

# COUNTRY ANALYSIS BRIEFS

## Iraq

Last Updated: June 2009

### Background

***Despite enormous oil reserves Iraq's oil sector is constrained by the lack of investment resulting from years of sanctions and wars.***

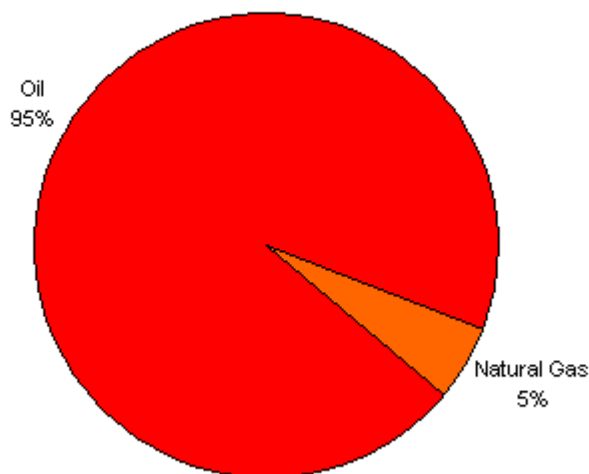
Iraq was the world's 13th largest oil producer in 2008, and has the world's third largest proven petroleum reserves after Saudi Arabia and Canada. Just a fraction of Iraq's known fields are in development, and Iraq may be one of the few places left where vast reserves, proven and unknown, have barely been exploited. Iraq's energy sector is heavily based upon oil, with approximately 94 percent of its energy needs met with petroleum. According to the [International Monetary Fund](#), crude oil export revenues represented over 75 percent of GDP and 86 percent of government revenues in 2008.



Iraq's oil sector has suffered over the past several decades from sanctions, and its oil infrastructure is in need of modernization and investment. As of March 31, 2009, the United States had allocated \$2.05 billion to the Iraqi oil and gas sector to begin this modernization, but ended its direct involvement as of the first quarter of 2008, and does not have any on going construction projects in the oil and gas sector. The 2009 Iraqi budget allocated \$3.2 billion to the Ministry of Oil, a 50% increase from the 2008 base budget, to continue this work.

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 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. Investment by the international oil companies will be aided by the passage of the proposed Hydrocarbons Law, which governs oil contracting and regulation. The law has been under review in the Council of Ministers since October 26, 2008, but has not received final passage.

### Total Energy Consumption in Iraq, by Type (2006)



Source: EIA International Energy Annual 2006

## Oil Reserves

***Iraq may be one of the few places left where vast oil reserves have barely been exploited.***

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. 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.

A major 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). Passage of the proposed Hydrocarbons Law, which would provide a legal framework for investment in the hydrocarbon sector, remains a main policy objective.

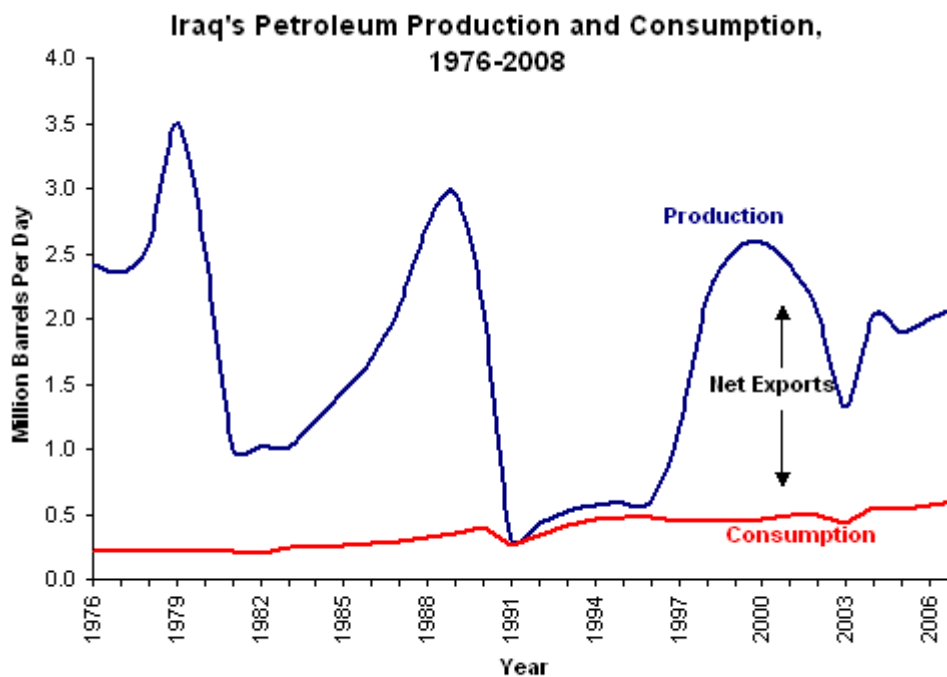
The majority of the known oil and gas reserves in Iraq form a belt that runs along the eastern edge of the country. Iraq has 9 fields that are considered "super giants" (over 5 billion bbls) as well as 22 known "giant" fields (over 1 billion bbls). According to independent consultants, the cluster of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

## Production

In 2008, Iraq's crude oil production under the control of the regional state-owned oil companies averaged 2.4 million barrels per day (bbl/d), up from its 2007 production of 2.1 million bbl/d. However, this is still below its pre-war production capacity level of 2.8 million bbl/d in 2003. About two-thirds of production comes from the southern fields, with 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.

Currently, the Ministry of Oil has central control over oil and gas production and development in all but the Kurdish territory through its three operating entities, the North Oil Company (NOC), the South Oil Company (SOC), and the Missan Oil Company (MOC), which was split off from the South Oil Company in 2008. According to the NOC'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 MOC, and though smaller in geographical size, includes the

majority of proven reserves. MOC's oil fields hold an estimated 30 billion barrels of reserves. They include Amara, Halfaya, Huwaiza, Noor, Rifaae, Dijaila, Kumait and East Rafidain.



#### Development Plans

Iraq's immediate goal is to boost production by 300,000 bbl/d by the end of 2010 to 2.7 million bbl/d. Iraq's 10-year strategic plan for 2008-2017 set a goal of increasing crude oil production capacity by 1.5 million bbl/d within 3-4 years, and by an additional 2 million bbl/d to a total of 6 million bbl/d within 10 years. As part of this plan, Iraq planned three licensing rounds. The first was announced June 30, 2008, and included plans to rehabilitate six giant producing fields with reserves of over 43 billion barrels. These contracts were planned to be awarded by mid-2009. The second bidding round was announced in December 2008 for fields that were explored but not fully developed.

<b>Oil Fields for Bid In Iraq</b>	
<b>First Bidding Round</b>	<b>Reserves (billion bbl)</b>
Rumaila	17
West Qurna, Phase I	8.7
Kirkuk	8.6
Zubair	4
Missan	2.5
Bai Hassan	2.3
<b>First Round Total (billion barrels)</b>	<b>43</b>
<b>Second Bidding Round</b>	
West Qurna, Phase II	12.9
Majnoon	12.6
East Baghdad	8.1
Halfaya	4.1
Gharaf	0.9
Najmah	0.9
Qayarah	0.8
Kifil	0.2
West Kifil	0.2
Marjan	0.2
Badra	0.1
Qamar	0.1
Gullabat	0.1
Naudoman	0.1
<b>Second Round Total (billion barrels)</b>	<b>41</b>

Iraq also plans to sign delineation agreements on shared oil fields with Kuwait and Iran. It would like to set up joint committees with its neighbors on how to share the oil. In April 2009, Iraq started work on the Safwan field with Kuwait.

### **Kurdistan Regional Government Issues**

The [Kurdistan Regional Government \(KRG\)](#), the official ruling body of a federated region in northern Iraq that is predominantly Kurdish, passed its own hydrocarbons law in 2007. Despite the lack of a national Iraqi law governing investment in hydrocarbons, KRG has signed oil production sharing, development and exploration contracts with several foreign firms. 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. In the interim, the Iraqi Ministry of Oil has approved a request from the KRG to send 60,000 bbl/d of crude oil from the Tawke and Taq fields in the Kurdish region to the northern Iraq export pipeline, effective June 2009. KRG Natural Resources Minister Ashti Hawrami expects Kurdish production to reach 250,000 bbl/d by early 2010.

### **Refining**

Iraqi refineries, with a total capacity of almost 600,000 bbl/d, have antiquated infrastructure, and their output does not reflect the current demand mix. Despite improvements in recent years, the sector has not been able to meet domestic demand for most refined products, and the refineries produce too much heavy fuel oil. As a result, Iraq relies on imports for about one fourth of the petroleum products it uses, with total petroleum product consumption averaging about 600,000 bbl/d in 2008.

Existing Refineries in Iraq			
Refinery	Location	Capacity (bbl/d)	Notes
Baiji	North-Central Iraq	310,000	Improvements in operational issues
Basrah	Near Basrah	150,000	Considering adding 70,000 bbl/d distillation tower
Daura	Baghdad	110,000	Considering adding 70,000 bbl/d distillation tower
Mosul-Qaiyarah, Kirkuk, Khanaqin, K3-Haditha	Scattered	< 10,000 each	Topping plants making low-grade diesel and kerosene
Muftiah, Najaf, Maysan, and Nassiriyah-Samawah	Scattered	< 10,000 each	Topping plants making low-grade diesel and kerosene

To alleviate product shortages, Iraq's 10-year strategic plan for 2008-2017 set a goal of increasing refining capacity from 600,000 bbl/d to 1.5 million bbl/d. Iraq has plans for 5 new refineries, as well as plans for expanding the existing Daura and Basrah refineries.

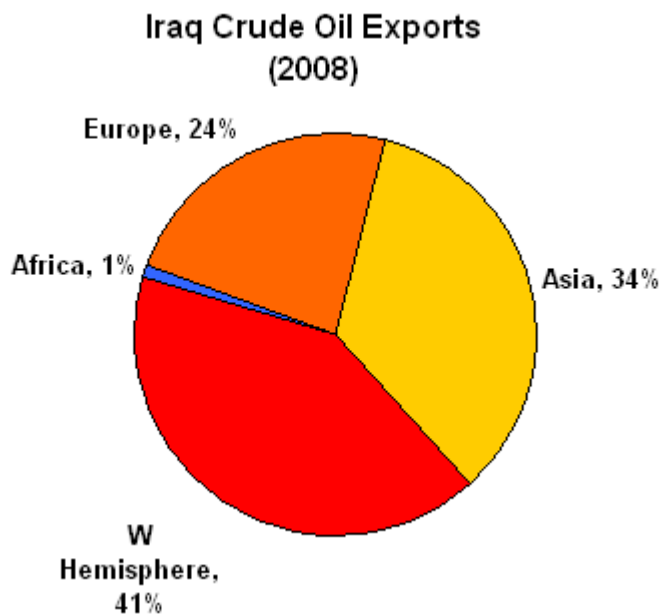
Planned New Refineries in Iraq			
Refinery	Builder	Capacity (bbl/d)	Notes
Nassiriyah	Foster Wheeler	300,000	Front End Engineering and Design Contract
Karbala	Technip	150,000	Front End Engineering and Design Contract
Kirkuk	Shaw and Webster	150,000	Front End Engineering and Design Contract
Maysan	Shaw and Webster	150,000	Front End Engineering and Design Contract
East Baghdad	N/A	100,000	Proposed

## Oil Exports

**Total installed export capacity is about 3.5 million bbl/d, although effective capacity is lower because of disruptions, lack of maintenance, and because some facilities have been closed for years and are unusable.**

### Exports

Iraq exported over 1.8 million bbl/d of crude oil in 2008. About 1.5 million bbl/d of this came from Iraq's Persian Gulf port of Basrah, with the rest exported via the Iraq-Turkey pipeline in the north. The majority of oil exports go to refineries in Asia, including China and India.



### Export Pipelines

In the north, the major international crude oil pipeline is the 1.1 million-bbl/d capacity Kirkuk-Ceyhan (Iraq-Turkey) pipeline. This pipeline has been subject to repeated disruptions this decade, which limited exports from the northern fields.

In the west, 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. Discussions were held between Iraqi and Syrian government officials to re-open the pipeline, but no timetable has been set up to repair or reopen this line. The Russian company Stroytransgaz accepted an offer to fix the pipeline in December 2007, but no follow-up was made.

In the south, 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.

Iraq has also held discussions to build a 500,000-bbl/d crude pipeline from Haditha to Jordan's port of Aqaba.

Improved pipeline security and repair procedures have contributed to stability in producing and exporting oil. The United States funded Pipeline Exclusion Zones (PEZs), a security measure around each oil pipeline that provides protective berms, fences, and concertina wire, as well as gates and guardhouses. Since September 2007, when the Kirkuk-to-Baiji PEZ was completed, no PEZ-protected pipelines have been attacked.

### Ports

The al-Basrah Oil Terminal (formerly Mina al-Bakr) on the Persian Gulf 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 to improve oil accounting.

### Overland Export Routes

Overland routes are used to export limited amounts of crude from small fields bordering Syria. In addition, Iraq has resumed shipping oil to Jordan's Zarqa refinery by road tankers at a rate of 10,000 bbl/d. Prior to 2003, Iraq supplied up to 100,000 bbl/d to Jordan.

## Natural Gas

### Reserves

According to the *Oil and Gas Journal*, Iraq's proven natural gas reserves are 112 trillion cubic feet (Tcf). An estimated 70 percent of these lie in Basra governorate in the south of Iraq. Probable Iraqi reserves have been estimated at 275-300 Tcf, and work is currently underway by several IOCs and independents to accurately update hydrocarbon reserve numbers. Iraq's proven gas reserves

***Iraq's natural gas sector is believed to contain significant untapped resources which the***

**Government of Iraq would like to develop for domestic consumption and export.**

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 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, Khashem al-Ahmar, and al-Mansuriyah.

### Production

Iraqi natural gas production has risen since 2003, and has returned to levels reached during the mid-1990's. However, its 2006 dry natural gas production of approximately 104 billion cubic feet (Bcf) per year is still far below its peak level of 215 Bcf reached in 1989. The Ministry of Oil reported 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 re-injected to enhance oil recovery efforts. In addition, the flaring of the natural gas has meant lost Liquefied Petroleum Gas (LPG) output of an estimated 4,000 tons per day, while at the same time there are LPG shortages requiring imports of 1,200 tons per day. To reduce flaring, the state-owned South Gas Company signed an agreement with Shell in September 2008 to implement a 25-year project to capture flared gas and provide it for domestic use, with any surplus sent to an LNG project for export.

### 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-Ahmar and Jaria Pika, Kor Mor, Akkas, Chemchemical and Siba. It is also been reported that the government of Iraq plans to capture more associated gas at Rumaila and Az-Zubair within five to ten years.

Iraq's 10-year strategic plan for 2008-2017 set a goal of increasing natural gas production to 2.5 trillion cubic feet per year, and to end the flaring of natural gas. As part of this plan, Iraq planned three licensing rounds. The first was announced June 30, 2008, and included an expected \$5 billion investment for natural gas fields with 22 Tcf of reserves, including Akkas in the western desert and al-Mansuriyah in the east. The contracts to develop these fields are planned for mid-2009. The second bidding round with 26 Tcf of reserves was planned for 2009, and includes the Siba field in the Basra area.

Natural Gas Fields for Bid In Iraq	
	Reserves (trillion cubic feet)
<b>First Bidding Round</b>	
al-Mansuriyah	3.3
Akkas	2.1
<b>First Round Total<sup>1</sup></b>	<b>22</b>
<b>Second Bidding Round</b>	
Siba	0.1
Khashem al-Ahmar	0.1
<b>Second Round Total<sup>1</sup></b>	<b>26</b>

<sup>1</sup> (includes associated natural gas from oil fields in bidding round)

### Export Plans

Plans to export natural gas remain 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. A central criticism of the South Gas Development Agreement remains the proposal to supply an LNG project with surplus natural gas,

Prior to the 1990-1991 Gulf War, Iraq exported 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 Ministry of Oil announced an agreement to fund a feasibility study on the revival of the mothballed pipeline.

Several other export proposals have been made. 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. Iraq has also discussed northern export routes through Turkey, including linking up to the Azeri-Turkish Baku-Tbilisi-Erzurum (BTE) line, the planned Nabucco (Iran-

Europe) pipeline, and the ongoing Arab Gas Pipeline (AGP) project. The proposed AGP pipeline would deliver gas from Iraq's Akkas field to Syria and then on to Lebanon and the Turkish border sometime in 2010, and then on to Europe.

## Profile

### Energy Overview

<b>Proven Oil Reserves (January 1, 2009E)</b>	115 billion barrels
<b>Oil Production (2008)</b>	2.4 million barrels per day, of which 2.4 million barrels per day was crude oil.
<b>Oil Consumption (2008E)</b>	0.6 million barrels per day
<b>Crude Oil Distillation Capacity (2008)</b>	0.6 million barrels per day
<b>Proven Natural Gas Reserves (January 1, 2009E)</b>	112 trillion cubic feet
<b>Natural Gas Production (2006E)</b>	64 billion cubic feet
<b>Natural Gas Consumption (2006E)</b>	64 billion cubic feet
<b>Recoverable Coal Reserves (2008E)</b>	0
<b>Coal Production (2008E)</b>	0
<b>Coal Consumption (2008E)</b>	0
<b>Electricity Installed Capacity (2006E)</b>	8.9 gigawatts
<b>Electricity Production (2006E)</b>	30 billion kilowatt hours
<b>Electricity Consumption (2006E)</b>	29 billion kilowatt hours
<b>Total Energy Consumption (2006)</b>	1.2 quadrillion Btus*, of which Natural Gas (5%), Oil (94%), Hydroelectricity (1%), Coal (0%)
<b>Total Per Capita Energy Consumption (2006)</b>	46.6 million Btus
<b>Energy Intensity (2006)</b>	18,528 Btu per \$2000-PPP**

### Environmental Overview

<b>Energy-Related Carbon Dioxide Emissions (2006)</b>	99 million metric tons, almost all of which are from oil
<b>Per-Capita, Energy-Related Carbon Dioxide Emissions (2006)</b>	3.7 metric tons
<b>Carbon Dioxide Intensity (2006)</b>	0.9 Metric tons per thousand \$2000-PPP**

## Oil and Gas Industry

<b>Organization</b>	National hydrocarbons draft law currently in negotiation; will set governance of sector. The North Oil Company (NOC), South Oil Company (SOC), and the Missan Oil Company (MOC) are the three 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 IDC), 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/Gas Ports</b>	Al-Basra, Khor al-Amaya, Khor az- Zubair, Um Qasr, Abu Fulus
<b>Foreign Company Involvement</b>	CNPC, LUKoil, ONGC, Shell. 35 companies qualified for the first oil & gas bidding round and 38 registered for the second bidding round
<b>Major Oil Fields</b>	Rumaila, Majnoon, West Qurna, Kirkuk, Zubair, Halfaya, Missan, Bai Hassan
<b>Major Natural Gas Fields</b>	Mansouriya, Akkaz
<b>Major Refineries (capacity, bbl/d)</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.

\*\*GDP figures from Global Insight estimates based on purchasing power parity (PPP) exchange rates.

## Maps

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

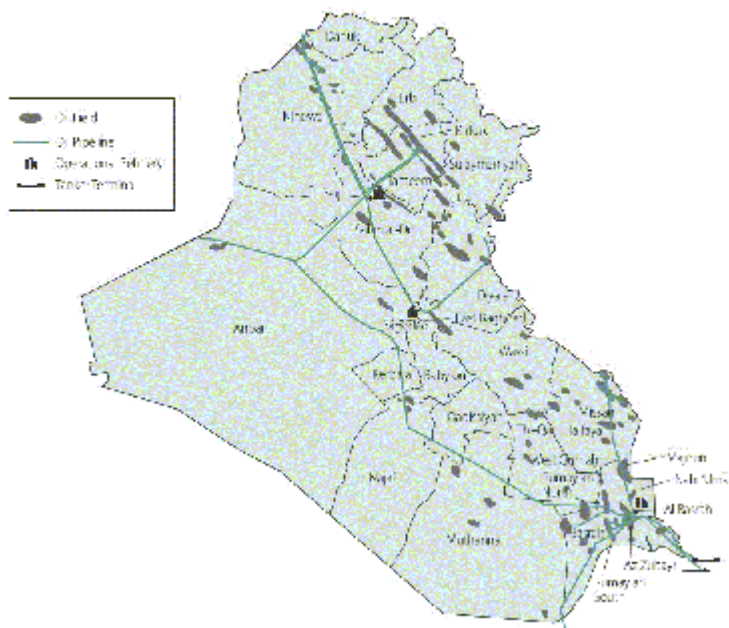
*Map 1: Oil and Gas Resources in Al-Anbar Governorate*



(Source: CIA)

*Map 2: 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 – Iraq Country Energy Profile](#)
- [EIA – OPEC Revenues Fact Sheet](#)

### 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](#)
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- [U.S. State Department Iraq Status Report](#)
- [U.S. State Department's Background Note- Iraq](#)
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- [U.S. State Department Travel Information Sheet – Iraq](#)

### Other Links

- [AcademicInfo – US Government Resources on Iraq](#)
- [BBC: Iraq Country Profile](#)
- [BBC: The Struggle for Iraq \(News, Special Report\)](#)
- [The Economist: Iraq](#)
- [Government of Iraq](#)
- [IMF Country Information Page – Iraq](#)
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