



# JOINT ECONOMIC COMMITTEE

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## IRAN'S OIL AND GAS WEALTH

### INTRODUCTION

Iran's vast oil and gas resources undermine the Iranian regime's claim that its nuclear program is needed for domestic energy generation. Iran holds the world's third largest known oil reserves, 132.5 billion barrels, and second largest natural gas reserves, 971 trillion cubic feet, representing 10 and 16 percent, respectively, of the totals.<sup>1</sup> However, support for terrorism and economic mismanagement by the government have damaged oil and gas development in Iran. Specific impediments to development of these natural resources include:

- Membership in the OPEC cartel;
- Restrictive contracting practices;
- Threatening policies that provoke U.S. trade and investment sanctions; and
- State control of domestic energy prices.

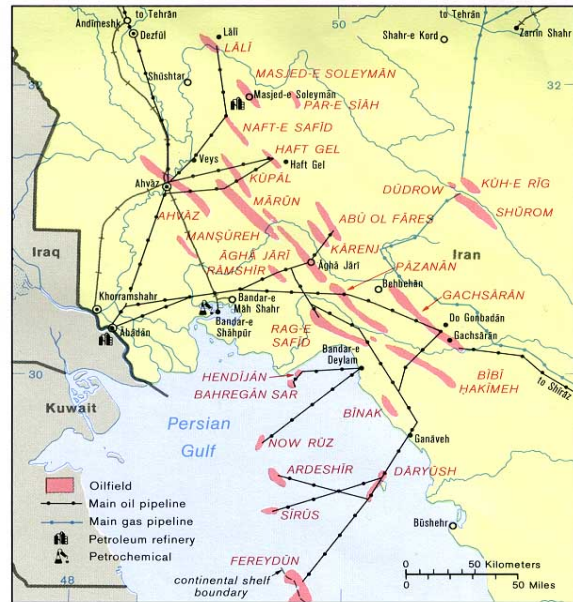
### IRAN'S OIL RESOURCES

The map shows the largest of Iran's 40 producing oil fields (27 on- and 13 offshore), which, in terms of sulfur content and gravity, hold mostly mid-grade crude oil similar to that found in Saudi Arabia, Iraq, and Kuwait. Iranian crude generally sells for slightly less than the weighted average price of the OPEC "basket" of eleven crude oil grades.<sup>2</sup>

<sup>1</sup> "Worldwide Look at Reserves and Production," *Oil & Gas Journal*, 103, 47 (12/19/ 2005): 24.

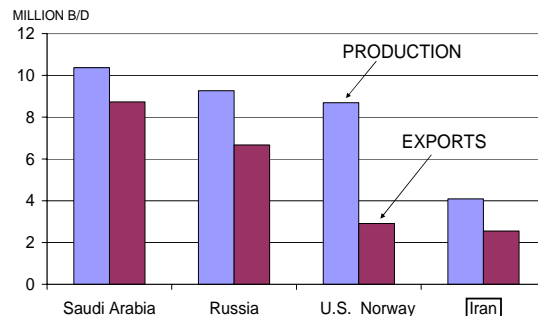
<sup>2</sup> Information supplied by the Energy Information Administration (EIA). African crude, for example, is lighter and hence more expensive. Since June 2005, the basket includes additional heavy crude oil grades, lowering the average price. EIA's "OPEC Revenues Fact Sheet" and "Country Analysis Briefs," are the sources for this report, unless otherwise noted.

### Major Iranian Oilfields



Only Saudi Arabia and Canada hold larger oil reserves than Iran, whereby most oil in Canada is in the form of oil sand and far more costly to extract. In oil production and exports Iran ranks fourth in the world; it produced 4.2 million barrels of oil per day (b/d) and exported 2.7 million b/d in 2005.

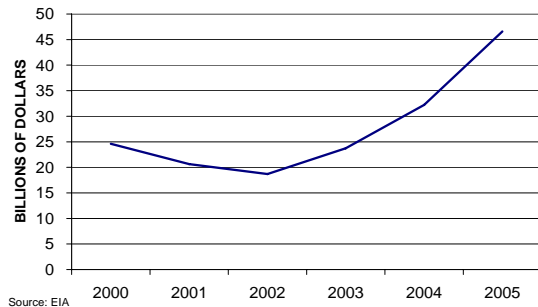
Figure 1  
CRUDE OIL PRODUCTION, EXPORTS  
TOP FOUR COUNTRIES



Source: EIA, 2004 Data.

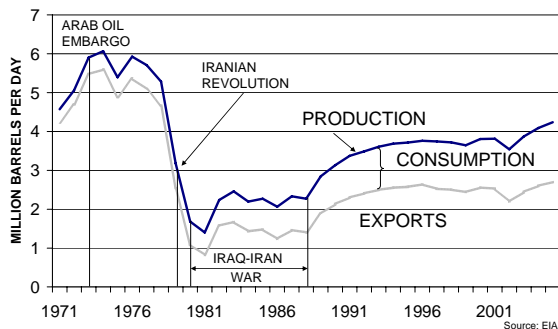
**OPEC.** Iran is a founding member of the Organization of the Petroleum Exporting Countries (OPEC) and participates in the cartel’s restrictive output practices to drive up the price of oil on the world market. As the oil price has surged, Iran’s net oil export revenue has reached record (nominal) levels, nearly doubling from \$23.7 billion in 2003 to \$46.6 billion in 2005.

**Figure 2 IRAN'S NET OIL EXPORT REVENUE**



Eighty to ninety percent of Iran’s export earnings come from oil. Boosted by oil, Iran’s real GDP grew 4.8 percent in 2004 and 5.6 percent in 2005. But, Iran’s rate of oil production and its share of OPEC’s oil output are much lower than they were prior to the Iranian revolution and the subsequent war with Iraq. Oil production did increase after the war but is only now approaching the level of 35 years ago. Iran’s share of OPEC production was 12.5 percent in 2005 compared to 19.8 percent in 1974.

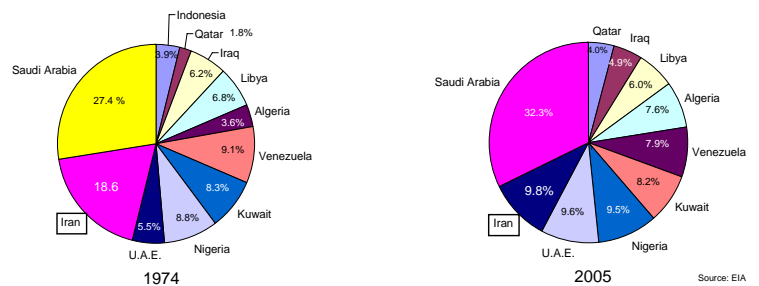
**Fig. 3 IRAN'S CRUDE OIL PRODUCTION & EXPORTS**



**Lagging oil exports.** Iran’s oil consumption has been increasing substantially and claims 36 percent of production while its oil exports

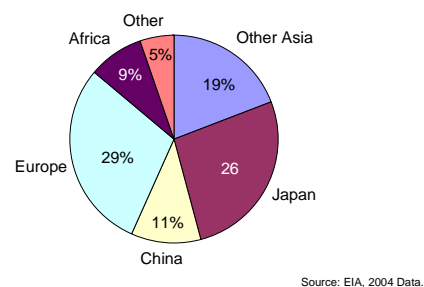
remain barely at half the peak rate of 1974. As Iran’s oil production and exports declined, OPEC—whose output slightly exceeds its peak rate in the 1970’s—reduced the output quota it assigns to Iran. Since 1990, OPEC has kept the quota at a rate between 3 and just over 4 million b/d. Iran thus accounts for a much smaller share of OPEC oil exports than it once did. Figure 3 compares the cartel members’ relative shares of net oil export revenue in 1974 and in 2005. The EIA’s estimate of 2005 OPEC revenue is \$473 billion.

**Figure 4 OPEC REVENUE SHARES**



Fifty-six percent of Iran’s oil exports are to Asia and 29 percent to Europe. Japan and the People’s Republic of China (PRC) together buy over one-third of Iran’s oil exports. The U.S. buys no oil from Iran (other than specially licensed swaps for Caspian oil).

**Figure 5 IRAN'S OIL EXPORT DESTINATIONS**

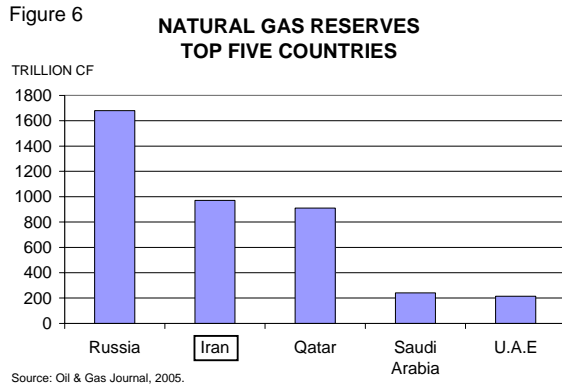


By comparison, 64 percent of all Mid-East oil exports are shipped to Asia, 16 percent to Europe, and 13 percent to the U.S.<sup>3</sup>

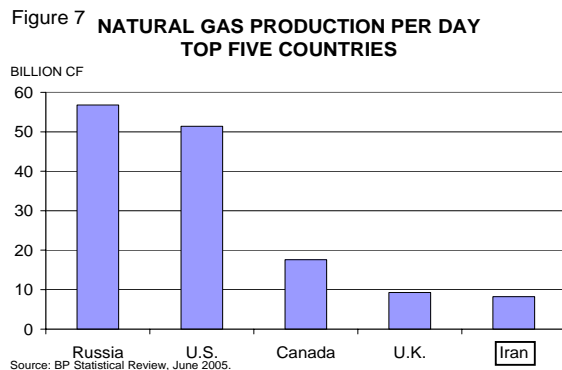
<sup>3</sup> Inter-area movements 2004, BP Statistical Review of World Energy, June 2005.

## IRAN'S GAS RESOURCES

Only Russia holds more natural gas than Iran, and only one other country, Qatar, holds nearly as much gas as Iran, as Figure 6 shows. But, 62 percent of its natural gas reserves have not yet been developed.



Iran ranks only fifth in the world in natural gas production and produces far less gas than Russia, not only in absolute terms but also in proportion to its reserves.



OPEC's output quotas do not extend to natural gas, and Iran's gas production has more than doubled in the last ten years, albeit from a low base. The South Pars gas field in the Persian Gulf is part of the largest natural gas deposit in the world and is shared by Iran and Qatar (whose portion is called the "North Field"). Developing South Pars is Iran's single largest energy project, which already has attracted more than \$15 billion in investments and has 18 active of 28 planned development phases.

**Minimal gas exports.** Natural gas now accounts for close to half of Iran's total energy consumption; its consumption of gas ranks fifth in the world. Iran imports natural gas from Turkmenistan via a pipeline built in 1997 and exports gas to Turkey, its only gas export customer. A natural gas pipeline to Turkey was completed in 2002, but there is a dispute between the two countries over price and purchase volume. Iran may be a net importer of gas.<sup>4</sup> It has signed multiple agreements with other potential gas customers, including Armenia, India, Pakistan, the PRC, and European countries, but concrete progress appears slow. In order to export natural gas on a large scale, Iran needs to build additional pipelines far beyond its borders and/or construct liquefied natural gas (LNG) facilities, of which it has none at this time. The potential for LNG exports has caused internal debate in Iran over the priorities of competing uses for natural gas.<sup>5</sup> Meanwhile, other Persian Gulf countries have moved ahead of Iran in positioning themselves for LNG exports.

## CONFLICTING PRIORITIES

**Buy-back contracts.** Iran's restrictive petroleum law was loosened recently but remains a hindrance to foreign investment.<sup>6</sup> Along with Saudi Arabia, Iraq, and Kuwait, Iran is one of the Persian Gulf's "Big Four" oil nations enjoying the highest well flow rates and the lowest unit cost in the world, less than \$2 per barrel.<sup>7</sup> However, investments in the billions of dollars are a prerequisite to

<sup>4</sup> The BP Statistical Review shows Iran's natural gas consumption exceeding production in 2004, 8.4 versus 8.2 billion cubic feet per day (bcfd).

<sup>5</sup> Gas can be used for domestic consumption, export, and re-injection into oil fields to raise underground pressure; see "Gas Use at Issue in Iran as Oil Production Sags," by Judy Clark, *OGJ*, 103, 18 (5/9/2005): 34.

<sup>6</sup> International Petroleum Encyclopedia 2005, PennWell Corp., p.149.

<sup>7</sup> Thomas R. Stauffer, "The Economic Cost of Oil and Gas Production: A Generalized Methodology," *The OPEC Review* 28, 2 (June 1999): 192.

production. Iran imposes so-called buy-back contracts on investors that compensate them through allocations of oil production on a relatively short-term, profit limiting basis. Oil field operations must be turned over to the National Iranian Oil Company (NIOC) when the contracts expire.

**U.S. Sanctions.** Since 1995, in response to Iran's support of terrorists and pursuit of nuclear technology, the U.S. has banned investment in and trade with Iran by executive order. In addition, the Iran-Libya Sanctions Act (ILSA) subjects foreign companies to sanctions, if they invest more than \$20 million in Iran's energy sector. While a key waiver in the case of the South Pars gas field was granted, ILSA is believed to have limited Iran's oil production capabilities.<sup>8</sup> Also, most LNG plants use technology developed by U.S. companies, which could hinder Iran's progress in this field.

**Large imports of gasoline.** Domestically, Iran sets low prices for oil products and natural gas. A gallon of gasoline sells for less than 40¢. Low prices and an increase in population since 1980 from 40 to 68 million people have pushed Iran's gasoline consumption beyond its refining capacity. Motor gasoline consumption has increased by nearly 13 percent annually from 2000 to 2004, resulting in an estimated 170,000 b/d of gasoline imports last year. On a net basis, Iran's gasoline imports rank second in the world. Its import bill for gasoline is running at \$3 to \$4 billion per year. An estimated 25 percent of Iran's gasoline imports come from Persian Gulf countries, 15 percent from India, and the remainder from a variety of sources, including France, Turkey, Singapore, the Netherlands, and the PRC. Iran is a net exporter of refined products in total, based on shipments of residual fuel oil.

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<sup>8</sup> See CRS Reports RS20871, "The Iran-Libya Sanctions Act (ILSA)," 4/19/2005, and RL32048, "Iran: U.S. Concerns and Policy Responses," 1/20/2006, by Kenneth Katzman. In 2001, the ILSA was extended to August 2006.

**Diverse pursuits.** Iran wants to raise its oil production to 5 million b/d by 2010; it has aspirations to expand the Caspian oil and gas trade and has made outsized claims for a stake in offshore fields. It wants to increase refining capacity from 1.47 to as much as 2.2 million b/d by 2008. It plans to convert 1.5 million motor vehicles to compressed natural gas (CNG) and install 700 CNG filling stations by the 2009 to 2011 timeframe.<sup>9</sup> It has announced new projects in exploration, pipelines, LNG, and petrochemicals. Well known are its nuclear ambitions. But, prospects in the Caspian Sea seem far off. Major producing oil fields are in decline—the rate of recovery in existing fields is 8 to 11 percentage points less than the world average—and there are doubts the country can even sustain its current production.<sup>10</sup> Iran is mired in slow-moving negotiations with an array of foreign companies, and it has drawn the ire of the world over its nuclear program.

## CONCLUSION

Iran has an enormous energy output gap: the reserve-to-production ratio of, say, Russia for natural gas applied to Iran would yield 33 bcf/d of gas production and for crude oil would yield 20 million b/d of Iranian oil production—4 and 4.8 times, respectively, its current rates of output. Iran is centrally located between European and Asian energy markets and is courted by eager buyers of oil and gas. Yet the regime insists on aggressive politics, pursues threatening nuclear technology, manipulates the international oil price through OPEC, and drives a wedge between energy demand and supply at home by limiting consumer prices while impeding foreign investment. Iran does not need nuclear energy; it needs to reconnect with the world, realign its disjointed priorities, and develop its vast oil and natural gas resources.

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<sup>9</sup> Petroleum Encyclopedia, p. 149.

<sup>10</sup> Iran's crude oil output fell slightly in December 2005 and January 2006, as did OPEC's, according to Platt's *Oilgram News*, 84, 30 (2/14/2006).