

# COUNTRY ANALYSIS BRIEFS

## Iran

Last Updated: January 2006

### Background

*Iran's economy is heavily reliant on oil exports, but the country is attempting to diversify. The country is earning high oil export revenues, but gasoline import costs are also rising rapidly.*



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 boosted Iran's oil export revenues and helped Iran's economic situation. For 2004, Iran's real GDP increased by around 4.8 percent. For 2005 and 2006, real GDP is expected to grow by around 5.6 percent and 4.8 percent, respectively. Inflation is running at around 15 percent per year.

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, contributing to a rapid (8-10 percent per year) growth rate in gasoline consumption. In addition, the country imports around one-third of its gasoline.

To pay for sharply increased subsidy expenditures, the Majlis voted in mid-November 2005 to spend an extra \$3 billion during the 2005/2006 fiscal year. Of this, \$2.6 billion is to be withdrawn from the country's oil stabilization fund (OSF), which was established in 2000 primarily as a tool for protecting the Iranian economy in the event of an oil price collapse. In total, Iran is expected to spend around \$4 billion on fuel imports - largely gasoline - this year, up from about \$2.8 billion last year. In addition, Iran is talking about instituting a rationing system, whereby low prices would apply up to a certain point, but beyond that the full price would kick in. The two-tier pricing system, using "smart cards," could kick in as early as April 2006. As of late November 2005, however, the Majlis had not yet taken action on the issue.

Another problem for Iran is lack of job opportunities for the country's young and rapidly growing population. Unemployment in Iran averages around 14 percent, but is significantly higher among young people.

In addition, Iran is attempting to diversify its economy 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). However, there has not been a great deal of progress in this area, in part due to disagreements between reformers and conservatives. In addition, foreign investors appear to be cautious about Iran due to uncertainties regarding its future direction under new leadership, as well as the ongoing, international standoff over the country's nuclear program. In September 2005, Iran threatened to impose investment limits on countries opposing its right to access nuclear fuel cycle technology. In November 2005, Iran rejected a proposal by Russia and the EU whereby Russia would supply it with enriched uranium, as opposed to Iran enriching the uranium itself.

In June 2005, Iran held Presidential elections in which the conservative mayor of Tehran, Mahmoud Ahmadinejad, won a surprise victory. Ahmadinejad succeeded Mohammad Khatami, a moderate reformist, who had been President since August 1997. Ahmadinejad ran on a populist platform, pledging to fight poverty and corruption while creating new jobs in the public sector. Ahmadinejad also pledged to share the Iran's oil wealth more broadly and to reduce the nation's income gap between rich and poor. Since taking office in August 2005, Ahmadinejad has replaced numerous political appointees. However, as of early December 2005, the Majlis had rejected three of his nominees (Ali Saeedlou, Sadegh Mahsouli, and Mohsen Tasalloti) for oil minister, leaving the country's all-important oil sector in limbo for the time being (and causing delays to a variety of projects). On December 4, 2005, President Ahmadinejad submitted the name of current caretaker and former deputy oil minister, Kazem Vaziri, to the Majlis. Vaziri was approved on December 12. On January 3, 2006, a shakeup at the oil ministry resulted in five new deputy ministers, including the one in charge of running the national oil company.

### 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

**Iran is OPEC's second largest oil producer and holds 10 percent of the world's proven, conventional world oil reserves. Most oil is located in the southwestern part of Iran, near the Iraqi border and Persian Gulf.**

According to the *Oil and Gas Journal*, Iran held 125.8 billion barrels of proven oil reserves as of January 1, 2005, roughly 10 percent of the world's total. In July 2004, Iran's oil minister 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 (note: in September 2005, several bombs were detonated near oil wells in Khuzestan, raising concerns about unrest amongst ethnic Arabs in the region). Overall, 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.

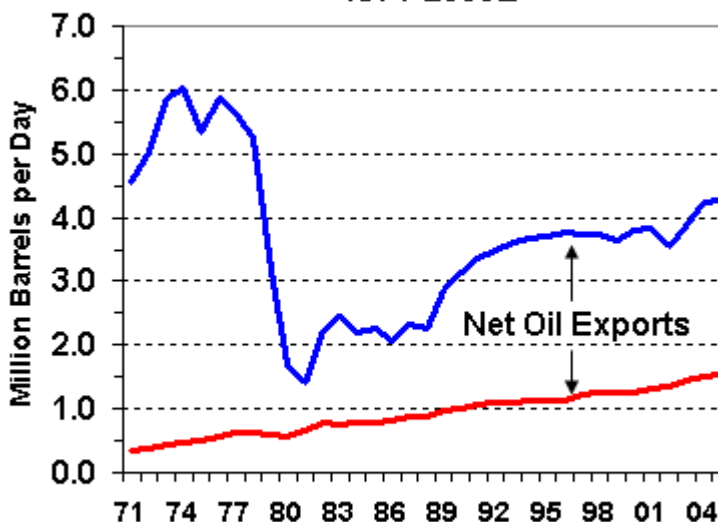
Major Iranian Oil Fields (est. production, bbl/d, early 2005)	
Onshore	Offshore
AghaJari (200,000 bbl/d)	Abuzar (125,000 bbl/d)
Ahwaz-Asmari (700,000 bbl/d)	Dorood (130,000 bbl/d)
Bangestan (around 245,000 bbl/d current production, with plans to increase to 550,000 bbl/d or more)	Salman (130,000 bbl/d)
BibiHakimeh (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)	
Pazanan (70,000 bbl/d)	

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

**Iran currently has crude oil production capacity of around 4.0 million bbl/d, which it would like to increase to 5 million bbl/d by 2010. In order to accomplish this goal, Iran will need billions of dollars in foreign investment, which it will need to attract by making contract terms as attractive as possible.**

During 2005, Iran has been producing about 4.2 million bbl/d of total oil (of which 3.9 million bbl/d is crude oil), up nearly 400,000 bbl/d from 2003. Iran's current sustainable crude oil production capacity is estimated at 4.0 million bbl/d, which is around 100,000 bbl/d below Iran's latest (July 1, 2005) OPEC production quota of 4.110 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 (the country has 40 producing fields - 27 onshore and 13 offshore) have a natural decline rate estimated at 8-13 percent per year (300,000-500,000 bbl/d). The fields are in need of upgrading, modernization, and enhanced oil recovery efforts (i.e., gas reinjection), with current recovery rates at just 24-27 percent (compared to a world average of 35 percent). Iran also needs to increase its search for new oil, with only a few exploration wells being drilled in 2005.

**Iran's Oil Production and Consumption  
1971-2005E**



**Note: Oil includes crude production and natural gas liquids. Source: EIA**

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, has not come close to recovering to that level since the 1978/79 Iranian revolution. Still, Iran has ambitious plans to increase national oil production - to more than 5 million bbl/d by 2010, and 8 million bbl/d by 2015. The country is counting on billions of dollars in foreign investment to accomplish this, but the goal 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 2.7 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 2005, 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 260,000 bbl/d by 2012. At its peak, Azadegan production could account for as much as 6 percent of Japan's oil imports. However, as of early December 2005, little forward progress had been made on Azadegan, including the lack of an operating agreement with NIOC, possibly due to financial and/or political issues (e.g., US sanctions against Iran, the absence of an Iranian oil minister). In September 2005, Iran sharply criticized Japan for the slow progress.

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). Darkhovin came online at 50,000 bbl/d in July 2005, with ultimate production expected to reach 160,000 bbl/d.

Another oil discovery in western Iran near the Iraqi border was made recently by Norsk Hydro, in the 2-billion-barrel Anaran field. According to Norsk Hydro, Anaran could produce more than 100,000 bbl/d of oil, possibly starting in 2010. Lukoil is a minority partner in the field. Reportedly, development of Anaran is complicated by the need to clear landmines in the area.

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

***Iran utilizes buyback contracts as a means of involving foreign companies in the country's oil sector without violating its constitutional prohibitions on concessions or direct equity stakes.***

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.

The buyback 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. In response, Iran has considered revisions to buyback terms (e.g., extending the length of contracts, allowing for continued involvement of oil companies after the field is handed over to NIOC), but these have been controversial and generally have not moved forward. In early December 2005, acting Iranian oil minister, Kazem Vaziri, questioned the future of buyback contracts but emphasized that Iran would continue to seek foreign investors in the energy sector.

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 (Petrolran) 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 Petrolran to develop the Foroozan and Esfandiar offshore oilfields. Petrolran is expected to increase production at the fields 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. CNPC began work on the field in June 2005. (Note: for more on Chinese involvement in Iran's Yadavaran field, please see the natural gas section below).

### Offshore Developments

***Iran plans extensive oil development of its offshore areas, including the Soroush-Nowruz field which came online in late 2001/early 2002.***

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 (Iran may launch a second licensing round in the next few months). 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 reaching 190,000 bbl/d in June 2005. The two fields are located offshore,

about 50 miles west of Kharg Island, and contain estimated recoverable reserves of around 1 billion barrels of heavy oil (20° API). The heaviness and high sulfur content (3 percent) of the oil has made marketing Soroush-Nowruz oil difficult; in September 2005, Iran reportedly diverted Soroush-Nowruz production into storage rather than try to sell it at a steep discount. In addition, there were reports in early October 2005 of technical difficulties at the oil fields, reducing production to 100,000 bbl/d for a time.

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. Iran reportedly hopes to become a major petrochemicals producer within 10 years.

### Caspian Sea Region

***Iran has no oil or natural gas production in the Caspian Sea, in part due to the Sea's boundaries being unresolved.***

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. However, Iran now looks likely to postpone any Caspian Sea drilling until 2006 at the earliest, in part due to problems at its Alborz platform.

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 early December 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 receives around 60,000 bbl/d of Turkmen and Kazakh oil at its Caspian Sea port of Neka, from where it sends the oil via pipeline to Tehran for refining and consumption. In exchange, Iran exports an equivalent amount of its own oil via the Persian Gulf.***

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 August 2005, about 60,000 bbl/d of Turkmen and Kazakh oil were being shipped to Neka. From Neka, oil is then sent to Tehran by the existing 180,000-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.

In July 2005, Iran and Iraq signed an MOU on a swap agreement involving construction of a 24-mile, 350,000-bbl/d oil pipeline from Basra to the Abadan refinery in southwestern Iran. In exchange, Iran would ship refined products back to Iraq. In addition, Iran could allow Iraq to export crude through the Kharg Island terminal and to import refined products through the Iranian port of Bandar Mahshahr. One potential problem with this deal revolves around the ability of the Abadan refinery to process Basrah Light in significant volumes. Another is the fact that Iran

already faces a severe shortfall in its own domestic gasoline supplies, making exports of gasoline problematic.

### Refining and Transportation

***Iran has a shortage of refining capacity to produce gasoline, resulting in the need for significant levels of gasoline imports. The country is looking to expand its capacity to refine oil into gasoline and other light products.***

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, although this will be extremely difficult to achieve given the security situation in the country. 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. In addition, diesel sulfur levels are slated for a major reduction (from 500 parts per million to 50 ppm by 2010), requiring significant additional hydrotreating capacity.

Iran has imported refined products since 1982, and these imports have been increasing rapidly. In 2005, Iran has been importing an estimated 170,000 bbl/d of gasoline at an estimated annual cost of around \$3-\$4 billion. According to *Petroleum Argus*, around 60 percent of this comes from European oil trader, Vitol, with another 15 percent coming from India's 600,000-bbl/d Reliance refinery.

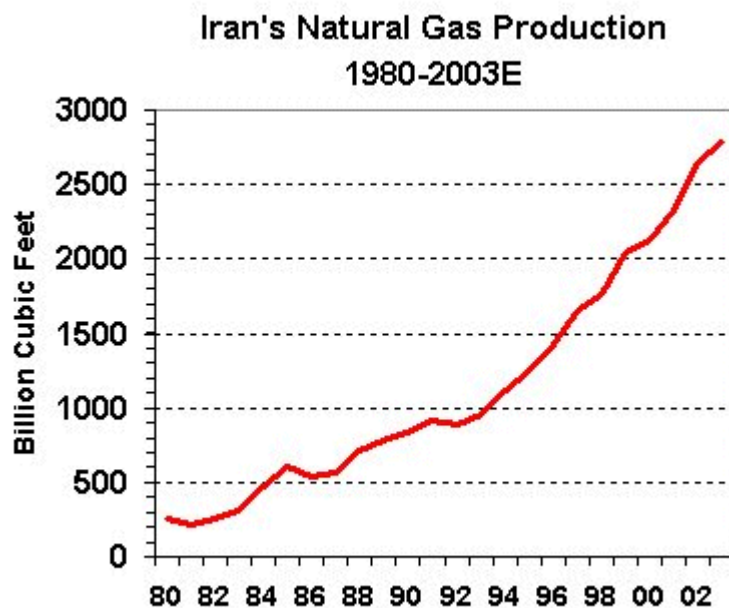
In June 2004, Japan's JGC reached an agreement with Iran to expand Arak to 250,000 bbl/d by 2009. In addition, Abadan is being expanded by 50,000 bbl/d, with completion expected by spring 2006 (in addition, a new, 180,000-bbl/d-capacity refinery is being planned for Abadan). Bandar Abbas is being expanded 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

***Iranian natural gas consumption is growing fast, but so is production from the South Pars field and elsewhere, meaning that the country could become a significant gas exporter in coming years.***

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 Russia. Around 62 percent of Iranian natural gas reserves are located in non-associated fields, and have not been developed, meaning that Iran has great potential for future 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), and Khangiran (11 Tcf).



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 4.3 Tcf (gross) of natural gas. Of this, around 1.1 Tcf was reinjected (in large part for enhanced oil recovery efforts), and 0.3 Tcf vented or flared. 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.

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

***The huge South Pars offshore natural gas field is being developed in 28 phases, and is aimed at supplying gas for domestic consumption, reinjection into oil fields, and export.***

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 and petrochemicals production).

Development of South Pars is Iran's largest energy project, already having attracted over \$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 issues (i.e., controversy over buyback arrangements), politics, etc.

**Phase 1**, for instance, which is being handled by Petropars (owned 60 percent by NIOC), was delayed several times but finally came onstream, several years behind schedule, in November 2004. Phase 1 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. Ultimately, Iran could be faced with a choice between using natural gas for domestic purposes, or exporting it.

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 - and including Petronas and Gazprom - developed the project at a cost of approximately \$2 billion. Currently, phases 2 and 3 are producing around 2.8 Bcf/d of natural gas for domestic use, plus 80,000 bbl/d of condensates. Twin undersea pipelines carry gas from South Pars to onshore facilities - natural gas processing trains, sulphur recovery units, condensate stabilization and storage units, and export compressors - at Asaluyeh.

**Phases 4 and 5**, estimated to cost \$1.9 billion each, are being handled by Eni and Petropars, and involve construction (by Eni 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, 80,000-90,000 bbl/d of condensates, plus ethane, sulfur, liquefied petroleum gas (LPG), and petrochemicals.

**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 \$2.7 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). In April 2004, Total was selected to enter into final negotiations on the \$1.2 billion project, while Petronas reportedly withdrew in May 2005. In addition, CNPC is negotiating for a 10 percent stake, and India's ONGC is reportedly interested as well. 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." As of mid-2005, both Eni and Statoil were in the running to participate in developing Phase 12; BG reportedly withdrew from participation in June 2005.

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. According to Shell, a final investment decision on the project is due by the end of 2006.

**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 initially awarded to a consortium of international and domestic companies led by Norway's Aker Kvaener. Subsequently, they were re-tendered. 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.

Plans for **Phases 19-22** have not yet been released.

### 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.

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 its enormous natural gas reserves, 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, Georgia (interested in receiving Iranian gas via Armenia), Taiwan, South Korea, and even China. Exports could be via pipeline and/or 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, and 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." By May 2005, Iran's Deputy Oil Minister was quoted as calling the natural gas pricing dispute with Turkey "insolvable."

Iran reportedly is aiming for large-scale natural gas exports to Europe via Turkey. 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 \$5 billion "Nabucco" gas pipeline from Iran through Turkey to Austria. A decision on the Nabucco line was supposed to have come by the end of 2005, but was delayed in part due to the Iranian nuclear issue. If Nabucco goes ahead, gas could start flowing in 2011.

Another option to Nabucco is Ukraine, which has offered two possible routes for Iranian gas exports to Western Europe. Each of these routes would cross Armenia, Georgia, and Ukraine, and possibly utilize the IGAT I and II lines in Iran. In July 2005, Iran and Ukraine signed a Memorandum of Understanding on the supply of up to 1 Tcf per year of Iranian natural gas to Ukraine.

Although India and Iran in 1993 signed an MOU on an overland natural gas pipeline, a variety of economic and political issues 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. Iran is offering to cover 60 percent of the construction costs of the pipeline. Pakistan could earn about \$200-\$500 million annually in transit fees from the pipeline and also would be able to purchase gas from the pipeline.

Given a thaw in India-Pakistan relations over the past couple of years, the pipeline idea is again gaining interest. Indian officials have stated that the plan could be considered if Pakistan can provide security guarantees for the \$3 billion project. 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. There also has been discussion of extending the pipeline to China. In September 2005, India and Pakistan agreed to seek third-party verification of Iran's natural gas reserves before proceeding with the pipeline project.

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 revolves 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 \$3.50 per million Btu, including shipping, was reached (although negotiations continue for additional volumes of gas above what has already been agreed upon).

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 (and/or Cochin in the southwest), either from South Pars or North Pars. The latest news is that India's state-owned Oil and Natural Gas Corp. (ONGC) as an option for 20 percent of Yadavaran, plus 100 percent of Jufeyr.

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 300,000-bbl/d peak oil output over the 25-year contract period. However, Iran also received bids on Yadavaran from other foreign companies, so the field's status is not completely clear.

Iran is also looking to export natural gas to Kuwait, most likely via pipeline from South Pars. In March 2005, Iran and Kuwait signed a preliminary memorandum of understanding for natural gas sales, possibly 300 Mmcf/d for 25 years starting in 2007. The gas would be used for power generation and water desalination. Another possible market for Iranian gas is the UAE.

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.

Aside from natural gas exports, Iran also has discussed importing natural gas from Azerbaijan (a swap deal is set to kick in by the end of 2005), 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.

## Electricity

***Iran's electricity demand is increasing rapidly, meaning that the country needs to invest billions of dollars in new generating capacity.***

As of 2003, Iran had installed power generation capacity of about around 31 gigawatts (GW). Of this total, 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 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, with 500 MW to be exchanged beginning in 2006. 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 kilowatt-hours per year.

## Environment

*Iran's position as a major producer and consumer of fossil fuels has caused numerous environmental problems.*

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.

## Profile

### Country Overview

<b>President</b>	Mahmoud Ahmedinejad
<b>Supreme Spiritual Leader</b>	Ayatollah Ali Khamenei
<b>Location/Size</b>	Middle East - between the Persian Gulf and the Caspian Sea/636,296 square miles
<b>Islamic Republic Proclaimed</b>	April 1, 1979
<b>Population (7/05E)</b>	68.0 million
<b>Languages</b>	Persian and Persian dialects (58%), Turkic and Turkic dialects (26%), Kurdish (9%), Luri (2%), Baluch (1%), Arabic (1%), Turkish (1%)
<b>Religions</b>	Shi'a Muslim (89%), Sunni Muslim (10%), Zoroastrian, Jewish, Christian, and Baha'i (1%)
<b>Ethnic Groups</b>	Persian (51%), Azerbaijani (24%), Gilaki and Mazandarani (8%), Kurd (7%), Arab (3%), Lur

(2%), Baluch (2%), Turkmen (2%), other (1%)

## Economic Overview

<b>Minister of Economic Affairs and Finance</b>	Davud Danesh-Jafari
<b>Currency/Exchange Rate (1/5/06)</b>	9,097.34 Iranian Rials per U.S. Dollar
<b>Inflation Rate (2005E)</b>	14.8%
<b>Gross Domestic Product (GDP, 2005E)</b>	\$192 billion
<b>Real GDP Growth Rate (2005E)</b>	5.6%
<b>Unemployment Rate (2005E)</b>	14%
<b>External Debt (2003/2004)</b>	\$11.9 billion
<b>Merchandise Exports (2005E)</b>	\$54.2 billion
<b>Exports - Commodities</b>	Petroleum 80%, chemical and petrochemical products, fruits and nuts, carpets
<b>Exports - Partners (2004)</b>	Japan 18.4%, China 9.7%, Italy 6%, South Africa 5.8%, South Korea 5.4%, Taiwan 4.6%, Turkey 4.4%, Netherlands 4%
<b>Merchandise Imports (2005E)</b>	\$41.5 billion
<b>Imports - Commodities</b>	Industrial raw materials and intermediate goods, capital goods, foodstuffs and other consumer goods, technical services, military supplies
<b>Imports - Partners (2004)</b>	Germany 12.8%, France 8.3%, Italy 7.7%, China 7.2%, UAE 7.2%, South Korea 6.1%, Russia 5.4%
<b>Current Account Balance (2005E)</b>	\$8.7 billion

## Energy Overview

<b>Minister of Energy</b>	Parviz Fatah
<b>Proven Oil Reserves (January 1, 2005E)</b>	125.8 billion barrels
<b>Oil Production (2005E)</b>	4,259.8 thousand barrels per day, of which 93% was crude oil.
<b>Oil Consumption (2005E)</b>	1,538.1 thousand barrels per day
<b>Net Oil Exports (2005E)</b>	2,721.7 thousand barrels per day
<b>Crude Oil Distillation Capacity (2005E)</b>	1,474 thousand barrels per day
<b>Proven Natural Gas Reserves (January 1, 2005E)</b>	940 trillion cubic feet
<b>Natural Gas Production (2003E)</b>	2.8 trillion cubic feet
<b>Natural Gas Consumption (2003E)</b>	2,789.9 billion cubic feet
<b>Recoverable Coal Reserves (2003E)</b>	461.9 million short tons
<b>Coal Production (2003E)</b>	1 million short tons
<b>Coal Consumption</b>	1.8 million short tons

(2003E)

<b>Electricity Installed Capacity (2003E)</b>	35.4 gigawatts
<b>Electricity Production (2003E)</b>	142.3 billion kilowatt hours
<b>Electricity Consumption (2003E)</b>	132.1 billion kilowatt hours
<b>Total Energy Consumption (2003E)</b>	6 quadrillion Btus*, of which Oil (49%), Natural Gas (46%), Hydroelectricity (2%), Coal (1%), Nuclear (0%), Other Renewables (0%)
<b>Total Per Capita Energy Consumption (2003E)</b>	87.6 million Btus
<b>Energy Intensity (2003E)</b>	13,766 Btu per \$2000-PPP**

## Environmental Overview

<b>Energy-Related Carbon Dioxide Emissions (2003E)</b>	372 million metric tons, of which Oil (53%), Natural Gas (46%), Coal (1%)
<b>Per-Capita, Energy-Related Carbon Dioxide Emissions (2003E)</b>	5.4 metric tons
<b>Carbon Dioxide Intensity (2003E)</b>	0.8 Metric tons per thousand \$2000-PPP**
<b>Environmental Issues</b>	Air pollution, especially in urban areas, from vehicle emissions, refinery operations, and industrial effluents; deforestation; overgrazing; desertification; oil pollution in the Persian Gulf; wetland losses from drought; soil degradation (salination); inadequate supplies of potable water; water pollution from raw sewage and industrial waste; urbanization
<b>Major Environmental Agreements</b>	party to: Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Marine Dumping, Ozone Layer Protection, Wetlands signed, but not ratified: Environmental Modification, Law of the Sea, Marine Life Conservation

## Oil and Gas Industry

<b>Organization</b>	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.
<b>Major Oil Terminals</b>	Kharg Island, Lavan Island, Sirri Island, Ras Bahregan
<b>Foreign Company Involvement</b>	BG, BHP, Bow Valley, BP, Eni, Gazprom, Lukoil, OMV, Petronas, Royal Dutch/Shell, Sheer Energy, Sinopec, Statoil, Total
<b>Major Oil Fields</b>	Agha Jari, Ahwaz (Bangestan), Azadegan, Bibi Hakimeh, Darkhovin, Doroud, Gachsaran, Mansouri (Bangestan), Marun, Masjid-e Soleiman, Parsi, Rag-e-Safid, Soroush/Nowruz
<b>Major Natural Gas Fields</b>	South Pars, North Pars, Khuff, Zireh, Tabnak, Nar-Kangan, Aghar, Dalan, Sarkhoun, Mand
<b>Natural Gas Pipelines</b>	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.

<b>Major Refineries (capacity, bbl/d)</b>	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)
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\* 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 OECD estimates based on purchasing power parity (PPP) exchange rates.

## Links

### EIA Links

[EIA - Country Information on Iran](#)

[OPEC Fact Sheet](#)

### U.S. Government

[CIA World Factbook - Iran](#)

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

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

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## Contact Info

Lowell Feld  
202-586-9502  
[lowell.feld@eia.doe.gov](mailto:lowell.feld@eia.doe.gov)