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Iran

Iran is OPEC's second largest oil producer and holds 10 percent 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 March 2005.

GENERAL BACKGROUND

Iran's economy relies heavily on oil export revenues - around 80-90 percent of total export earnings and 40-50 percent of the government budget. Strong oil prices the past few years have helped Iran's economic situation. For 2004, Iran's real GDP increased by around 5.8 percent; for 2005 and 2006, it is expected to grow around 5.4 percent and 4.5 percent, respectively.

Despite higher oil revenues, Iranian budget deficits remain a chronic problem, in part due to large-scale state subsidies on foodstuffs, gasoline, etc. Expenditures on fuels were estimated at $4.7 billion in 2004, and the country's parliament (the Majlis) has rejected measures to raise consumer prices. To the contrary, in January 2005, the Majlis decided to freeze domestic prices for gasoline and other fuels at 2003 levels. Currently, gasoline costs less than 40 cents per gallon in Iran, far below market cost.

To pay for sharply increased subsidy expenditures, President Khatami's budget proposal calls for withdrawing $7.7 billion from the country's oil stabilization fund (OSF). In late November 2004, the Iranian parliament agreed to allow the government to withdraw $825 million from the OSF to pay for rapidly increasing gasoline import costs. In December, the country's Finance Minister said that money had been withdrawn, that this was "legal and within the framework of the Third Five-Year Economic Development Plan`s (2000-05) law and the annual budget law." In general, President Khatami has had difficulty gaining support for his 2005/2006 proposed budget, which is likely to be highly expansionary given continued high oil prices and political pressures for increased spending.

Iran is attempting to diversify by investing some of its oil revenues in other areas, including petrochemicals. In 2004, non-oil exports rose by a reported 9 percent. 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 had been 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 elections are 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 addition, 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* (1/1/05), Iran holds 125.8 billion barrels of proven oil reserves, roughly 10 percent of the world's total, up from 90 billion barrels in 2003 (note: in July 2004, Iran's oil minister had noted that the country's proven oil reserves had increased to 132 billion barrels following discoveries in the Kushk and Hosseineih fields of 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 (see table below). Iran's crude oil is generally medium in sulfur, with gravities mainly in the 28°-35° API range.

Major Iranian Oil Fields (est. production, bbl/d)	
Onshore	**Offshore**
Agha Jari (200,000 bbl/d)	Abuzar (125,000 bbl/d)
Ahwaz-Asmari (700,000 bbl/d)	Dorood (130,000 bbl/d)
Bangestan (around 245,000 bbl/d current production, with plans to increase to 550,000 bbl/d or more)	Salman (130,000 bbl/d)
Bibi Hakimeh (130,000 bbl/d)	Sirri A&E (95,000 bbl/d)
Gachsaran (560,000 bbl/d)	Soroush/Nowruz (60,000 bbl/d)
Karanj-Parsi (200,000 bbl/d)	
Marun (520,000 bbl/d)	

During 2004, Iran produced about 4.1 million bbl/d of oil (of which 3.9 million bbl/d was crude oil), up about 200,000 bbl/d from 2003. Iran's current sustainable crude oil production capacity is estimated at around 3.9 million bbl/d, which is around 100,000 bbl/d below Iran's latest (March 16, 2005) OPEC production quota of 4.037 million bbl/d. Some analysts believe that Iran's capacity is

Pazanan (70,000 bbl/d)	
Rag-e-Safid (180,000 bbl/d	

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 8-13 percent per year (300,000-500,000 bbl/d) and are in need of upgrading, modernization, and enhanced oil recovery efforts (i.e., gas reinjection).

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 that have permanently damaged the fields. Despite these problems, Iran has ambitious plans to increase national oil production - to 4.5 million bbl/d by the end of 2005, 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 (and possibly a change in relations with the West).

Iran exports around 2.5 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 percent sulphur); Iranian Heavy (31° API, 1.7 percent sulphur); Lavan Blend (34°-35° API, 1.8-2 percent sulphur); and Foroozan Blend/Sirri (29-31° API). Iran's domestic oil consumption, 1.5 million bbl/d in 2004, is increasing rapidly as the economy and population grow. As mentioned above, Iran subsidizes the price of oil products heavily, resulting in a large amount of waste and inefficiency in oil consumption.

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 and Karanj. Overall, Iran's oil sector is considered old and inefficient, needing thorough revamping, advanced technology, and foreign investment.

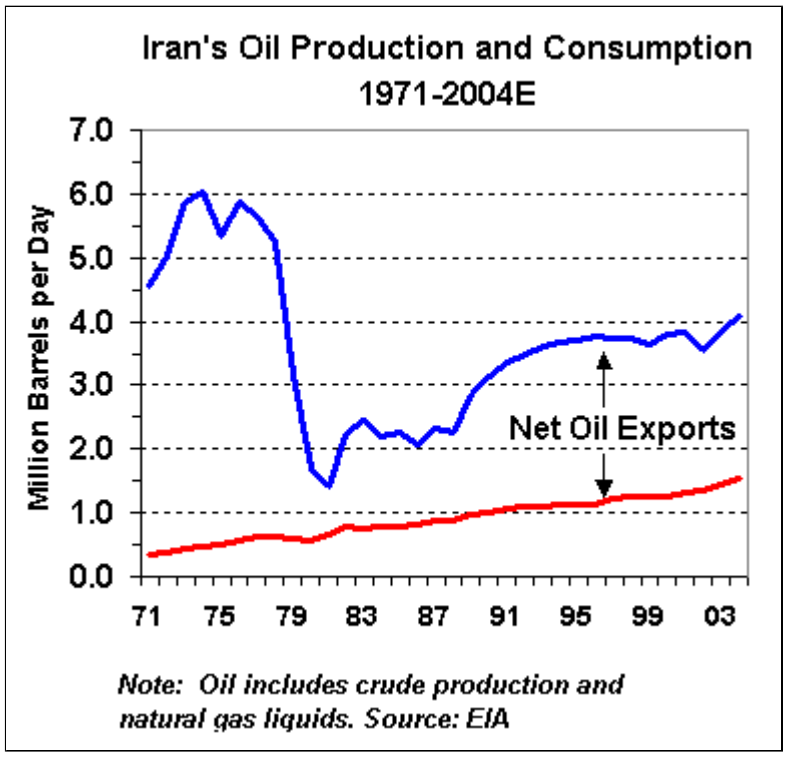
In February 2004, a Japanese consortium led by Inpex signed a final agreement on the $2 billion Azadegan oilfield development project. Azadegan was discovered in 1999, representing Iran's largest oil discovery in 30 years, and is located onshore in the southwestern province of Khuzestan, a few miles east of the border with Iraq. Reportedly, Azadegan 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). Inpex, which has no upstream experience of its own, hopes to bring in an international partner - possibly Total, Statoil, Sinopec, or Lukoil (Shell has indicated that it is not interested) - as the field's operator. Initial production of medium-sour crude oil from Azadegan could come in 2007, ramping up to 250,000 bbl/d by 2009. At its peak, Azadegan production could account for as much as 6 percent 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). 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 percent), 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 approach 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. 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 percent share, while Eni holds the other 45 percent.

In April 1999, Iran awarded Elf (46.75 percent share), along with Canada's Bow Valley Energy (15 percent share), a buyback contract to develop the offshore Balal field. Eni is also involved, with a 38.25 percent 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.

On March 18, 2005, a much-sought-after contract to develop the giant Bangestan field was awarded to Petro Iran Development Co., after having been delayed several times since 2001. Bangestan contains an estimated 6 billion barrels of oil reserves and produces about 250,000 bbl/d of oil, but the field is one of the oldest in the country, requiring investment and technological applications 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. Total and BP then bid on the project, which is now reported likely to be awarded to a local firm (PetroIran) instead. 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 offshore 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. Sheer's goal was to boost MIS production from 4,500 bbl/d to 20,000 bbl/d (the historic field, discovered in 1908, peaked at 130,000 bbl/d in the 1930s), but the company was replaced by China's CNPC, which bought the subsidiary of Sheer working on MIS. In general, the addition of a limited risk/reward element has not attracted the flood of foreign energy investment Iran both needs and wants. In January 2004, Iran announced modifications to the buyback model, extending the length of such contracts from 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.

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 significantly. 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-Nowruz 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. Output from Soroush is expected to reach 190,000 bbl/d in the next few months (the original target had been May 2004). In early 2003, a consortium of three Japanese companies bought a 20 percent share Soroush-Nowruz. In March 2004, the Iranian Offshore Oil Company (IOOC) awarded a $1.26 billion contract for recovery of NGLs and natural gas from Soroush, Nowruz, 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 only a small amount (0.1 billion barrels) has been proven as "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. In September 2004, it issued an initial tender to begin drilling in deepwater portions of the Caspian Sea sometime in 2005. Reports indicate that Brazilian company Petrobras has been in talks with the National Iranian Oil Company (NIOC) to finalize production sharing agreements.

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 percent) shares. Under 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 percent of the Sea. As of March 2005 , no agreement has been reached among Caspian Sea region states on this matter. In March 2003, Iran and Turkmenistan had 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.

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, via the Caspian port town of Neka in northern Iran, for local consumption. An equivalent amount of Iranian oil is then 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 late 2004, about 35,000 bbl/d of Turkmen and Kazakh oil were being shipped to Neka, down 75 percent compared to levels during the summer of 2004 as price differentials between sweet and sour crude rendered the swaps less competitive with Meditteranean routes. From Neka, oil is then sent 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 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 high sulfur Caspian crude. This follows a $330 million project, completed by a Sinopec-led consortium in late 2003, to expand storage at Neka and to upgrade the Tehran and Tabriz refineries.

Aside from Caspian "swaps," there were reports in February 2005 that Iran and Iraq were discussing 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.

Refining and Transportation

As of January 2005, 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). In order to meet burgeoning domestic demand for middle and light distillates (gasoline demand is growing at around 9 percent per year), Iran plans to increase its refining capacity, possibly to 2.2 million bbl/d by 2008. One goal of this expansion 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 percent heavy fuel oil and just 16 percent gasoline.

Iran has imported refined products since 1982, and these imports have been increasing rapidly. In 2004 alone, Iran imported an estimated 160,000 bbl/d of gasoline at an estimated annual cost of around $2-$3 billion. In June 2004, Japan's JGC reached an agreement with Iran to expand Arak to 250,000 bbl/d by 2009. In addition, Abadan is being expanded by 50,000 bbl/d, with completion expected by spring 2006. Bandar Abbas is being expanded in several phases, adding around 250,000 bbl/d of capacity by 2010 (and significantly more after that). Two planned grassroots refineries include a 225,000-bbl/d plant at Shah Bahar and a 120,000-bbl/d unit on Qeshm Island. Under Iranian law, foreign companies are permitted to own no more than 49 percent 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

According to the *Oil and Gas Journal*, 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 percent 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 (for consumption, enhanced oil recovery, petrochemicals, etc.) is growing rapidly, Iran has the potential to become a significant natural gas exporter due to its enormous reserves. In 2002, Iran produced about 2.7 Tcf of natural gas. Of this, around 10 percent was flared, and approximately 30 percent 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 Nowruz, 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 at extremely low prices, encouraging rapid consumption growth and replacement of fuel oil, kerosene and LPG demand.

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 natural gas field is South Pars, geologically an extension of Qatar's 900-Tcf North Field. 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 (i.e., condensates - by 2010, South Pars could be producing condensates of more than 500,000 bbl/d, mainly for domestic consumption).

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 buyback arrangements), political, etc. **Phase 1**, for instance, which is being handled by Petropars (owned 60 percent by NIOC), has been delayed several times but finally has begun to come onstream, several years behind schedule. Phase 1, which was officially inaugurated by President Khatami in November 2004, involves production of 900 million cubic feet per day (Mmcf/d) of natural gas for the domestic grid, plus 40,000-45,000 bbl/d of condensate.

Overall, South Pars is slated to be developed in 28 phases, although only 18 phases are active so far. According to FACTS, Inc., total condensate production from South Pars phases 1-14 is expected to reach 628,000 bbl/d by 2015. Total gas reinjection needs from South Pars are estimated by FACTS at 8-10 billion cubic feet per day (Bcf/d) by 2010-2012, although "field engineers think this may not be enough," with some citing the need for as much as 20 Bcf/d. If this latter figure is correct, it could cut significantly into the potential for South Pars gas exports, since future South Pars production is projected at perhaps 20 Bcf/d total - potentially all of South Pars' future production according to FACTS.

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 domestic consumption and 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. Currently, Iran has no LNG facilities.

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/d of natural gas for domestic use, and around 85,000 bbl/d of condensates. Twin undersea pipelines 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 began coming online in October 2004 and are expected to produce around 2 Bcf/d (for domestic consumption) of natural gas, 80,000 bbl/d of condensates, plus ethane, sulfur, and 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. The project is scheduled to come online by 2007, 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/d to the domestic market, possibly by 2007, plus around 80,000 bbl/d of condensate production. 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 percent, and the deal reportedly uses international bank project financing rather than a buyback model. In January 2005, a foreign (Cayman Islands) subsidiary of Halliburton Co. reportedly reached agreement on helping develop Phases 9 and 10, along with local partner Oriental Kish (in late March 2005, Halliburton announced that it would seek no new work in Iran but would honor existing contracts).

Bids on **Phase 11**, which is slated for LNG export, were opened in March 2003. In February 2004, Total (30 percent) formed "Pars LNG" along with Petronas (20 percent) and NIOC (50 percent), and in April 2004, Total was selected to enter into final negotiations on the $1.2 billion project. Phase 11 is slated to produce 2 Bcf/d for export as LNG and 80,000 bbl/d of condensate under a buyback contract, possibly beginning in 2010.

Phase 12 is slated for LNG export (2 Bcf/d), reinjection (0.7 Bcf/d), and condensate production (around 100,000 bbl/d), possibly beginning around 2010. The consortium slated to export the LNG

is called "NIOC LNG." Meanwhile, a Shell-led consortium called "Persian LNG" hopes to win Phase 13, which is slated for LNG export (2 Bcf/d) and LPG production (80,000 bbl/d) starting in 2010. In September 2004, Shell signed a framework agreement on the $4 billion project, along with NIOC, Repsol and YPF.

Phase 14 of South Pars is slated for gas-to-liquids (GTL) development, with Statoil and Shell reportedly interested. In January 2005, **Phases 15-16** of the South Pars project were awarded to a consortium of international and domestic companies led by Norway's Aker Kvaener. The two phases are expected to cost $2 billion to develop. They are expected to produce 2 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.

Phases 17 and 18 of South Pars are expected to produce 2 Bcf/d of natural gas, possibly for export to Pakistan/India, plus 70,000 bbl/d or so of condensates. In late 2004, Iran invited companies to bid on Phases 17 and 18.

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 power facility. By the spring of 2005, Tabnak is slated to be producing around about 1 Bcf/d of gas.

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, Europe, India, Pakistan, Armenia, Azerbaijan (gas exports from Iran scheduled to begin in September 2005), 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 February 2005, BG and NIOC reportedly remained interested in 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 December 2004, gas flows from Iran to Turkey were cut for four days, reportedly due to "technical reasons."

Iran reportedly is aiming for around 300 Bcf per year of natural gas exports to Europe via Turkey by 2007. In March 2002, Greece and Iran signed a $300 million agreement 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). Alternatively, gas could be transported 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 2005, 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, $3-$4 billion gas pipeline from southern Iran to southeastern Pakistan and on to India. Australia's Broken Hill Proprietary (BHP) is the main foreign backer of the idea. 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. Iran is offering to cover 60 percent 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 $200-$500 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. Given a thaw in India-Pakistan relations over the past year, the pipeline idea is again gaining some interest. Two other options would be a pipeline serving only Pakistan, or separate pipelines for Pakistan and India. Gas piped from Iran to India reportedly would cost around $2.10-$2.49 per million Btu at the Indian border.

Another possibility would involve LNG exports to India. In January 2005, Gas Authority of India Ltd. (GAIL) and the National Iranian Gas Export Corp. signed a 30-year deal with Iran for delivery of 7.5 million tons per year of LNG starting in 2009-10. One sticking point revolved around price, with Iran asking around $4 per million Btu (based on a formula calculated off of Brent crude at around $45 per barrel), and India looking more at the $2.50 per million Btu it is paying Qatar for LNG. In the end, a compromise around $3 per million Btu was reached. In addition, NIOC offered Indian companies service contracts towards developing the Yadavaran (previously known as Kushk and Hosseinieh) and Jufeyr oilfields. Combined, India's shares in the two oil fields will produce 90,000 bbl/d. Iran reportedly will build three LNG plants at Assaluyeh, using South Pars gas as a feedstock. If successful, LNG exports most likely would flow to Dahej, in the western Indian state of Gujarat, from South Pars Phases 17 and 18. Exports could amount to 5 million tons (worth $800 million) per year for 20 years starting in 2010, according to Petronet.

In addition to India, China has expressed interest in LNG imports from Iran. In October 2004, Iran signed a $100 billion, 25-year contract with China's Sinopec for the production and export of LNG to that country (possibly 10 million tons per year), plus construction of a refinery for natural gas condensates and development of the Yadavaran oilfield. Under terms of the deal, Sinopec would have rights to purchase half of Yadavaran's peak oil output - possibly 150,000 bbl/d - over the 25-year contract period. Iran was the second-largest supplier of oil to China after Saudi Arabia in 2003,

accounting for 14 percent of total Chinese oil imports.

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 percent of Turkmen supplies allocated as payment for Iran's contribution to building the 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 (construction on the line began in late November 2004). 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 percent) or oil-fired (for 2005, Iranian power generation capacity is expected to reach 36 GW). 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, 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.

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 in coming years. 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's first solar thermal power plant is slated to be built in Yazd province by 2009.

With power demand growing rapidly (7-8 percent annually; 3,000 MW in 2005 alone), Iran is building significant new generation capacity - both thermal and hydroelectric - with the goal of adding 18 GW over the next five years. Currently, the largest hydropower projects are the 2,000-megawatt (MW) Karun 3 plant (in March 2005, President Khatami inaugurated two, 250-MW units at this project), 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, a 1,000-MW facility in Bandar Abbas, and a 1,000-MW combined cycle plant being built by the Tehran Regional Electricity Company (TREC) in Qom. This latter project is significant as it is being privately financed and built by a regional - as opposed to national - company. The plant is expected to be completed in 2007.

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). In September 2004, the BOO plan was dealt a setback due to a lack of bidders, and will most likely be re-bid. Overall, Iran is planning 5,800 MW of BOT projects and 7,000 MW of BOO projects.

Although the government has considered privatization, at present Iran's power sector is run by the state-controlled Tavanir organization. Power plant construction is handled by the Iran Power Development Company (IPDC), a wholly owned subsidiary of Tavanir. 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 percent of Iran's rural population has access to electricity.

Overall, Iran imports around 1.5 billion kilowatthours (Bkwh) per year, and exports just under 1.0 Bkwh. Iran trades electricity with Afghanistan (exports to the western part of the country), Armenia (exports and imports), Azerbaijan (exports and imports), Pakistan, Turkey and Turkmenistan (exports and imports). In April 2003, Iran said that it would be willing to supply Iraqi cities with electricity as well. In December 2004, a protocol was reached on synchronizing the power grids of Iran, Azerbaijan, and Russia. In August 2004, Turkmenistan began power exports to Iran via a new transmission line (Sarahs). Annual exports of 375 million kilowatt-hours, worth $7.5 million, are expected. This line adds to previous electric export capacity from Turkmenistan to Iran via the Balkanat-Gonbad line started up in June 2003. Another line is to be constructed in the short-term, bringing total power exports from Turkmenistan to Iran to 2.4 billion killowatt-hours per year.

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 percent of the country's power generation capacity at that point. In January 2005, the Majlis' National Security and Foreign Policy Committee Chairman, Aladdin Borujerdi, said that Iran was studying proposals to build 20 nuclear plants in the country.

On December 18, 2003, Iran signed a protocol to the Nuclear Non Proliferation Treaty (NNPT) that will allow the International Atomic Energy Agency (IAEA) to have more comprehensive access to sites in the country. 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. On November 22, 2004, Iran announced that it was suspending enrichment of uranium.

On February 27, 2005, Iran and Russia signed an agreement under which Iran is to return spent

reactor fuel to Russia (which hopes to earn millions of dollars 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 late March 2005, the Iranian Majlis ratified a bill calling for construction of twenty more nuclear facilities in Iran with total capacity of 20 GW.

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 percent 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 percent 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 sometime in 2006. Russia's ambassador to Iran, Alexander Maryasov, stated in January 2005 that Russia would compensate Iran if Russia was responsible for delays in completion of the Bushehr plant. The two countries also were reported to have signed a preliminary agreement on the second generating unit at Bushehr.

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

Given its heavily energy-centered economy, environmental issues in Iran generally have ranked as a relatively low priority. However, ongoing and severe air pollution in urban areas 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 highly inefficient and polluting 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.

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; next elections June 2005)
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 (3/11/05): R7,900 per $US
Gross Domestic Product (GDP, at market exchange rates) (2004E): $155.4 billion
Real GDP Growth Rate (2003E): 6.7% **(2004E):** 5.8% **(2005F):** 5.4%
Inflation Rate (2004E): 14.8% **(2005F):** 14.0%
Unemployment Rate (2003E): 16%-21%
Current Account Balance (2003E): $2.1 billion **(2004E):** $6.4 billion **(2005F)**: $3.5 billion
Major Export Partners (2003): Japan, China, Italy, Taiwan, Turkey, South Korea
Major Import Partners (2003): Germany, France, China, Italy, UAE, South Korea, Russia, Japan
Merchandise Exports (2004E): $40.1 billion
Merchandise Imports (2004E): $33.2 billion
Merchandise Trade Surplus (2004E): $6.8 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 (2004E): $32.5 billion **(2005F):** $32.3 billion **(2006F):** $32.0 billion
Oil Export Revenues/Total Export Revenues (2004E): 80%-90%
Foreign Reserves (2004E): $24.4 billion
External Debt (2004E): $11.9 billion (around 8% of GDP)

ENERGY OVERVIEW

Minister of Energy: Habibollah Bitaraf
Minister of Petroleum: Bijan Namdar-Zanganeh
Vice President for Atomic Energy: Gholamreza Aqazadeh-Khoi
Proven Oil Reserves (1/1/05E): 125.8 billion barrels (up from 89.7 billion barrels as of 1/1/03)
OPEC Crude Oil Production Quota (as of 3/16/05): 4.037 MMBD **(as of 11/1/04):** 3.964 MMBD

Crude Oil Production Capacity (2/05E): 3.9 MMBD
Oil Production (2004E): 4.1 MMBD (of which, 3.9 MMBD was crude oil) **(2005F):** 4.1 MMBD (of which 3.9 MMBD is crude oil)
Oil Consumption (2004E): 1.5 MMBD **(2005F):** 1.6 MMBD
Net Oil Exports (2004E): 2.6 MMBD **(2005F):** 2.5 MMBD
Crude Oil Refining Capacity (1/1/05E): 1.47 MMBD
Major Crude Oil Customers: OECD Europe, Japan, China, South Korea
Natural Gas Reserves (1/1/05E): 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 (2002E): 28.0 gigawatts (around 90% conventional thermal - oil, gas, and coal)
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): 15,073 Btu/$ (vs U.S. value of 10,689 Btu/$)**
Carbon Dioxide Intensity (2002E): 0.92 metric tons/thousand $ (vs U.S. value of 0.63 metric tons/thousand $)**
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 based on OECD Purchasing Power Parity (PPP) figures

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 Oi & 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) (1/1/05E): 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: Kharg Island, Lavan Island, Sirri Island, Ras Bahregan
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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Iran: Ministry of Energy
Iran Online
Iran Press Service
Iranian Trade
National Iranian Gas Company - Overview
National Petrochemical Company of Iran
Pars Times: Caspian Sea Region
Pars Times: Iran Oil and Gas Resources
Pars Times: Persian Gulf Region
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