans"), makes it challenging to refine. Ultimately, Iran hopes to transform Neka into the "Rotterdam of the Caspian."

Aside from Caspian "swaps," there were reports in early August 2004 that Iran and Iraq had reached a framework swap agreement involving possible construction of a 24-mile, 350,000-bbl/d oil pipeline from Basra to the Abadan refinery in southwestern Iran. In exchange, Iran would export a similar volume of oil from Kharg Island, crediting Iraq minus a swap fee. The pipeline idea was discussed by Iraqi Oil Minister al-Uloum visited Tehran in December 2003 and met with Iranian Oil Minister Zanganeh.

Refining and Transportation

As of January 2004, Iran had nine aging (most built before the 1979 Iranian revolution) but operational refineries with a combined capacity of 1.47 million bbl/d. Major refineries include: Abadan (400,000-bbl/d capacity); Isfahan (265,000 bbl/d); Bandar Abbas (232,000 bbl/d); Tehran (225,000 bbl/d); Arak (150,000 bbl/d); and Tabriz (112,000 bbl/d). There reportedly are plans to increase capacity at all of Iran's refineries significantly over the next few years, at a cost of several billion dollars. Objectives include increasing gasoline output and reducing Iranian gasoline imports significantly. Another objective is to allow Iran's refineries to process a heavier crude slate while decreasing the fuel oil cut. Currently, Iran's refineries produce around 30% heavy fuel oil and just 16% gasoline. In June 2004, Japan's JGC reached an agreement with Iran to expand Arak to 250,000 bbl/d by 2009.

In order to meet burgeoning domestic demand for middle and light distillates (gasoline demand is growing at around 10%-12% per year), Iran has imported refined products since 1982. In 2004 alone, Iran imported an estimated 160,000 bbl/d of gasoline, for instance, at an estimated annual cost of around \$2-\$3 billion. To minimize these imports, Iran is attempting to boost its refining capacity to 2 million bbl/d. Two planned grassroots refineries include a 225,000-bbl/d plant at Shah Bahar and a 120,000-bbl/d unit on Qeshm Island. The \$3 billion Shah Bahar

refinery project was approved by the government in late 1994 and would be built by private investors. Under Iranian law, foreign companies are permitted to own no more than 49% of Iranian oil refining assets.

Iran exports crude oil via four main terminals -- Kharg Island (by far the largest), Lavan Island, Sirri Island (reopened on April 13, 2003 for the first time since 1988, when it was damaged by an Iraqi air raid), and Ras Bahregan. Refined products are exported via the Abadan and Bandar Mahshahr terminals. Many Iranian oil export terminals were damaged during the Iran-Iraq War, but all have been rebuilt.

NATURAL GAS

Iran contains an estimated 940 trillion cubic feet (Tcf) in proven natural gas reserves -- the world's second largest and surpassed only by those found in Russia. Around 62% of Iranian natural gas reserves are located in non-associated fields, and have not been developed, meaning that Iran has huge potential for gas development. Major non-associated gas fields include: South Pars (280-500 Tcf of gas reserves), North Pars (50 Tcf), Kangan (29 Tcf), Nar (13 Tcf), Khangiran (11 Tcf), and several others.

Despite the fact that domestic natural gas demand is growing rapidly, Iran has the potential to be a large natural gas exporter due to its enormous reserves. In 2002, Iran produced about 2.7 Tcf of natural gas. Of this, around 10% was flared, and approximately 30% reinjected -- in part for enhanced oil recovery efforts. Natural gas treatment and processing plants include Kangan-Nar, Aghar-Dalan, Ahwaz, Marun-4, Bid Boland, and Asaluyeh. In March 2004, Iran signed a \$1.2 billion contract with a consortium of two foreign and two domestic companies to gather associated gas, previously flared or re-injected, from the Nowrooz, Soroush, Hendijan and Behregansar fields.

Currently, natural gas accounts for nearly half of Iran's total energy consumption, and the government plans billions of dollars worth of further investment in coming years to increase this share. The price of natural gas to consumers is state-controlled.

Iran has been involved in a border dispute with Kuwait and Saudi Arabia over

demarcation of the border through the northern Gulf continental shelf. This region contains the 7-13-Tcf Dorra natural gas field, which Iran had begun drilling in early 2000 but stopped after complaints by Kuwait. Saudi Arabia and Kuwait (which do not recognize Iran's claims to Dorra) signed a bilateral agreement in July 2000 on dividing up the field equally between the two countries. In early 2002, there were reports that Saudi Arabia and Kuwait were planning to develop Dorra even without an agreement with Iran.

The dual Aghar-Dalan field development has been one of National Iranian Gas Company's recent successful natural gas utilization projects. Since coming online in mid-1995, the Aghar and Dalan fields have produced approximately 600 Mmcf/d and 800 Mmcf/d, respectively. Natural gas from both fields is processed at a \$300 million facility at the Dalan field, which is also the location of a 40-MW, natural-gas-fired power plant. Most of the treated natural gas from the Dalan processing plant is carried through a 212-mile pipeline for re-injection in the Marun field and other oil fields in Khuzestan province.

South Pars

Iran's largest non-associated natural gas field is South Pars, geologically an extension of Qatar's 380-Tcf North Field, most likely the largest non-associated gas field in the world. South Pars was first identified in 1988 and originally appraised at 128 Tcf in the early 1990s. Current estimates are that South Pars contains 280 Tcf or more (some estimates go as high as 500 Tcf) of natural gas, of which a large fraction will be recoverable, and over 17 billion barrels of liquids.

Development of South Pars is Iran's largest energy project, already having attracted around \$15 billion in investment, but development has been delayed by various problems -- technical (i.e., high levels of mercaptans -- foul-smelling sulfur compounds -- in the South Pars gas), contractual (i.e., controversy over "buy-back" arrangements), political, etc. Phase 1, for instance, which is being handled by Petropars (owned 60% by NIOC), has been delayed several times but finally has begun to come onstream, around three years behind schedule. Phase 1 involves production of 900 million cubic feet per day (Mmcf/d) of natural gas and 40,000-45,000 bbl/d of condensate. Overall, South Pars is slated to be developed in 28 phases, although only 16 phases are active so far. According to FACTS,

Inc., total condensate production from South Pars phases 1-14 is expected to reach 218,000 by 2005 and 628,000 bbl/d by 2015. Total gas reinjection from South Pars phases 6-10 is estimated by FACTS at 5 bcf/d, although "field engineers think this may not be enough," with some calling for "up to 12 bcf/d."

Natural gas from South Pars largely is slated to be shipped north via the planned 56-inch, 300-mile, \$500 million, IGAT-3 pipeline (a section of which is now being built by Russian and local contractors), as well as planned IGAT-4 and IGAT-5 lines. Gas also will be reinjected to boost oil output at the mature Agha Jari field (output peaked at 1 million bbl/d in 1974, but has since fallen to 200,000 bbl/d), and possibly the Ahwaz and Mansouri fields (which make up part of the huge Bangestan reservoir in the southwest Khuzestan region).

Besides condensate production and reinjection/enhanced oil recovery, South Pars natural gas also is intended for export, by pipeline and also possibly by liquefied natural gas (LNG) tanker. Sales from South Pars could earn Iran as much as \$11 billion per year over 30 years, according to Iran's Oil Ministry. However, Iran likely will face stiff competition for LNG customers, particularly given the fact that many other LNG suppliers (Oman, Qatar, the UAE) are already players, having locked up much of the Far East market. U.S. sanctions also mean that Iran is limited to non-U.S. liquefaction technology, which is an important consideration given that most LNG plants use processes developed by U.S. companies.

In February 2003, Oil Minister Zanganeh officially inaugurated Phases 2 and 3 of South Pars development, which began to come onstream in March 2002. A consortium led by Total developed the project at a cost of approximately \$2 billion. Already, Phases 2 and 3 reportedly are producing over 2 Bcf per day of natural gas, and around 85,000 bbl/d of condensates. Twin undersea pipelines will carry gas from South Pars to onshore facilities at Asaluyeh. In March 2002, Hyundai signed another contract, this one for \$1 billion, to build four natural gas processing trains. The Asaluyeh facility comprises four natural gas processing trains, sulphur recovery units, condensate stabilization and storage units, and export compressors.

Phases 4 and 5, estimated to cost \$1.9 billion each, are being handled by Eni and

Petropars, and involve construction (by Agip and Petropars) of onshore treatment facilities at the port of Bandar Asaluyeh. These two phases are expected to come online by late 2004 or early 2005 at around 2 Bcf per day, plus 1 million tons per year of liquefied petroleum gas (LPG).

Phases 6-8, which are to produce a combined 3 Bcf/d of natural gas and 120,000 bbl/d of condensate at a cost of \$2.6 billion, are being handled by Petropars and Norway's Statoil, which signed an agreement in October 2002. First stages of the project are scheduled to come online in late 2004, with gas being transported via the planned \$235 million IGAT-5 pipeline to the Agha Jari oilfield for injection as part of enhanced oil recovery efforts. NIOC is to take over as operator when development is finished. In May 2003, Iran signed a \$1.2 billion deal with a Japanese-led consortium for construction of an onshore natural gas and condensate processing facility for Phases 6-8.

Phases 9 and 10, being developed by South Korea's LG Engineering and Construction Corp., are expected to supply 2 Bcf per day to the domestic market, possibly by 2007. In September 2002, South Korea's LG signed a \$1.6 billion deal with NIOC on phases 9 and 10. LG's share is 42%, and the deal reportedly uses international bank project financing rather than a "buy-back" model. Bids on Phase 11, which is slated for LNG export, were opened in March 2003. In February 2004, Total (30%) formed Pars LNG along with Petronas (20%) and NIOC (50%), and in April 2004 Total was selected to enter into final negotiations on the \$1.2 billion project. Phase 11 is slated to produce 8 million tons per year of LNG and 70,000 bbl/d of condensate under a buyback contract, possibly beginning in 2009.

Phase 12, which had been slated for LNG export and condensate production, possibly by 2008, reportedly is on hold for now. Eni, however, reportedly is seeking to follow in the footsteps of Total and its deal on Phase 11. Other companies mentioned as possible partners with Eni on Phase 12 include NIOC, the UK's BG Group, and Petropars. Meanwhile, a Shell-led consortium ("Persian LNG") hopes to win Phase 13, which is slated for LNG production but may be left unused. Phase 14 is slated for gas-to-liquids (GTL) development, with Statoil and Shell reportedly interested. In May 2003, invitations were sent out for bids on

Phases 15-16 of the South Pars project, which is to produce 1.8 Bcf/d of natural gas for domestic use, plus 80,000 bbl/d of condensate and 1 million tons per year of LPG for export.

Other Natural Gas Development

In addition to South Pars, Iran's long-term natural gas development plans may involve: the 48-Tcf North Pars field (a separate structure from South Pars); the 6.4-Tcf, non-associated Khuff (Dalan) reservoir of the Salman oil field (which straddles Iran's maritime border with Abu Dhabi, where it is known as the Abu Koosh field); the 800-Bcf Zireh field in Bushehr province; the 4-Tcf Homa field in southern Fars province; the 14-Tcf Tabnak natural gas field located in southern Iran; the onshore Nar-Kangan fields, the 13-Tcf Aghar and Dalan fields in Fars province, and the Sarkhoun and Mand fields. In September 2003, President Khatami inaugurated the first phase of Tabnak development, along with a related gas processing plant and a combined cycle (electricity is produced from otherwise lost waste heat exiting from one or more gas turbines) power facility.

In June 2004, the Iranian News Agency reported that Iran had discovered two new natural gas fields in the Persian Gulf, one at Balal and the other beneath Lavan Island (with possible reserves of 7 Tcf).

Natural Gas Trade

With almost unlimited natural gas production potential, Iran is looking to export large volumes of gas. Besides Turkey (see below), potential customers for Iranian gas exports include: Ukraine (Kiev reportedly is interested in building an Iran-Armenia-Georgia-Crimea-Ukraine line), Europe, India, Pakistan, Armenia, Azerbaijan, Georgia (interested in receiving Iranian gas via Armenia), Taiwan, South Korea, and coastal China. Exports could be either via pipeline or by LNG tanker, with possible LNG export terminals at Asaluyeh or Kish Island. As of July 2004, BG and NIOC reportedly were in advanced talks on developing a \$2.2 billion LNG plant at Bandar Tombak on the Persian Gulf coast. The plant is to comprise two LNG trains, with capacity of at least 4 million tons per year each, with possible completion in 2008.

In late January 2002, Iran and Turkey officially inaugurated a much-delayed natural gas pipeline link between the two countries, following several years of

delays due to economic, political, and technical factors. Exports of Iranian natural gas to Turkey could reach 350 Bcf per year by 2007. There are questions, however, whether Turkish demand will grow rapidly enough to absorb this volume of gas from Iran, in addition to gas slated to be supplied by Russia, Algeria, and Nigeria. In June 2002, for instance, Turkey halted Iranian gas imports, ostensibly due to "quality problems" but more likely due to lack of demand in Turkey and also the desire for a lower price. On November 13, 2002, Turkey announced that it had resumed gas imports from Iran after reportedly securing a lower price and a reduction in the "take-or-pay" percentage. In February 2004, Turkey's Energy Minister, Hilmi Guler, stated that Turkey would seek international arbitration on its natural gas price dispute with Iran. In April 2004, Iran said that it would not cut the price of natural gas to Turkey.

In October 2002, the International Atomic Energy Agency (IAEA) predicted that "Iran will be a major global natural gas supplier in the future," especially to Europe. Iran reportedly is shooting for around 300 Bcf per year of natural gas exports to Europe via Turkey by 2007. Along these lines, Greece and Iran signed a \$300 million agreement in March 2002 which calls for extending the natural gas pipeline from Iran to Turkey into northern Greece. After that, gas could be transported to Europe via Bulgaria and possibly Romania (a memorandum of understanding -- MOU -- was signed on this possibility in January 2003, and a joint working group set up in October 2003), or via an undersea pipeline to Italy, where gas demand is expected to grow rapidly in coming years. A deep water option could be extremely expensive, however, making an overland route more likely. In January 2004, Austria's OMV signed an MOU with the National Iranian Gas Export Co. (NIGEC) on possible cooperation regarding the proposed \$4 billion "Nabucco" gas pipeline from Iran through Turkey to Austria. A decision on the Nabucco line is possible by the end of this year, with gas flows beginning in 2009 at the earliest.

Although India and Iran in 1993 signed an MOU on an overland natural gas pipeline, regional political and security concerns to date have blocked completion of a feasibility study. Meanwhile, in February 2002, Iran and Pakistan signed an MOU on a pre-feasibility study for a possible 1,600-mile, \$4 billion gas pipeline from southern Iran to southeastern Pakistan and on to India. While Iran and

Pakistan have shown great interest in the project, India has been reluctant to move forward as long as political and military tensions with Pakistan over Kashmir persist. The issue was due to be discussed at bilateral talks between India and Pakistan in June 2004, but negotiations are expected to be protracted and difficult. Iran is offering to cover 60% of the construction costs of the pipeline, but India remains wary of Pakistani access to its energy supply. Indian officials said the plan could be considered if Pakistan can provide security guarantees for the \$3 billion project. Pakistan could earn about \$600 million annually in transit fees from the pipeline and also would be able to purchase some gas from the pipeline when and if its own demand were sufficient.

Another possibility would involve LNG exports to India. In January 2003, the leaders of Iran and India signed an MOU on energy cooperation, including the LNG option, and negotiations between Iran and India's import consortium Petronet LNG are continuing. As of early July 2004, Iran reportedly had slashed its price offer for LNG to India below what Qatar's RasGas was offering. However, Petronet reportedly was demanding an even lower price than the \$2.22/MMBtu offered, and no final deal had been reached. If successful, LNG exports most likely would flow to Dahej, in the western Indian state of Gujarat, from South Pars Phases 7 and 8. Exports could amount to 5 million tons (worth \$800 million) per year for 20 years starting in 2010, according to Petronet. As part of the deal, NIOC is asking India's ONGC Videsh to bid on the Husseineh-Khusk oilfield development project south of Azadegan, and reportedly has offered ONGC a 20% stake in the field on a buyback basis. In addition, Iran reportedly has offered India a stake in South Pars development if it agrees to an LNG deal, while India has offered to invest more than \$1 billion in building an LNG plant in India. GAIL India, a major shareholder in Petronet, has stated that it considers Iran a potential supplier for India's new LNG terminals.

In addition to India, China has expressed interest in LNG imports from Iran. In March 2004, press reports indicated that Chinese firm Zhuhai Zhenrong had reached a "preliminary agreement" to purchase \$20 billion worth of Iranian LNG over 25 years beginning in 2008. Currently, Zhuhai Zhenrong has a contract to purchase around 240,000 bbl/d of Iranian oil. Also, in April 2004, China's Sinopec confirmed that it was holding talks with Iran on a major LNG purchase

agreement, possibly 5 million tons per year. In exchange, Sinopec reportedly would be given access to Iranian oilfields. In early 2004, Sinopec drilled its first well in the Zavareh-Kashan bloc, which it had been exploring since 2001. Iran is the second-largest supplier of oil to China after Saudi Arabia, accounting for 14% of total Chinese oil imports in 2003.

Aside from natural gas exports, Iran also has discussed *importing* natural gas from Azerbaijan, and already imports some natural gas from Turkmenistan. This natural gas is for use in Iran's northern areas, far from the country's main natural gas reserves in the south. In December 1997, Turkmenistan launched the \$190 million Korpezhe-Kurt Kui pipeline to Iran, the first natural gas export pipeline in Central Asia to bypass Russia. according to terms of the 25-year contract between the two countries, Iran will take between 177 Bcf and 212 Bcf of natural gas from Turkmenistan annually, with 35% of Turkmen supplies allocated as payment for Iran's contribution to building the pipeline.

In December 2001, the presidents of Turkmenistan and [Armenia](#) reached an agreement by which Turkmenistan will supply up to 70.6 Bcf per year of natural gas to Armenia via the Korpezhe-Kurt Kui pipeline and across Iran. Implementation of this deal is contingent on the construction of an Iran-Armenia natural gas pipeline. In May 2004, Armenia and Iran agreed on a long-term deal, under which Iran will supply around 1.3 Tcf of natural gas to Armenia over 20 years (starting in 2007), in exchange for electricity supplies from Armenia. As part of the deal, the two countries are to build an 85-mile gas pipeline at a cost of more than \$200 million. There are doubts, however, whether Armenia's gas demand justifies the economics of the project, which has been discussed for a decade or so but gone nowhere. Armenia also reportedly is looking to receive credit from Iran for building hydro plants on the Araks River in exchange for supplies of hydropower to Iran.

ELECTRIC POWER

As of 2003, Iran had installed power generation capacity of about around 31 gigawatts (GW), of which three-quarters or more was natural gas-fired, with the remainder either hydroelectric (7%) or oil-fired. As a result of significant state investment in this area, a number of new power plants (mainly hydroelectric and

combined cycle) have come online in recent years in Iran, including the 2,000-MW Shahid Rai thermal power station in Qazvin; a 1,290-MW combined-cycle plant in Rasht; a 1,272-MW combined-cycle plant came online in Kerman; a doubling of the Tabriz power plant's capacity to 1,500 MW; two, 200-MW, steam-powered units at the Martyr Montazeri plant; the 400-MW Karkheh hydro facility; a 215-MW steam-powered unit at the Ramin Power Plant; a 107-MW combined cycle generator at Montazer Qa'em Power Plant, and three-fourths of the Shazand power plant near Arak in central Iran. In September 2003, President Khatami inaugurated a 1,053-MW combined cycle power plant in Fars.

With power demand growing rapidly (7%-8% annually), Iran is building significant new generation capacity -- both thermal and hydroelectric -- with the goal of adding 30 GW over the next ten years (Iran estimates that it may need 90 GW of power generating capacity by 2020). Currently, the largest hydropower projects are the 3,000-megawatt (MW) Karun 3 plant, the 2,000-MW Godar-e Landar facility, and a 1,000-MW station in Upper Gorvand. New thermal projects include two 1,040-MW combined cycle plants in the South, an 1,100-MW combined cycle plant at Arak, and a 1,000-MW facility in Bandar Abbas. In May 2004, a 494-MW, gas-fired power plant was inaugurated in Abadan. Also in May 2004, a large wind power plant at Binaloud in Khorasan province began to come online, with Iran hoping to increase wind power capacity to 60 MW by the end of 2004. In June 2004, Iran's first geothermal plant, in the northwestern province of Ardebil, came online, with an initial power generating capacity of 2 MW (expandable to 100 MW).

Iran has received offers for investment in the form of loans and build-operate-transfer (BOT) contracts, but progress has been slow. BOT contracts allow the investing company to build and operate the generating facility for a period of 15-20 years, after which time the plant is turned over to the Energy Ministry. Negotiations have taken place with international energy firms on expansion plans for power plants at Bandar Abbas, Shaid Rajai, Alborz, Ramin, and Kerman. In addition to BOT plants, Iran has attempted to promote a build-own-operate (BOO) model for the 2,000-MW, Zanjan 1-4 independent power project (IPP).

Although the government has considered privatization, at present Iran's power

sector is run by the state-controlled Tavanir organization. Eventually, Tavanir may be broken up into smaller companies as part of a privatization package. In addition to power generation, Tavanir also is responsible for transmission. Iran has main power distribution networks: 1) the Interconnected Network, which serves all of Iran except for remote eastern and southern areas, using 440-kV and 230-kV transmission lines; 2) the Khorassan Network, which serves the eastern Khorossan province; and 3) the Sistan and Baluchistan Network, which serves the remote southeastern provinces of Sistan and Baluchistan. The government goal is to join these three networks into one national grid. Currently, around 94% of Iranians are connected to one of Iran's power grids. Iran also has power links to neighboring countries, including Azerbaijan, Turkmenistan (started August 2002), and Turkey.

Iran exports electricity to western Afghanistan as part of an economic assistance package. In early September 2003, Iran and Turkmenistan signed a deal for long-term Turkmen power exports to Iran. In April 2003, Iran said that it would be willing to supply Iraqi cities with electricity as well.

NUCLEAR

Currently, Iran has several small nuclear research reactors, in addition to a large-scale nuclear power plant under construction at the southern town of Bushehr. Iran claims that its nuclear power is for peaceful purposes and that it will help free up oil and natural gas resources for export, thus generating additional hard-currency revenues. The country has stated its aim of having 7,000 MW of nuclear power online by 2020, accounting for 10% of the country's power generation capacity at that point.

In September 2003, the International Atomic Energy Agency (IAEA) gave Iran until October 31 to provide guarantees that its nuclear program was for peaceful purposes and to open the country to snap inspections by the IAEA. On October 6, 2003, Iran's envoy to the IAEA, Ali Akbar Salehi, said that Iran would withdraw from the Nuclear Non Proliferation Treaty (NNPT) if Western pressure continued. On October 30, IAEA head Mohammed el-Baradei declared that Iran's report on its nuclear activities appeared to be "comprehensive," but that he would still have a lot of questions. On November 14, Iran's Foreign Minister, Kamal Kharazzi,

said that his country was committed to "complete transparency," and added that the IAEA report made clear that Iran's nuclear program was for peaceful purposes. On December 18, Iran signed a protocol to the NNPT that will allow the IAEA to have more comprehensive access to sites in the country. It is not known when Iran will officially ratify the protocol. In mid-March 2004, Iran announced that it was barring nuclear inspectors from entering the country for an indefinite period of time after the IAEA passed a resolution rebuking Iran for failure to fully disclose the details of its past nuclear activity. However, Iran shortly reversed course and allowed IAEA inspectors to continue their work.

In December 2002, Iran and Russia signed a protocol for peaceful cooperation in nuclear power. Russia has been assisting Iran on the Bushehr nuclear power facility, work on which first began in 1974 by West Germany, but was halted (80% complete) following the 1978/1979 revolution. Significant amounts of money, possibly billions of dollars, had been spent on Bushehr to that point. Following the Iran-Iraq War (1980-1988), during which time Bushehr was bombed six times and seriously damaged, progress on the plant resumed when Russia signed an \$800 million contract in 1995. The contract with Russia called for completion of a 1,000-MW, pressurized-light-water reactor, as well as the possible supply of two modern VVER-440 units. Since then, work has proceeded slowly, although reports in early March 2003 indicated that Bushehr was 70% complete, and was expected to come online as early as March 2004.

Subsequently, the completion date for Bushehr-1 was pushed off by a year -- supposedly due to technical difficulties -- and is now scheduled to come online in 2005. In early September 2003, a Russian Atomic Energy Ministry spokesman said that it would cost "\$1.2-\$1.3 billion to complete the construction" of Bushehr's first unit. In November 2003, Russia proposed that it build a "totally new" second nuclear unit at Bushehr, instead of completing the one started in the late 1970s.



Although Iran is a signatory to the NNPT and insists that its nuclear program is for peaceful purposes (i.e., power generation), the United States strongly opposes the Bushehr project and has in the past provided Russia with information pointing to the existence of an Iranian nuclear weapons program. In May 2002, U.S. Energy Secretary Spencer Abraham met with Alexander Rumyantsev, head of Russia's nuclear agency, and discussed this issue, with Rumyantsev stating the Russian position that Bushehr "is not a source of proliferation of nuclear material." In late March 2003, U.S. Undersecretary of State for Arms Control, John Bolton, said, "In the aftermath of Iraq, dealing with the Iranian nuclear weapons program will be of equal importance as dealing with the North Korean nuclear weapons program." In April 2003, Russia and Iran reached a deal on returning spent nuclear fuel rods from Bushehr back to Russia for reprocessing. Russia hopes to earn as much as \$40 million per year supplying Iran with nuclear fuel and with shipping out spent fuel. The two countries also have discussed construction of additional nuclear power plants in Iran.

In February 2003, Iran announced that it had begun mining uranium deposits at Saghand near the central Iranian city of Yazd, and was constructing a uranium enrichment facility at Natanz, located 200 miles southeast of Tehran. In March 2003, International Atomic Energy Agency (IAEA) inspectors examined Natanz and described it as "impressive." Other news reports indicated that Natanz was "extremely advanced" and involved "hundreds" of gas centrifuges for producing enriched uranium. Some analysts believe that Yazd and Natanz are part of an Iranian effort to attain self-sufficiency in the entire nuclear fuel cycle. Besides

Natanz, the IAEA also has expressed interest in inspecting a heavy-water plant at Arak.



ENVIRONMENT

In the context of its oil-based economy, environmental issues in Iran only recently have become important. Ongoing air pollution in urban areas, which reached a crisis level in Tehran in December 1999, have highlighted the need to improve Iran's environmental record. The rush to develop oil and natural gas resources in the Caspian Sea makes oil pollution in the Caspian a real environmental threat.

Huge increases in energy consumption over the past 20 years have contributed greatly to pollution levels as Iran's carbon emissions have nearly tripled over the same time span. Large numbers of old, inefficient cars on the road lacking catalytic converters account for much of the country's air pollution. Energy prices are kept artificially low in Iran through heavy state subsidies, resulting in wasteful consumption patterns.

In addition, Iran's abundance of fossil fuel resources has tended to discourage the country's incentive to shift to cleaner alternative energy sources for its energy needs. As Iran continues to struggle with air pollution in the 21st century,

however, the country likely will need to take a variety of tough measures in order to avert an environmental crisis.

Sources for this report include: Agence France Presse; AP Worldstream; APS Review Gas Market Trends; BBC Summary of World Broadcasts; Calgary Herald; CIA World Factbook; Deutsche Presse-Agentur; Dow Jones; Economist Intelligence Unit Viewswire; Energy Compass; FACTS, Inc; Financial Times; Foreign Broadcast Information Service; Global Insight; Gulf News; Hart's Africa Oil and Gas; Hart's Asian Petroleum News; Hart's Middle East Oil and Gas; InfoProd; Interfax; International Herald Tribune; International Monetary Fund; International Oil Daily; International Petroleum Finance; Iran Brief; Lloyd's List; Middle East Business Intelligence; Middle East Economic Digest; National Post; Nefte Compass, New York Times; Oil and Gas Journal; Petroleum Economist; Petroleum Intelligence Weekly; Petroleum Report; Pipeline and Gas Journal; Platt's Oilgram News; Reuters; Stratfor; Time Magazine; Turkish Daily News; Upstream; U.S. Energy Information Administration, Weekly Petroleum Argus; World Gas Intelligence, World Markets Analysis.

COUNTRY OVERVIEW

President: Mohammed Khatami (since August 1997; reelected June 2001)

Supreme/Spiritual Leader: Ayatollah Ali Khamenei

Islamic Republic Proclaimed: April 1, 1979

Population (7/04E): 69.0 million

Location/Size: Middle East - between the Persian Gulf and the Caspian Sea/636,296 square miles

Major Cities: Tehran (capital), Meshed, Isfahan, Tabriz, Shiraz, Ahwaz, Kermanshah, Qom, Ardebil, Qazvin

Languages: Persian and Persian dialects (58%), Turkic and Turkic dialects (26%), Kurdish (9%), Luri (2%), Baluch (1%), Arabic (1%), Turkish (1%)

Ethnic Groups: Persian (51%), Azerbaijani (24%), Gilaki and Mazandarani (8%), Kurd (7%), Arab (3%), Lur (2%), Baluch (2%), Turkmen (2%), other (1%)

Religion: Shi'a Muslim (89%), Sunni Muslim (10%), Zoroastrian, Jewish,

Christian, and Baha'i (1%)

ECONOMIC OVERVIEW

Minister of Economic Affairs and Finance: Dr. Tahmasb Mazaheri

Currency: Rial (R)

Exchange Rate (8/3/04): R7,900 per \$US

Gross Domestic Product (GDP, at market exchange rates) (2003E): \$126.1 billion

Gross Domestic Product (GDP, at purchasing power parity exchange rates) (2003E): \$551.4 billion

Real GDP Growth Rate (2002E): 5.9% **(2003E):** 4.5% **(2004F):** 4.4%

Inflation Rate (2003E): 10%-15%

Unemployment Rate (2003E): 16%-21%

Current Account Balance (2002E): \$3.8 billion **(2003E):** \$2.8 billion **(2004F):** \$0.2 billion

Major Trading Partners (2000): Japan, Italy, Germany, China, France, United Arab Emirates

Merchandise Exports (2003E): \$29.1 billion

Merchandise Imports (2003E): \$25.8 billion

Merchandise Trade Surplus (2003E): \$3.2 billion

Major Export Products: Oil and oil products (90%), carpets, pistachios

Major Import Products: Industrial supplies (37%), machinery (30%), consumer goods (18%)

Oil Export Revenues (2003E): \$23.9 billion **(2004F):** \$27.5 billion

Oil Export Revenues/Total Export Revenues (2004E): around 90%

External Debt (6/03E): \$9.2 billion (down from \$14 billion in March 1999)

ENERGY OVERVIEW

Minister of Energy: Habibollah Bitaraf

Minister of Petroleum: Bijan Namdar-Zanganeh

Vice President for Atomic Energy: Gholamreza Aqazadeh-Khoi

Proven Oil Reserves (1/1/04E): 125.8 billion barrels (up from 89.7 billion barrels as of 1/1/03)

OPEC Crude Oil Production Quota (as of 8/1/04): 3.817 MMBD **(as of 7/1/04):** 3.744 MMBD

Crude Oil Production Capacity (6/04E): 3.9 MMBD

Oil Production (2003E): 3.9 MMBD (of which, 3.7 MMBD was crude oil) (**Jan.-June 2004E): 4.1 MMBD** (of which 3.9 MMBD was crude oil)

Oil Consumption (2003E): 1.4 MMBD (2004F): 1.4 MMBD

Net Oil Exports (2002E): 2.5 MMBD (2004F): 2.5 MMBD

Crude Oil Refining Capacity (1/1/04E): 1.47 MMBD

Major Crude Oil Customers: OECD Europe, Japan, China, South Korea

Natural Gas Reserves (1/1/04E): 940 trillion cubic feet (Tcf)

Dry Natural Gas Production (2002E): 2.65 Tcf

Natural Gas Consumption (2002E): 2.80 Tcf

Recoverable Coal Reserves (2000E): 1,885 million short tons (Mmst)

Coal Production (2002E): 1.3 Mmst

Coal Consumption (2002E): 1.5 Mmst

Net Coal Imports (2002E): 0.2 Mmst

Electric Generation Capacity (2001E): 30.6 gigawatts (around 93% thermal)

Electricity Consumption (2002E): 119.9 billion kilowatthours

ENVIRONMENTAL OVERVIEW

Vice President for Environmental Protection: Dr. Mrs. Masumeh Ebtekar

Total Energy Consumption (2002E): 5.86 quadrillion Btu* (1.4% of world total energy consumption)

Energy-Related Carbon Dioxide Emissions (2002E): 359.4 million metric tons (1.5% of world total carbon dioxide emissions)

Per Capita Energy Consumption (2002E): 86.1 million Btu (vs U.S. value of 339.1 million Btu)

Per Capita Carbon Dioxide Emissions (2002E): 5.28 metric tons (vs U.S. value of 19.97 metric tons)

Energy Intensity (2002E -- PPP): 12,851 Btu/ \$nominal -- PPP (vs U.S. value of 9,344 Btu/\$nominal -- PPP)**

Carbon Dioxide Intensity (2002E -- PPP): 0.79 metric tons/thousand \$nominal -- PPP (vs U.S. value of 0.55 metric tons/thousand \$nominal -- PPP)**

Fuel Share of Energy Consumption (2002E): Natural Gas (50%), Oil (48%), Coal (1%), Hydroelectric (1%)

Fuel Share of Carbon Dioxide Emissions (2002E): Oil (52%), Natural Gas (48%), Coal (1%)

Status in Climate Change Negotiations: Non-Annex I country under the United Nations Framework Convention on Climate Change (ratified July 18th, 1996). Not a signatory to the Kyoto Protocol.

Major Environmental Issues: Air pollution, especially in urban areas, from vehicle emissions, refinery operations, and industrial effluents; deforestation; overgrazing; desertification; oil pollution in the Persian Gulf; inadequate supplies of potable water.

Major International Environmental Agreements: A party to Conventions on Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection and Wetlands. Has signed, but not ratified, Environmental Modification, Law of the Sea and Marine Life Conservation.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

**GDP figures from CIA Factbook estimates based on purchasing power parity (PPP) exchange rates.

OIL AND GAS INDUSTRIES

Organizations: The Ministry of Petroleum (MoP) has overall responsibility for the country's energy sector. The MoP has four subsidiaries which function autonomously for the most part, but ultimately report to the Ministry: 1) National Iranian Oil Company (NIOC) - oil and gas exploration and production, refining and oil transportation; 2) National Iranian Gas Company (NIGC) - manages gathering, treatment, processing, transmission, distribution, and exports of gas and gas liquids; 3) National Iranian Petrochemical Company (NPC) - handles petrochemical production, distribution, and exports; and 4) National Iranian Oil Refining and Distribution Company (NIORDC) handles oil refining and transportation, with some overlap to NIOC. The National Iranian Offshore Oil

Co. (IOOC) is in charge of offshore oil fields in the Persian Gulf. The National Iranian South Oil Fields Co. (NIOC South) is in charge of onshore oilfields in southern Iran. Pars Oil & Gas Co. (POGC) is in charge of the offshore North and South Pars gas fields. Khazar Exploration & Production Co. is in charge of Iran's Caspian Sea sector. Also, the National Iranian Tanker Company (NITC) controls the second largest fleet of tankers in OPEC.

Selected Foreign Oil Company Involvement: BG, BHP, Bow Valley, BP, ENI, Gazprom, Lukoil, OMV, Petronas, Royal Dutch/Shell, Sheer Energy, Sinopec, Statoil, Total

Major Oil Fields: Agha Jari, Ahwaz (Bangestan), Azadegan, Bibi Hakimeh, Darkhovin, Doroud, Gachsaran, Mansouri (Bangestan), Marun, Masjid-e Soleiman, Parsi, Rag-e-Safid, Soroush/Nowruz

Major Refineries (capacity, bbl/d) (1/1/04E): Abadan (400,000), Isfahan (265,000), Bandar Abbas (232,000); Tehran (225,000), Arak (150,000), Tabriz (112,000), Shiraz (40,000), Kermanshah (30,000), Lavan Island (20,000)

Major Oil Terminals: Ganaveh, Kharg Island, Lavan Island, Sirri Island, Cyrus, Ras Bahregan, Larak Island

Gas Pipeline System: The 780-mile, 40/42-inch IGAT-1 trunkline transports associated gas from Khuzestan area oilfields to consumption centers in the north; the 56-inch, \$1.5 billion, 880-mile IGAT-2 line transports non-associated gas from the Kangan and Nar fields on the Persian Gulf coast near Bandar Taheri; the \$500 million, 56-inch, 300-mile IGAT-3 pipeline, which would run from South Pars to Tehran, is under construction. Evaluation also has begun on a possible IGAT-4 line from South Pars to industrial northern Iran and IGAT-5 from South Pars to the onshore Agha Jari oilfield..

LINKS

For more information on Iran, please see these other sources on the EIA web site:

[EIA - Historical Energy Data on Iran](#)

[OPEC Fact Sheet](#)

Links to other U.S. government web sites:

[CIA World Factbook - Iran](#)

[U.S. Treasury Department's Office of Foreign Assets Control](#)

[U.S. State Department - Iran](#)

[Library of Congress Country Study on Iran](#)

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[Interests Section of the Islamic Republic of Iran in Washington, DC \(in the
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