

# COUNTRY ANALYSIS BRIEFS

## Iraq

Last Updated: August 2007

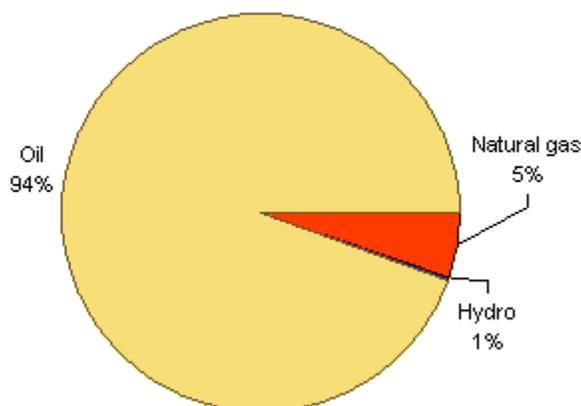
### Background

**Security issues continue to hold back rehabilitation of Iraq's energy sector.**

Iraq has the world's third largest proven petroleum reserves and some of the lowest extraction costs, although just a fraction of its known fields are in development. According to the March 2007, review by the [International Monetary Fund \(IMF\)](#), in 2006, crude oil export revenues represented around 60 percent of GDP and 89 percent of government revenues. In 2006, the U.S. Department of Energy's Energy Information Administration (EIA) reported that Iraq was the world's 15th biggest oil producer and Iraq meets approximately 94 percent of its energy needs with petroleum. Iraq's use of abundant natural gas resources and hydropower is limited. According to the findings of the December 2006, [Iraq Study Group \(ISG\)](#), led by former Secretary of State James A. Baker and former Congressman Lee H. Hamilton, the stabilization of Iraq is highly correlated with Iraq's economic success or failure, which in the medium-term is highly dependent on its hydrocarbons industry.



### Total Energy Consumption in Iraq, by Type (2004)



Source: EIA International Energy Annual 2004

## Oil

***Experts agree that Iraq may be one of the few places left where vast reserves, known and unknown, have barely been exploited.***

After more than a decade of sanctions and two Gulf Wars, Iraq's oil infrastructure needs modernization and investment. Despite a large reconstruction effort (including Iraq Relief and Reconstruction Fund (IRRF) support of \$1.72 billion), the industry has not been able to meet hydrocarbon production and export targets since 2004. According to the January 2007, [Special Inspector General for Iraq Reconstruction \(SIGIR\) report](#), Iraq's petroleum sector faces technical challenges in procuring, transporting and storing crude and refined products, as well as managing pricing controls and imports, fighting smuggling and corruption, improving budget execution, and managing sustainability of operations. Oil production has not recovered to pre-war levels, and parliament and cabinet officials are working to map out investment and ownership rights that will help move the industry forward.

Another challenge to Iraq's development of the oil sector is that resources are not evenly divided across sectarian-demographic lines. Most known hydrocarbon resources are concentrated in the Shiite areas of the south and the ethnically Kurdish north, with few resources in control of the Sunni minority (Click [HERE](#) to link to oil resources maps). For this reason a legal framework for investment in the hydrocarbon sector remains a main policy objective.

According to reports by various U.S. government agencies, multilateral institutions and other international organizations, long-term Iraq reconstruction costs could reach \$100-billion or higher, of which it is estimated that more than a third will go to the oil, gas and electricity sectors. In addition, the World Bank estimates that at least \$1 billion in additional revenues needs to be committed annually to the oil industry just to sustain current production.

### Oil Reserves

According to the Oil and Gas Journal, Iraq's proven oil reserves are 115 billion barrels, although these statistics have not been revised since 2001 and are largely based on 2-D seismic data from nearly three decades ago. Over the past two years, multinational companies, at the request of the Government of Iraq (GoI), have reexamined seismic data and conducted comprehensive surveys of Iraq's hydrocarbons reserves in locations throughout the country. Geologists and consultants have estimated that relatively unexplored territory in the western and southern deserts may contain an estimated additional 45 to 100 billion barrels (bbls) of recoverable oil. While internal Iraqi estimates have ranged into the hundreds of billions of barrels of additional oil, the seismic data under review by a host of international firms seem to be pointing to more conservative, but significant, increases. Iraq has the lowest reserve to production ratio of the major oil-producing countries.

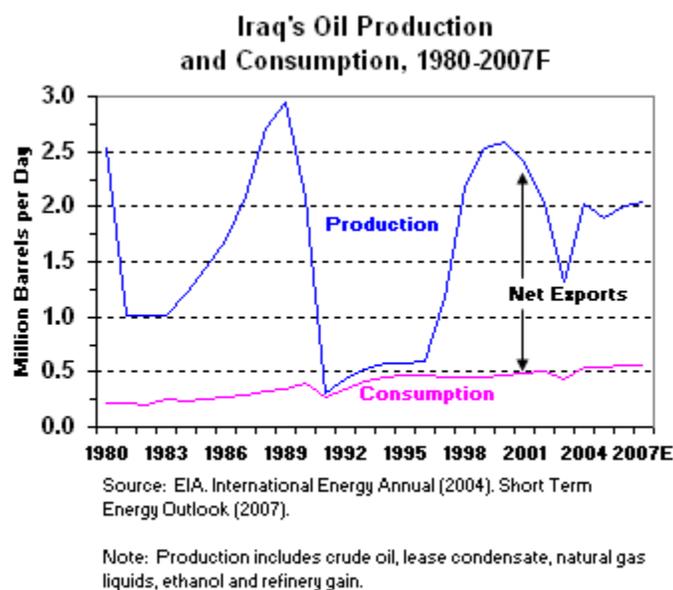
The majority of the known oil and gas reserves in Iraq form a belt that runs along the eastern edge of the country. According to the GoI, Iraq has around 9 fields that are considered "super giants" (over 5 billion bbls reserves) as well as 22 known "giant" fields (over 1 billion bbls). According to independent consultants, the cluster of super-giant fields of southeastern Iraq forms

the largest known concentration of such fields in the world and accounts for 70 to 80 percent of the country's proven oil reserves. An estimated 20 percent of oil reserves are in the north of Iraq, near Kirkuk, Mosul and Khanaqin. Control over rights to reserves is a source of controversy between the ethnic Kurds and other groups in the area.

The Western Desert is of interest to oil prospectors as well as to the sectarian groups occupying these areas where there is no active oil production. Minor oil formations beneath western territory have been known of for decades, but little has been done in the way of development. Much of this area is just now undergoing exploration, although it belongs to same geological formation as part of the Saudi Arabian deposits. According to an Egyptian news source from February, 2007, a test well at the Akkas field in the Al-Anbar province is flowing at rates equivalent to larger fields elsewhere in Iraq.

### Oil Production

In 2006, Iraq's upstream crude oil production under the control of the regional state-owned oil companies averaged 2.0 million barrels per day (bbl/d), down from around 2.6 million bbl/d of production and a nameplate capacity of 2.8 to 3.0 million bbl/d in pre-invasion January 2003. Estimates of Iraq's current production levels vary and metering systems have been put in place at Basrah to improve export accounting.



According to 2007 report from the [U.S. Government Accountability Office](#) (GAO), the Energy Information Administration (EIA), State Department and Gol reported differences in daily production volumes ranging between 100,000 to 300,000 bbl/d. While EIA reported significantly lower average daily production numbers than the State Department, annual averages only differed by approximately 100,000 bbl/d. Some analysts suggest that differences could be accounted for by oil smuggling, although discrepancies could arise from differing methods used to measure production (e.g. estimating re-injection at the well-head).

Historically, two-thirds of production came from the southern fields and the remainder from the north-central fields near Kirkuk. At present, the majority of Iraqi oil production comes from just three giant fields: North and South Rumaila and Kirkuk. The Rumaila fields, operated by Iraqi parastatal South Oil Company, along with a ring of nearly a dozen smaller fields, including Subha, Luhais, West Qurna and Az-Zubair, have been producing 1.5 to 1.9 million bbl/d; close to pre-war levels. Conversely, average production at Kirkuk and the northern fields of around 200,000 bbl/d is only a fraction of the pre-war peak of around 680,000 bbl/d, due to reservoir damage from gas and water injection as well as shut-in export routes. In May 2007, the Iraq Ministry of Oil (MoO) reported that total production from the northern fields was 206,000 bbl/d, all of which went to domestic consumption.

The table below represents reported installed oil production capacity in Iraq, all of which is not online. Effective capacity, or actual production, is subject to change based on the security situation.

| <b>Usable Oil Production Capacity in Iraq</b>  |                                           |                                           |                      |
|------------------------------------------------|-------------------------------------------|-------------------------------------------|----------------------|
|                                                | <b>Estimated Current Capacity (2007E)</b> | <b>Estimated Pre-War Capacity (2003E)</b> | <b>Est. Reserves</b> |
| <b>Southern Fields</b>                         | <b>(bbl/d)</b>                            | <b>(bbl/d)</b>                            | <b>(billion bbl)</b> |
| Rumaila North                                  | 500,000                                   | 500,000                                   | 10                   |
| Rumaila South                                  | 800,000                                   | 800,000                                   | 7                    |
| West Qurna                                     | 180,000                                   | 250,000                                   | 15-21                |
| Az-Zubair                                      | 230,000                                   | 230,000                                   | 5                    |
| Missan (inc. Buzurgan, Jabal Faqi, Abu Ghraib) | 100,000                                   | 100,000                                   | 3                    |
| Majnoon                                        | 50,000                                    | 50,000                                    | 20                   |
| Luhais                                         | 50,000                                    | 50,000                                    | 2                    |
| <b>Southern Sub Total (million bbl/d)</b>      | <b>1.9</b>                                | <b>2.0</b>                                |                      |
| <b>Northern Fields*</b>                        |                                           |                                           |                      |
| Kirkuk                                         | 250000 [600,000 - 700,000]                | 700,000                                   | 10                   |
| Bai Hassan                                     | [50,00 - 100,000]                         | 125,000                                   | 2                    |
| Jambur                                         | [75,000]                                  | 75,000                                    | 1                    |
| Khabbaz                                        | [25,000]                                  | 30,000                                    | <1                   |
| Ajil                                           | [25,000]                                  | 25,000                                    | <1                   |
| East Baghdad                                   | 0                                         | 50,000                                    | 8                    |
| Ain Zalah/Butmah                               | [10,000]                                  | 10,000                                    | <1                   |
| Sufiya (other minor fields)                    | 10,000                                    | 10,000                                    | <1                   |
| <b>Northern Sub Total (million bbl/d)</b>      | <b>0.3</b>                                | <b>1.0</b>                                |                      |
| <b>Totals (million bbl/d)</b>                  | <b>2.2</b>                                | <b>3.0</b>                                |                      |

Source: EIA, ITO, Media Reports, Government of Iraq Ministry of Oil

\* Most production shut-in due to limited export routes/limited refining capacity.

Amounts in brackets are estimates of production that could potentially come online if export/domestic refining became available.

Currently, the MoO has central control over oil and gas production and development in all but the Kurdish territory through its two operating entities, the North (NOC) and South Oil Companies (SOC). According to the North Oil Company's website, their concession and jurisdiction extends from the Turkish borders in the north to 32.5 degrees latitude (about 100 miles south of Baghdad), and from Iranian borders in the east to Syrian and Jordanian borders in the west. The company's geographical operation area spans the following governorates: Tamim (Kirkuk), Nineveh, Irbil, Baghdad, Diyala and part of Babil to Hilla and Wasit to Kut. The remainder falls under the jurisdiction of the SOC, and though smaller in geographical size, includes the majority of proven reserves.

### Petroleum Legislation

Passage and implementation of Iraq's Hydrocarbon Law, which was first presented to upper house of Parliament for review on February 27, 2007, is central to the development of the Iraq's oil and gas industry, and Iraq's economy overall. The draft law focuses on upstream development and lays out the conditions for investment and international participation in the sector. The law also details a governance model which includes the proposed re-establishment of the umbrella operations company that was the Iraq National Oil Company (INOC) and a central regulatory body, such as a Federal Oil and Gas Council, to review contracts. The original draft law laid out a proposed plan for domestic control of oil and gas fields and a framework for revenue sharing among governorates. Initially, four annexes to the law proposed which fields would be centrally managed and which fields would be under local/regional control, and thus opened to foreign investment at the governorate's discretion. Annexes I and II, which listed currently producing, partially developed or mothballed fields included some 93 percent of proven reserves. Annex III,

listing the “undeveloped” fields, and Annex IV, listing 65 exploration blocks, were to fall under regional development authorities. Upstream development privileges based on the aforementioned thresholds are the subject of ongoing negotiations. Following discussions between cabinet members, parliament and other groups in July 2007, the annexes are reported to have been removed from the current version draft law and will be considered at a later date by the yet-to-be-established regulatory body.

| Iraq Draft Oil Law - Field Classification                             |                 |                     |
|-----------------------------------------------------------------------|-----------------|---------------------|
| I                                                                     | II              | III                 |
| In Production                                                         | Near Production | Undeveloped         |
| Abu Ghraib                                                            | Alan            | Abu Khaimah         |
| Amara                                                                 | Ibrahim         | Samawa              |
| Buzurgan                                                              | Qasab           | Ahdab               |
| Fuqua (Jabal Faqi)                                                    | Najmah          | Badrah              |
| Halfaya*                                                              | Jawan           | Dhafriyah           |
| West Qurna*                                                           | Sarjoun         | Akkas               |
| Majnoon*                                                              | Demir Dagh      | Buhaira             |
| Ain Zalah                                                             | Makhmour        | Chemchemical        |
| (West) Butmah                                                         | Qara Chauq      | Chia Surkh          |
| Qaiyarah                                                              | Himrin (Hamrin) | Gilabat             |
| Sufiya                                                                | Kor Moor        | Injanah             |
| Az-Zubair (Shuaiba, Rafidhiyah, Safwan)*                              | Ismail          | Khashm              |
| Tuba                                                                  | Judaida         | Al-Ahmar            |
| North Rumaila*                                                        | Jeria Pika      | Qamarim             |
| South Rumaila*                                                        | Mansuriyah      | Djailia             |
| Luhais                                                                | Nahrawan        | Kumait              |
| Subba                                                                 | Nau Dauman      | East Rafidain       |
| Nahr Umar* (Bin Umar)                                                 | Tal Ghazal      | Gharraf             |
| Ajil                                                                  | Huwaiza         | Rafidain            |
| Balad                                                                 | Noor            | Al-Nasariya         |
| Tikrit                                                                | Rifai           | Khanuqa             |
| East Baghdad*                                                         | Jraishan        | Khashab             |
| Naft Khanah                                                           | Rachi (Raki)    | Pulkhana (Bulkhana) |
| Bai Hassan                                                            | Ratawi          | Kifl                |
| Jambur                                                                | Siba            | Marjan              |
| Khabbaz                                                               |                 | West Kifl           |
| Kirkuk (Avanah, Baba, Khurmala)*                                      |                 | Taq Taq             |
| Source: Media Reports, Global Insight, IHS, DOE estimates             |                 |                     |
| * Super Giant defined as having 5 billion barrels or more of reserves |                 |                     |

Certain internal groups and some members of the expatriate Iraqi community have voiced reservations about the role of foreign oil companies in Iraq’s upstream oil and gas sector. Such groups claim that defacto “denationalization” would make Iraq the only major oil producing country in the region to allow foreign control in upstream operations, and at generous terms. The Kurds also oppose widening central control over planning, upstream development and revenue distribution. The Kurdish Oil and Gas Minister Ashti Hawrami has called for the reclassification of several field in the Annexes, particularly “boundary fields” with unclear borders or fields that have been contracted to or negotiated with foreign companies, including Kor Mor, Demir Dagh, and Taq Taq. It was reported in late June 2007 that the GoI and the Kurds had come to an agreement on the revenue sharing portion of the law, considered an important step forward for the passage of the bill. Following Ministry approval in early July 2007, parliament is expected to consider the law in an amended form in the fall 2007.

#### Upstream Development Plans

The MoO has announced a goal of 6 million bbl/d of sustainable production by the end of the decade, stating that between \$25 and \$75 billion in investment is needed to get Iraq’s sector producing at such levels. The southern fields intended for development in the immediate term for export are West Qurna, Halfaya, Majnoon and Nahr (Bin) Umar. Experts suggest that these fields could produce an additional 2 million bbl/d in the medium-time frame with moderate investment. In

the north, further development at a number of fields, including Bai Hassan, Jambur, Khabbaz, Ajil, Ain Zalah, Butma and others may depend on the final status of Kirkuk (Tamim) and settlement of Kurdish claims on the Nineveh governorate (Mosul). A referendum is scheduled to take place in late 2007.

Despite the lack of agreement over the national law governing investment in hydrocarbons, the [Kurdistan Regional Government \(KRG\)](#) has signed a half-dozen oil production sharing, development and exploration contracts with several small foreign firms. In June 2007, the KRG announced an offering of 40 additional exploration blocks during the summer of 2007. In addition, more than a dozen contracts signed by the central government with international companies during Saddam Hussein's regime are being renegotiated or may come under review when Iraq's oil law and investment framework is in place. Below is a table detailing the status of reported international investment in Iraq's upstream petroleum sector:

#### Iraq's Upstream Petroleum Development Agreements

| Status                  | Field                                                                     | Location                                | Partners                                                                                                                    | Country               | Est. Production (bbl/d)                          | Reserves (billion bbls) | Notes                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| EPCRA                   | Bas Dowl (1)                                                              | KRG (KRG)                               | ANF Petroleum Company (Petrol Technology, KRG), Resale (Prime Retail) (Rosencor oil company, KRG), Caldec Energy Inc. (USA) | Turkey<br>USA         | N/A                                              | N/A                     | Start-Down later                                                                                                                |
|                         | Taq Taq                                                                   |                                         | Develco                                                                                                                     | Turkey                | 100,000 - 200,000                                | 0.4-6.8                 | - Includes KRG Client's exploration                                                                                             |
|                         | Turki                                                                     | KRG (KRG, KRG)                          | Taq Taq Operating Company (TTOPCO), Adha Petroleum (KRG), Gasol Energy (KRG), DKO A.S. (USA), KRG (KRG)                     | Norway<br>KRG         | 15,000 - 25,000 (2007)<br>40,000 - 50,000 (2008) | 0.1                     | - First permits production in 3rd quarter - 100% owned by DKO, to include 26 mile pipeline link to KRG's Ceyhan pipeline        |
|                         | Shahk Chik Turk                                                           | KRG (KRG)                               | Fothies (Purd and Price, Norco Petroleum JV)                                                                                | Turkey                | N/A                                              | 1                       | - Returned to Iraq since given rights to Shalul No longer involved in Baghdad development                                       |
|                         | Gawak Aris, Zagros                                                        | KRG (Iraqi company)                     | Ventura Oil (Saudi), VenturaZagros                                                                                          | Canada                | N/A                                              | N/A                     | - Shalul was originally included (Shalul, East Shalul, Kuba, East Kuba, Bismayah, Muzahim - KRG, Ghazal, Rabana, Ghazal, Zaygh) |
| MOU (undetermined type) | Unknown                                                                   | KRG                                     | Swirling Energy                                                                                                             | UK                    | N/A                                              | N/A                     | - Detail releases (Exploration)                                                                                                 |
|                         | Dura Dagh, Al Zula, Hamdaniya, Sidi Hish, Al-Hayyarah, Al-Hayyarah, Maysa | KRG (KRG)                               | Heritage Oil Corporation (HOC), Eagle Group of Iraq, Inabco (USA), Inabco (KRG)                                             | Canada<br>Iraq        | N/A                                              | N/A                     | - PFA conversion reportedly in discussion                                                                                       |
|                         | Khalifa Alawi 1                                                           | KRG (KRG)                               | Petro Resources                                                                                                             | Japan                 | N/A                                              | 0.8                     | - Review Oil (TEI AR) (M) originally scheduled in 2004                                                                          |
|                         | Block 5, including Al-Khalifa                                             | KRG (Al-Mutawa)                         | Petro Resources                                                                                                             | India                 | N/A                                              | 0.2                     | - Exploration, full contract                                                                                                    |
|                         | Block 4                                                                   |                                         | Supernova                                                                                                                   | Russia                | N/A                                              | N/A                     | - Exploration, Status releases                                                                                                  |
|                         | Block 6                                                                   | Ventura Desert (Al-Anbar)               | Petro Resources                                                                                                             | India                 | N/A                                              | N/A                     | - Initial award pre-2003 - Amending exploration to oil 4000                                                                     |
| Service Contract (SC)   | Al-Mutwa                                                                  | KRG (Iraqi)                             | China National Petroleum Company (CNPC)                                                                                     | China                 | 20,000                                           | 1                       | - Contracted Jan. 2007. PFA negotiated in 2007                                                                                  |
|                         | Al-Hayy                                                                   | KRG (Iraqi)                             | Korea National Oil Company (KNOC)                                                                                           | South Korea           | 225,000-250,000                                  | 5                       | - EPC (Bilateral) (Australia) reportedly converted                                                                              |
|                         | Yusuf Ghara                                                               | KRG (Iraqi, Shi Shi)                    | Lakel, Conoco Phillips (USA), M&D                                                                                           | USA<br>Iraq<br>Russia | 400,000 - 800,000                                | 28                      | - In review<br>- Proposed, Lakel wants to revise agreement scheduled in 2002                                                    |
|                         | Alawi                                                                     | KRG (Iraqi)                             | Petro Resources                                                                                                             | Vietnam               | 50,000 - 50,000                                  | 0.1                     | - In Discussion to be revised.                                                                                                  |
| Western                 | Dakki Lakali                                                              | KRG (Iraqi)                             | Petro Resources, Borealis Group                                                                                             | India<br>France       | 240,000 crude oil<br>90,000 NGL gas              | 1.8                     |                                                                                                                                 |
|                         | Majnoon                                                                   | KRG (Iraqi, Muzahim)                    | Total                                                                                                                       | France                | 450,000 - 500,000                                | 12.6                    | - Returned from Chevron will join project                                                                                       |
|                         | Mish Umer (Shi Umer) Al-Hayyarah                                          | KRG (Iraqi)                             | Total or Zardubudoff                                                                                                        | France<br>Russia      | 440,000                                          | 5                       |                                                                                                                                 |
|                         | Al-Khalifa                                                                | KRG (Shi Shi)                           | Supernova                                                                                                                   | Russia                | 500,000                                          | 2.6                     | - 100% successful development in 4000 Status releases                                                                           |
|                         | Alawi                                                                     |                                         | TRAO                                                                                                                        | Turkey                | 100,000                                          | 0.9                     | - 100% successful development in 4000 - M&U reportedly signed 2005                                                              |
| EPC                     | Talab al Block 2                                                          | KRG (Iraqi) / Ventura Desert (Al-Anbar) | Indonesia's PT Pertamina                                                                                                    | Indonesia             | N/A                                              | 15 (Tale)               | - In discussion to be revised. Tale negotiated in 1981 - 1985, Block 2 negotiated in 2005.                                      |
|                         | Barrick, Dohuk (Iraqi)                                                    | KRG (Iraqi, Shi)                        | DPF, EPC, Anasir                                                                                                            | Turkey                | 100,000 - 120,000                                | N/A                     |                                                                                                                                 |

(Click above for full chart)

### Refining

Refinery operations, with antiquated infrastructure, are often disrupted by thievery, employee intimidation, and sabotage to feeder pipelines, lack of feedstock, and unreliable power supply. The fuel mix, including high levels of heavy fuel oil, does not reflect the current demand mix. The sector has not been able to meet domestic demand for refined products like gasoline, kerosene, LPG and diesel for the generators that supplement electric power since 2003, and shortages are reported. In 2006, Iraq's petroleum product consumption was approximately 545,000 bbl/d.

According to the Oil and Gas Journal, Iraq's total installed refinery capacity is 597,500 bbl/d. Iraq has four major refineries with an installed/nominal capacity of approximately 570,000 bbl/day. Since 2003, these facilities and their related infrastructure (pipelines, external power supply) have been subject to attacks and repeated disruptions.

The main refineries include:

- Daura: The 110,000-bbl/d capacity facility just outside Baghdad, primarily supplies refined products to Iraq's capital and is considered central to supply security in the capital. It is Iraq's oldest refinery, and is a frequent target of sabotage. According to the MoO, Daura will be expanded to 240,000 bbl/d and will be able to meet Baghdad's short-term fuel requirements. A \$110 million contract was initially signed by the Hydrocarbon Supply of Texas and Czech-based ProKop in 2005, although progress has been inhibited by the security situation and rising costs.
- Baiji: Iraq's two largest sister refineries in north-central Iraq (with 310,000 bbl/d capacity) is a point of sectarian contention as the facility currently processes crude from the northern fields, but is located in nominally non-Kurdish territory. In January 2007, Iraqi Deputy Prime Minister Barham Saleh reported to Parliament that the country is losing \$1.5 billion annually from attacks and theft at Baiji. The facility has been subject to repeated disruptions and power loss, and generally operates at around 75 percent capacity. The January 2007 SIGIR report indicated that at least some of the oil storage facilities were under "insurgent control" as of December 2006.
- Basrah: The 150,000-bbl/day capacity facility located near the port lacks independent power generation and wastewater treatment

Other sources report that Iraq's refining capacity also includes several minor plants (called "topping plants"), which produce 10,000 bbl/d or less each. According to the U.S. [Department of State's Iraq Reconstruction Management Office \(IRMO\)/Iraq Transition Assistance Office \(ITAO\)](#) reports, these facilities (including Mosul-Qaiyarah, Kirkuk, Khanaqin, K3-Haditha, Muftiah, Najaf, Maysan, and Nassiriyah-Samawah) primarily produce asphalt and low-grade kerosene and diesel. Some of these smaller facilities have been reportedly "cannibalized" for spare parts for the larger refineries.

#### *Investment in New Refining Capacity*

In order to alleviate shortages, the GoI has initiated a \$4-billion plan to attract investment in the downstream operations and raise refinery capacity by around 1 million bbl/d. Timetables for new additions are uncertain due to security and financing roadblocks. The following table highlights proposed new construction:

| Refinery Development in Iraq                          |                                                                                   |                       |                                                                                                 |
|-------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------|
| Location                                              | Investor                                                                          | Est. Capacity (bbl/d) | Notes                                                                                           |
| Kirkuk                                                | MoO                                                                               | 150,000               | Approved July 2007                                                                              |
| Dohuk (KRG)                                           | Make Oil AG (Lebanon)                                                             | 250,000               | Construction to start July 2007. A second "microrefinery" has                                   |
| Kurdistan (location TBD)                              | PetroGulf and Taqat al-Qabidha (Kuwait), Cukurova Holding and Investment (Turkey) | 20,000                | Planned for 2008.                                                                               |
| Msaib / Nassiriyah                                    | MoO, Japan                                                                        | 300,000               | In discussion phase                                                                             |
| Hindiyah (Karbala)                                    | MoO                                                                               | 140,000               | Planned for 2009 or 2010.                                                                       |
| Koya (Kwysengeq )                                     | MoO                                                                               | 70,000                | Planned for 2012.                                                                               |
| Amarah                                                | MoO                                                                               | 30,000                | Planned for 2009. To be expanded to 120,000 bbl/d. Includes 16-million gallon storage facility. |
| Basrah                                                | Make Oil AG (tentative)                                                           | 150,000               | In contract phase. Planned for 2010.                                                            |
| Source: Media Reports, IHS, Global Insight, MoO, ITAO |                                                                                   |                       |                                                                                                 |

Since 2003, the only new facility to come on-stream is a 10,000-bbl/d reconstruction fund-

financed facility in the southern city of Najaf, completed in October, 2006. However, the refinery remains generally inactive due to limited storage facilities and inability to secure transport lines. The 20,000-bbl/d partially completed refinery at Bazyan (Sulaymaniyah) is expected to come online in late 2007.

#### Refined Products

According to the IMF and independent reporting, subsidies have contributed to local supply shortages and an international black market trade with Iran and Turkey. As part of their IMF program, the GoI is slowly reducing subsidies on refined products, as seen in the table below:

| Official Prices of Refined Product in Iraq<br>(Dollars/Gallon)* |      |        |        |        |
|-----------------------------------------------------------------|------|--------|--------|--------|
|                                                                 | 2005 | Mar-06 | Dec-06 | Jun-07 |
| Regular Gasoline                                                | 0.05 | 0.27   | 0.75   | 1.23   |
| Blended/Super Gasoline<br>(replaced "Premium" in 2007)          | 0.13 | 0.67   | 1.05   | 1.38   |
| Kerosene                                                        | 0.01 | 0.07   | 0.22   | 0.46   |
| Diesel                                                          | 0.03 | 0.24   | 0.45   | 1.07   |
| LPG (12 kg cylinder)                                            | 0.17 | 0.43   | 0.81   | 2.43   |

\*With the exception of LPG; which is reported in dollars per cylinder.  
Source: IMF, OANDA, Media Reports

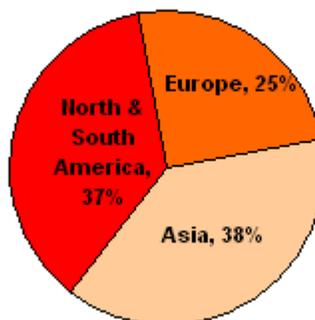
## Oil Exports

### Overview of Export and Imports

Iraq's inability to secure crude pipelines in the north has meant that exports are generally routed through the southern port of Basrah. According to IRMO/ITAO, crude oil exports have fallen from a post-war high of around 2.0 million bbl/d in 2004, to an average of 1.5 million bbl/d in 2006. However, there is some marginal improvement recently mainly due to the intermittent ability to export crude through a northern pipeline, and improved loading capabilities in Basrah. In June 2007, Iraq issued its first tender in almost six months to sell Kirkuk oil. Iraq's oil exports are under the domain of the Iraqi parastatal State Oil Marketing Organization (SOMO). The majority of oil exports go to refineries in Asia, including China and India.

***Iraq's ability to increase exports and ensure reliable domestic supply is limited, primarily in the north, because of reported sabotage to pipeline infrastructure and other installations. Total installed export capacity is around 3.5 million bbl/d, although effective capacity is lower.***

Iraqi's Estimated Exports by Destination (Q1 2007)



Source: ITAO, MEED, Energy Intel

A lack of continuous refining operations has forced the GoI to import light fuels, relying heavily on deals brokered by the USG and the MoO with neighboring countries including Turkey, Iran, Syria and Kuwait. According to SOMO, in May 2006, imports of refined products totaled nearly 160,000

bbl/d. Before the war, Iraq was a large exporter of petroleum products and crude. However, according to the IMF, imports have cost the Gol close to \$2.5 billion annually since 2004. In early 2007, the Gol liberalized the fuel import market and now relies on private importers of refined products to meet local demand.

In January 2007, Turkey temporarily stopped exporting refined products to Iraq due to political disagreements over Iraqi Kurdistan and outstanding debt for earlier fuel imports. In addition, Iraq now receives imports from Syria at the Iraqi border city of Al-Hasaka, and transports the fuel in state-owned trucks to the northern part of the country. In June 2007, the Gol announced plans to import an additional estimated 15,000 bbl/d of gas oil, 17,000 bbl/d of gasoline, and 7,700 bbl/d of kerosene from Kuwait.

### **Pipelines and Supply Security**

Iraq's 4,350-mile network of pipelines remains a target of sabotage. According to the [Institute for the Analysis of GlobalSecurity \(IAGS\)](#), between April 2003 and May 2007, there were over 400 attacks on Iraqi energy infrastructure. Due to security issues, much of the pipeline infrastructure is offline.

In the north, the major international crude oil pipeline is the 1.1 million-bbl/d capacity Kirkuk-Ceyhan (Iraq-Turkey) pipeline. This pipeline and its 480,000-bbl/day sister-installation have been subject to repeated attacks and function intermittently, particularly in the Beyji-Fatha area. The KRG is reportedly considering building another pipeline that avoids unfortified areas. The inability to export oil through this pipeline has severely limited exports from the northern fields.

The 200,000 – 300,000 bbl/d Iraq-Syria-Lebanon Pipeline (ISLP) has been closed and the Iraqi portion reported unusable since 2003. The initial capacity of the pipeline was approximately 700,000 bbl/d, with potential to expand to 1.4 million bbl/d. Although discussions were held between Iraqi and Syrian government officials, no timetable has been set up to repair or reopen this line. The pipeline runs across the Western Desert, by the Akkas field. Also, the 1.65 million bbl/d Iraq Pipeline to Saudi Arabia (IPSA) has been closed since 1991. There are no plans to reopen this line.

In the south, in June 2007, it was reported that Iraq is planning to build a 500,000-bbl/d crude pipeline from Haditha to Jordan's port of Aqaba, but the project is in the very early stages of discussion. In March 2007, it was reported that Iraq and Iran agreed to build a 200,000-bbl/d pipeline to transport crude from Basrah to Abadan in return for increased liquefied gas shipments. The project was first discussed in 2005.

### *Domestic Pipelines*

The 120-mile set of eight parallel pipelines connecting north-central Baiji and Daura (Baghdad) installations are frequent targets of attack. The four Baiji feedstock pipelines from Kirkuk are also frequently out of commission. The 1.4 million-bbl/d reversible "Strategic Pipeline", which pre-war connected the northern fields through a pumping station at Haditha, to Rumaila and the storage facilities at Fao in the south, could optimize export options, particularly for the Kurds, but is mothballed due to non-functioning pumping stations and general deterioration.

### **Ports**

Lack of functioning pipelines in the north has meant that nearly all exports have passed through the southern ports since 2003, primarily Basrah. The Al-Basrah Oil Terminal (formerly Mina al-Bakr) has the capacity to load around 82,000 bbl/hour and support Very Large Crude Carriers. There are five smaller ports on the Persian Gulf, all functioning at less than full capacity, including the Khor Al Amaya terminal. Installation of a metering system beginning January 2007, is expected improve oil accounting.

### **Overland Routes for Export and Import**

Production from the larger northern fields is mostly shut-in due to lack of functioning pipelines. However, overland routes are used to export limited amounts of crude from small fields bordering Syria. Other exports via overland routes are limited because they require passing through territory where rule of law is lacking, and truck drivers have been targeted by insurgents. These overland routes include passage to Saudi Arabia, Syria and Jordan.

## **Natural Gas**

*Iraq's natural gas*

**sector is believed to contain significant untapped resources which the Gol would like to develop for domestic consumption and export.**

**Reserves and Production**

According to the Oil and Gas Journal, Iraq’s proven natural gas reserves are 112 trillion cubic feet (Tcf). Probable reserves have been estimated at closer to 275-300 Tcf and work is currently underway by several IOCs and independents to accurately update hydrocarbon reserve numbers. Iraq’s proven gas reserves are the tenth largest in the world, and two-thirds of resources are associated with oil fields including, Kirkuk, as well as the southern Nahr (Bin) Umar, Majnoon, Halfaya, Nassiriya, the Rumaila fields, West Qurna, and Az-Zubair. Just under 20 percent of known gas reserves are non-associated; around 10 percent is salt “dome” gas. The majority of non-associated reserves are concentrated in several fields in the North including: Ajil, Bai Hassan, Jambur, Chemchemical, Kor mor, Khashm Al-Ahmar, and Al- Mansuriyah.

According to the EIA’s International Energy Annual report, natural gas production in Iraq has steadily declined over the past decade-and-a-half, reportedly due to an associated fall in oil production and deterioration of gas processing facilities. In 2005, dry natural gas production was approximately 87 billion cubic feet (Bcf); down from 215 Bcf in 1989. In late 2006, the MoO reported that natural gas production in was averaging 900 million cubic feet (MMcf/d) in the south (associated) and 490 MMcf/d in the north (non-associated) –including 375 MMcf/d of non- at the northern fields of Ajil and Jambur.

The MoO also reports that approximately 60 percent of associated natural gas production is flared due to a lack of sufficient infrastructure to utilize it for consumption and export. Significant volumes of gas are also reinjected to enhance oil recovery efforts. According to the January 2007 SIGIR report, approximately \$4-billion worth of natural gas is flared or reinjected into wells.

**Upstream Development**

The non-associated gas fields reportedly slated for priority development are mostly in the northern governorates near Kirkuk, including: Al-Mansuriyah and the nearby Khashem-al Ahmer and Jaria Pika, Kor Mor, Akkas, Chemchemical and Siba. According to the MoO, these fields have approximately 10 Tcf of reserves combined and could produce between 900 and 1000 MMcf/d for possible export and around 400 MMcf/d for domestic use. It is also been reported that the Gol plans to capture more associated gas at Rumaila and Az-Zubair within five to ten years. In 2004, Shell began work on a domestic master gas plan for Iraq on a cost-free basis. Results have not been publicly released at this time.

Along with petroleum contracts, several Saddam Hussein-era production sharing agreements and development contracts are reportedly up for review and renegotiation. The KRG is the first to move ahead with development of gas fields within their semi-autonomous territories. As in the petroleum sector, the KRG has exercised significant autonomy over the development of natural gas resources, including a reported deal in April 2007, with Royal Dutch Shell and Turkey’s parastatal Turkish Petroleum Corporation (TPAO) to develop Al-Mansuriyah. The Gol is also believed to have entered into talks with the Korea National Oil Company (KNOC) to discuss upstream gas development in April 2007. According to media reports, the following natural gas projects are moving ahead in Iraq:

**Iraq’s Natural Gas Development Projects**

| Upstream Natural Gas Development in Iraq |               |          |             |             |                               |                |                |                                           |
|------------------------------------------|---------------|----------|-------------|-------------|-------------------------------|----------------|----------------|-------------------------------------------|
| Status                                   | Field         | Location | Partners    | Country     | Estimated Production Capacity | Reserves (TCF) | Type           | Notes                                     |
|                                          | Al-Mansuriyah | North    | Shell, TPAO | USA, Turkey | 100 MMcf/d                    | 10             | Non-associated | Development contract signed in April 2007 |
|                                          | Al-Mansuriyah | North    | Shell, TPAO | USA, Turkey | 100 MMcf/d                    | 10             | Non-associated | Development contract signed in April 2007 |
|                                          | Al-Mansuriyah | North    | Shell, TPAO | USA, Turkey | 100 MMcf/d                    | 10             | Non-associated | Development contract signed in April 2007 |
|                                          | Al-Mansuriyah | North    | Shell, TPAO | USA, Turkey | 100 MMcf/d                    | 10             | Non-associated | Development contract signed in April 2007 |
|                                          | Al-Mansuriyah | North    | Shell, TPAO | USA, Turkey | 100 MMcf/d                    | 10             | Non-associated | Development contract signed in April 2007 |

(Click picture to enlarge)

In May 2007, the MoO claimed a large natural gas discovery near Nineveh, to the West of Al-Qa'em with further extensions to the Iraqi-Saudi border. A ministry official reported that "the field would produce 100,000-bbl/d" of gas and condensate and that the European Union has expressed interest in developing the field, known as Ukash.

In 2001, the GoI reported a find of 2.1 Tcf of non-associated gas near Akkas field, in the central province/Western Desert, but it is not yet under development. According to recent press reports, there is interest by Shell Oil in developing this field as a source of income for the Sunni-majority governorates. IOCs have also proposed development for export to Syria. In May 2007, it was reported that the Syrian-based Euro-Arab Mashreq Gas Project is considering a link from the Akkas field to the Arab Gas Pipeline (AGP) currently under construction in Syria. The AGP is will feed the European gas supply network by way of Turkey. In September 2004, Iraq agreed to join the \$1.2-billion, 351-Bcf/year Arab Gas Pipeline project linking Egypt, Jordan, Syria and Lebanon, but progress has been delayed.

### Gas Processing & Domestic Pipelines

The gas processing facilities, particularly in the South, have reportedly deteriorated since 2003. Prior to the war, the southern infrastructure included nine gathering stations with a processing capacity of 1.5 day Bcf/d, all of which was intended for export. The associated dry gas gathered from the North and South Rumaila and Az-Zubair fields was piped to a 575-MMcf/d natural gas liquids (NGL) fractionation plant in Az-Zubair and a 100-MMcf/d processing plant in Basra. At Khor al-Jubair there is a 17.5-million-cubic-foot LPG storage tank farm and loading terminals. Iraq also has a major domestic natural gas pipeline in the south with capacity of to deliver 240 MMcf/d of associated gas to Baghdad from the West Qurna field.

Gas processing facilities in the north currently gather supply from Kirkuk, Bai Hassan and Jambur for domestic consumption, including LPG. The system is designed to supply LPG to Baghdad and other cities, as well as dry gas and sulfur to power stations and industrial plants.

### Potential Exports

Prior to the 1990-1991 Gulf War, Iraq exported raw natural gas to Kuwait. The gas came from Rumaila through a 105-mile, 400-MMcf/d pipeline to Kuwait's central processing center at Ahmadi. Talks have been in progress since 2005 that would export 35 MMcf/d, rising to 200 MMcf/d, but a final deal is subject to passage of Iraq's Petroleum Law. In 2007, the MoO announced an agreement to fund a feasibility study on the revival of the mothballed pipeline. The Kuwait Foreign Petroleum Exploration Company (KUFOEC) is reported to be interested in developing Iraqi gas in the south, but no deals have been signed. The GoI continues to discuss northern export routes through Turkey, including linking up to the Azeri-Turkish Baku-Tbilisi-Erzurum (BTE) line, the planned Nabucco (Iran-Europe) pipeline, or the ongoing Arab Gas Pipeline project. The idea of gas exports remains controversial due to the amount of idle and sub-optimally-fired electricity generation capacity in Iraq - much a result of a lack of adequate gas feedstock.

## Electricity

### Generation, Transmission and Distribution

Iraq's power infrastructure is ageing and in need of rehabilitation; many power plants are over two decades old and affected by decades of sanctions and war. Since 2003, more than \$4.24 billion of U.S. Iraq Relief and Reconstruction Fund (IRRF) money has been allocated to investment in the sector.

In 2006, Iraq's average domestic electricity generation capacity was reported to be approximately 4000 MW. This represents approximately 50 percent of average demand, and on average was below prewar levels of 4500 MW and USG/GoI reconstruction goals of 6000 MW. In the first three months of 2007, generation capacity fell slightly due to security and feedstock supply issues, although sustainable generation capacity is expected to surpass pre-war level during summer 2007. Electricity imports are around 200 to 300 MW daily.

***Rehabilitation of the electricity sector is a major component of the Iraq reconstruction efforts.***

| Electric Power Generation (MW)                   |                               |                              |                           |                          |
|--------------------------------------------------|-------------------------------|------------------------------|---------------------------|--------------------------|
| Pre-war                                          | 2006                          |                              |                           |                          |
| Average Generation                               | Average Generation            | Peak Generation <sup>*</sup> | Average Demand            | Peak Demand <sup>*</sup> |
| 4,500                                            | 4,063                         | 4,855                        | 7,482                     | 9,299                    |
| 2007 (Q1)                                        |                               |                              |                           | TBD                      |
| Average Generation                               | Peak Generation <sup>**</sup> | Average Demand               | Peak Demand <sup>**</sup> | Generation Goal          |
| 3,832                                            | 4,159                         | 8,533                        | 8,893                     | 6,000                    |
| *August 2006                                     |                               |                              |                           |                          |
| ** February 2007                                 |                               |                              |                           |                          |
| Source: SIGIR, Iraq Ministry of Energy, IRMO/TAO |                               |                              |                           |                          |

The MoE reports that Iraq has around eight steam generation plants, 20 gas-powered facilities and six main hydroelectric plants with an intended capacity of 11,120 MW, though much is in disrepair. Reportedly, 40 percent of existing infrastructure is thermal (diesel, HFO, crude-fired), 22 percent is hydropower and 38 percent is gas-powered.

### Power Supply & Challenges to Reconstruction

In 2006, the amount of power from the national grid supplied to areas outside of Baghdad averaged 12 to 14 hours per day, while the average daily hours of power in the capital remained low at 6.5 hours per day. In 2007, average power in the capital has reportedly increased to around eight hours. However, a lack of equitable power generation throughout the country is compounded by the security situation. Power transmission and distribution infrastructure, particularly around the capital, is frequently targeted, amounting to approximately 1000 MW lost per day. As of January 2007, some 80 transmission towers between Baiji and Baghdad alone were reported destroyed by sabotage, preventing power imports from the north. It is estimated that another 1500 MW is lost per day due to shortages of fuel and water supply for hydropower.

A resistance to power sharing, primarily in the south, has contributed to the country's power inequity. Reportedly, provincial authorities are fighting the central authorities in the distribution and rationing of supplies to almost seven million consumers in Baghdad. In the long-term, the Gol aims to reduce Baghdad's dependency on power sharing by extending generation capacity in and around the capital. The Gol is also pursuing opportunities to link grids with neighboring countries including Jordan and Saudi Arabia. In the north, the KRG has accused Baghdad publicly of "turning off the lights" in retaliation for political moves. The KRG's regional 10-year Master Electricity Plan calls for increasing hydropower and thermal capacity annually but expects to remain dependent on imports from abroad from Turkey, Syria and Iran and the national grid at least through 2015.

### Growing Cost of Reconstruction

The World Bank estimates that an additional \$20 to \$25 billion is needed to ensure reliable electricity supply and increase available capacity to approximately 24,000 MW by 2015. Unfortunately, according to the January 2007 SIGIR report, the Gol Operation and Maintenance (O&M) budgets are reportedly too low to support all of the existing installations, in addition to new capacity. The April SIGIR report noted that "O&M allocations by the Gol continue to limit the sustainability of U.S. funded projects as responsibility is transferred to Iraqi operators." However, the electricity ministry is believed to have started issuing independent tenders to bring in private investment to support development. The USG program formally ends in September 2007.

The World Bank recently approved two loans for the electricity sector (only the fourth such loan in 30 years): A \$40-million Emergency Hydropower Project at Dokan and Derbandikhan (KRG) in December 2006, and a US\$124-million loan for the Emergency Electricity Reconstruction Project for Hartha (Units 2&3, doubling capacity to 800 MW), in March 2007.

## Profile

### Country Overview

|                       |                                     |
|-----------------------|-------------------------------------|
| <b>President</b>      | Jalal Talabani (since 6 April 2005) |
| <b>Prime Minister</b> | Nuri al-Maliki (since 20 May 2006)  |

|                           |                                                                                                                                                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Location</b>           | Middle East; Borders Iran, Jordan, Kuwait, Saudi Arabia, Jordan and Syria, on the Persian Gulf                                                                                                    |
| <b>Major Cities</b>       | Baghdad, Kirkuk, Basrah, Mosul                                                                                                                                                                    |
| <b>Independence</b>       | October 3, 1932 (from League of Nations mandate under British administration); note - on 28 June 2004 the Coalition Provisional Authority transferred sovereignty to the Iraqi Interim Government |
| <b>Population (2006E)</b> | 27,499,638                                                                                                                                                                                        |
| <b>Languages</b>          | Arabic, Kurdish (official in Kurdish regions), Assyrian, Armenian                                                                                                                                 |
| <b>Religion</b>           | Muslim 97% (Shi'a 60%-65%, Sunni 32%-37%), Christian or other 3%                                                                                                                                  |
| <b>Ethnic Group(s)</b>    | Arab 75%-80%, Kurdish 15%-20%, Turkoman, Assyrian or other 5%                                                                                                                                     |

## Economic Overview

|                                                                            |                                                 |
|----------------------------------------------------------------------------|-------------------------------------------------|
| <b>Minister of Finance</b>                                                 | Bayan Jabr                                      |
| <b>Currency/Exchange Rate (6/2007)</b>                                     | 1,279 IQD per 1 USD                             |
| <b>Inflation Rate (2005E), (2006E), (2007F)</b>                            | 37%, 53.2%, 32.3% (annualized)                  |
| <b>Real Gross Domestic Product (GDP) (2005E), (2006E)</b>                  | US \$34.7 billion, US\$53.0 billion             |
| <b>Real GDP Growth Rate (1995-2004 average), (2005E), (2006E),( 2007F)</b> | 3.7%, 6.5%, 5.1% (Global Insight)               |
| <b>Unemployment Rate (2006E)</b>                                           | Estimated 30-40 %                               |
| <b>Foreign Debt (2006E)</b>                                                | \$55 Billion (loan forgives ongoing, IMF)       |
| <b>Merchandise Exports (2006E), (2007 F)</b>                               | \$31.7 billion, \$30.8 billion (Global Insight) |
| <b>Exports – Commodities</b>                                               | Petroleum, Petroleum Products                   |
| <b>Oil Export Revenues (2006E)</b>                                         | \$31.3 billion (ITAO), IMF (\$28.6 billion)     |
| <b>Oil Export Revenues/Total Export Revenues (2006E)</b>                   | 97% (IMF)                                       |
| <b>Major Trading Partners (2006)</b>                                       | Syria, Iran, Turkey, USA, E.U., China           |
| <b>Merchandise Imports (2006E), (2007F)</b>                                | \$24.3 billion, \$28.8 billion                  |

## Energy Overview

|                                                                            |                                                                                                              |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Minister of Oil</b>                                                     | Husayn al-Sharistani                                                                                         |
| <b>Minister of Electricity</b>                                             | Karim Wahid al-Hassan                                                                                        |
| <b>Proven Oil Reserves (January 1, 2007E)</b>                              | 115 billion barrels of oil                                                                                   |
| <b>Total Oil Production (2006E)</b>                                        | 2.0 million bbl/d                                                                                            |
| <b>OPEC Crude Oil Production Quota (effective 2/01/2007)</b>               | Suspended                                                                                                    |
| <b>Crude Oil Production Capacity (5/07E)</b>                               | 2.1 million bbl/d                                                                                            |
| <b>Oil Consumption (2006E)</b>                                             | 545,000 bbl/d                                                                                                |
| <b>Crude Oil Refining Capacity (January 1, 2007E, Oil and Gas Journal)</b> | 597,500 bbl/day (installed capacity, may not be fully functional); Other estimates as high as 640,000 bbl/d. |
| <b>Net Oil Exports (2006 E)</b>                                            | 1.5 million bbl/d                                                                                            |
| <b>Major Oil Importers (2006E, approximate net exports)</b>                | E.U., India, China, Japan, South Korea, U.S. (Term-buyers, resale banned)                                    |
| <b>Proven Natural Gas</b>                                                  | 112 trillion cubic feet (Tcf)                                                                                |

**Reserves (January 1, 2007E)**

|                                                    |                                                               |
|----------------------------------------------------|---------------------------------------------------------------|
| <b>Natural Gas Production/Consumption (2005E)</b>  | 87 Billion cubic feet (Bcf)                                   |
| <b>Electricity Installed Capacity (2004E)</b>      | 2.8 Gigawatts (majority thermal; some hydroelectric)          |
| <b>Electricity Generation (2004E)</b>              | 29.3 billion kilowatt-hours (Bkwh)                            |
| <b>Electricity Consumption (2004E)</b>             | 27.3 billion kilowatt-hours (Bkwh)                            |
| <b>Total Energy Production (2004E)</b>             | 1.2 quadrillion Btu* (1 % of world total energy production).  |
| <b>Total Energy Consumption (2004E)</b>            | 4.4 quadrillion Btu* (< 1% of world total energy consumption) |
| <b>Total Per Capita Energy Consumption (2004E)</b> | 47.5 million Btu (vs. U.S. value of 342.7 million Btu)        |
| <b>Energy Intensity (2004E)</b>                    | 20,448 Btu/\$ -- PPP (vs U.S. value of 9,336 Btu/\$)**        |

**Environmental Overview**

|                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Energy-Related Carbon Dioxide Emissions (2004E)</b>             | 84 million metric tons (0.3% of world carbon dioxide emissions); of which Oil (94%), Natural Gas (6%), Coal (0%)                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Per-Capita, Energy-Related Carbon Dioxide Emissions (2004E)</b> | 3.3 metric tons (vs. U.S. value of 20.2 metric tons of carbon dioxide)                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Carbon Dioxide Intensity (2004E)</b>                            | 1.42 metric tons/thousand \$ -- PPP (vs. U.S. value of 0.55 metric tons/thousand \$)**                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Environmental Issues</b>                                        | Saddam-era government water control projects drained much of marsh areas east of An Nassiriyah by drying up or diverting the feeder streams and rivers; displacing millions of people and threatening of the habitat and wildlife populations (although there has been some restoration); inadequate supplies of potable water; development of the Tigris and Euphrates rivers system contingent upon agreements with upstream riparian Turkey; airs, soil water pollution; soil degradation (salination) and erosion; desertification |
| <b>Major Environmental Agreements</b>                              | Law of the Sea – Party; Environmental Modification - Signed, not ratified; Nuclear Test Ban - Party                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Oil and Gas Industry**

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Organization</b>                                                               | Petroleum draft law currently in negotiation; will set governance of sector. Reestablishment of the Iraq National Oil Company (INOC) proposed; which will control fields designated “developed” or “near development.” Governorates will have control over new prospects. Will establish a regulatory/oversight body. Status of downstream organization unknown. Currently, the Supreme Oil and Gas Council has overall authority, along with the Oil Ministry. The North Oil Company (NOC) and South Oil Company (SOC) are the two main upstream oil companies, with the North Gas Company (NGC) and South Gas Company (SGC) being the equivalents on the natural gas side. Other important entities include the Iraq Drilling Company, Oil Exploration Company, Oil Pipelines Company, Oil Products Distribution Company, the State Company for Oil Projects (SCOP), and the State Oil Marketing Organization (SOMO). |
| <b>Major Oil Terminals</b>                                                        | Al-Basra, Khor al-Amaya, Khor az- Zubair, Um Qasr, Abu Fulus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Major Refineries (capacity, bbl/d, January 1, 2007E) ; Oil and Gas Journal</b> | Baiji (310,000), Basrah (150,000), Daura (110,000), Khanaqin (12,000), K-3/ Haditha (7,000), Mufthiah (4,500), Qaiyarah Mosul (2,000), Kirkuk (2,000)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

\* 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.

**Maps**

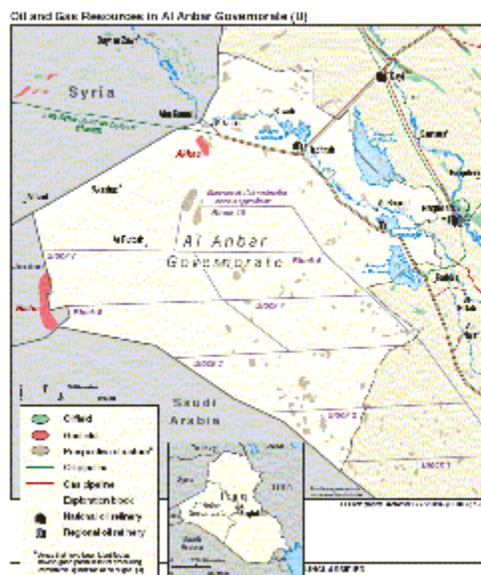
**Iraq Energy Maps: Click maps for high resolution versions**

*Map 1: Iraq: Petroleum Production Capacity and Reserves by Region*



(Source: CIA)

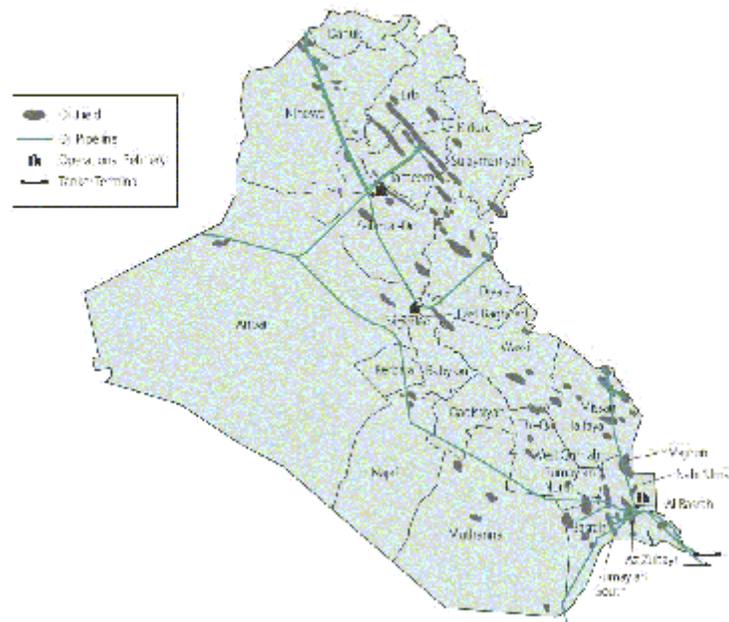
*Map 2: Oil and Gas Resources in Al-Anbar Governorate*



(Source: CIA)

*Map 3: Gas and Oil Resources by Governorate*

**GAS AND OIL INFRASTRUCTURE BY GOVERNORATE**  
Source: CIA Country Profile Map



(Source: SIGIR)

#### Links to Non-USG Maps:

- [Perry-Castaneda Map Collection](#)
- [Relief Web Map](#)
- [United Nations Assistance Mission for Iraq \(UNAMI\)](#)
- [Washington Institute \(Oil Fields\)](#)

## Links

### EIA Links

[EIA - Country Information on Iraq](#)  
[EIA – OPEC Fact Sheet](#)  
[EIA – OPEC Revenues Fact Sheet](#)  
[Iraq Energy Chronology: 1980-2005](#)

### U.S. Government

[CIA World Factbook - Iraq](#)  
[Library of Congress Country Study on Iraq \(1998\)](#)  
[Special Inspector General for Iraq Reconstruction](#)  
[U.S. Aid for International Development – Iraq \(USAID\)](#)  
[U.S. Army Corps of Engineers – Gulf Regional Division](#)  
[U.S. Commercial Service – Iraq](#)  
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[U.S. State Department Iraq Weekly Status Report](#)  
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[U.S. State Department Near Eastern Affairs – Iraq Country Information](#)  
[U.S. State Department International Information Programs – Iraq Update](#)  
[U.S. State Department Consular Information Sheet – Iraq](#)  
[U.S. State Department Travel Information Sheet – Iraq](#)

### Other Links

[BBC: Iraq Country Profile](#)  
[BBC: The Struggle for Iraq \(News, Special Report\)](#)

[The Economist: Iraq](#)  
[Government of Iraq](#)  
[IMF Country Information Page – Iraq](#)  
[Information on Iraq from ArabNet](#)  
[Iraq Central Bank](#)  
[Iraq Ministry of Foreign Affairs](#)  
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International Oil Daily  
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Middle East Economic Digest (MEED)  
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