ENERGY COUNTRY REVIEW

Kuwait

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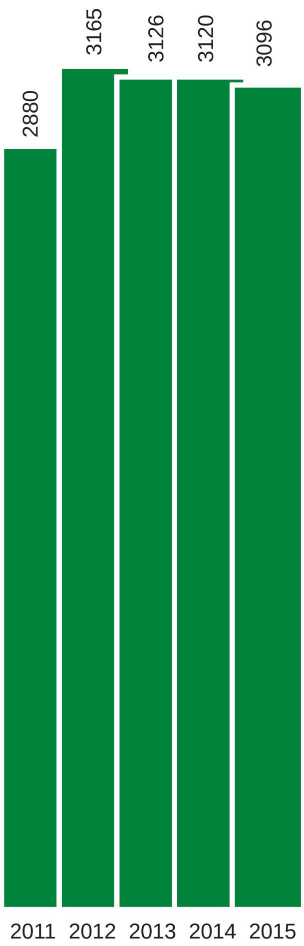
KEYFACTS Energy

Country Review Kuwait

Kuwait Oil Production
Thousand barrels per day



Source: BP Statistical Review

Located on the Arabian Peninsula bordering Saudi Arabia and Iraq, Kuwait is one of the most densely populated OPEC Member Countries. The Middle Eastern nation comprises an area of around 18 thousand square kilometres and has a population of over three million. Its official language is Arabic.

Kuwait has a prosperous economy. Oil and gas sector accounts for about 60 per cent of its gross domestic product and 93 per cent of export revenues.

As a member of OPEC Kuwait restricted oil output for many years prior to 2003 and also saw production decline during the 1st Gulf War.

Oil production, the bulk of which comes from the giant Burgan field, peaked in 1973 and, despite new investment in other fields, especially near the Iraqi border, the country has been struggling to match former levels.

Kuwait's associated gas production is due to expand considerably as associated gas percentages increase in the oil fields and as new infrastructure is built.

In an effort to diversify its oil-heavy economy, Kuwait has expanded efforts to develop its non-associated natural gas fields, which remain a small portion of its natural gas production. Greater production of gas can provide fuel for electricity generation which frequently falls short during periods of peak electricity demand.

Energy policy is set by the Supreme Petroleum Council, overseen by the Ministry of Petroleum, and executed by The Kuwait Petroleum

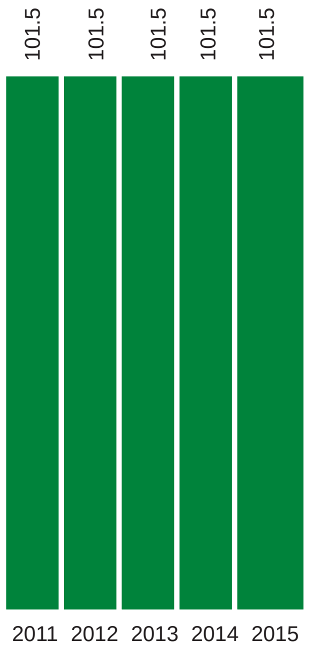
Country Key Facts

Official name:	State of Kuwait
Capital:	Kuwait City
Population:	4 197 676 (2016)
Area:	17,818 square kilometers (6,880 square miles)
Form of government:	Constitutional Monarchy
Language:	Arabic, English
Religions:	Shiite and Sunni Muslim, Christian, Hindu, Parsi
Currency:	Kuwaiti Dinar
Calling code:	+965

Operational Key Facts

2015 year end oil reserves:	101.5 billion barrels
2015 oil production:	3120 thousand bbls per day
2015 year end gas reserves:	63.0 Tcm
2015 gas production:	15.0 Bcm

Kuwait year end oil reserves
Billion barrels



Source: BP Statistical Review

Corporation and its various subsidiaries. In addition, Kuwait has an active sovereign-wealth fund, the Kuwait Investment Authority, which oversees all state expenditures and international investments. Despite, Kuwait's constitutional ban on foreign ownership of its resources, the government has taken measures to increase foreign participation in the oil and gas sectors. Kuwait is a constitutional emirate led by the Emir of Kuwait, a hereditary seat led by the Al-Sabah family. The Prime Minister and his deputy and council of ministers are approved by the Emir.

Kuwait's economy is heavily dependent on petroleum export revenues, which account for nearly 60% its gross domestic product and about 94% of export revenues, according to OPEC and IMF data. Kuwait attempts to remain one of the world's top oil producers as the country targets crude oil and condensate production of 4 million barrels per day (bbl/d) by 2020. However, Kuwait has struggled to boost oil and natural gas production for more than a decade because of upstream project delays and insufficient foreign investment.

The Kuwait Petroleum Corporation (KPC) manages domestic and foreign oil investments. The Kuwait Oil Company (KOC), the upstream subsidiary of KPC, was taken over by the Kuwaiti government in 1975 and manages all upstream development in the oil and natural gas sectors. The Kuwait National Petroleum Company (KNPC) controls the downstream sector, while the Petrochemical Industries Company (PIC) is in charge of the petrochemical sector. Export operations are overseen by both KNPC and the Kuwait Oil Tanker Company (KOTC). Foreign interests of KPC are handled by the Kuwait Foreign Petroleum Exploration Company (Kufpec), and international upstream development and downstream operations are controlled by Kuwait Petroleum International (KPI). Kuwait Energy Company (KEC) is a privately-held company that has developed a number of foreign interests over the past decade, including interests in Yemen, Egypt, Russia, Pakistan, and Oman.

The Partitioned Neutral Zone (PNZ) has its own managing companies, separated by onshore and offshore activities. The onshore sector was developed by American Independent Oil Company (Aminoil), which was nationalized in 1977. Getty Oil, which was subsumed by Chevron, was brought in to develop onshore PNZ fields Wafra, South Umm Gudair, and Humma. Chevron remains a participant along with KPC, although management of all KPC's PNZ interests has been transferred to the Kuwait Gulf Oil Company (KGOC). Offshore, a Japanese company, the Arabian Oil Company (AOC) discovered the Khafji, Hout, Lulu, and Dorra oil fields in the 1960s. The concessions with Saudi Arabia and Kuwait expired in 2000 and 2002, respectively. KGOC was established in 2002 to oversee the

Kuwait Gas Production
Billion cubic meters

Source: BP Statistical Review

offshore operations for KPC. Subsequently, KGOC, along with Aramco Gulf Operations Company (AOGC), set up a joint operating company, Al-Khafji Joint Operations Company (KJO), which manages the offshore PNZ production.

Because of the constitutional ban on foreign ownership of Kuwait's natural resources, development of domestic fields has stalled. There have been several discoveries of lighter crudes in the center of the country, but progress has not moved toward production. In 1984, a discovery was made in South Maqwa in the Greater Burgan field, revealing light crude of API 35° to 40° grade, and after drilling began at Kra'a al-Mara in 1990, significant volumes of 49° API crude oil grade were found. Another discovery was made in 2006 in the Sabriya and Umm Niqa areas in the northern region of the country, which added an estimated 20 to 25 billion barrels of reserves, although mostly of a heavier, sour quality and more technically challenging to develop.

In a plan to circumvent the constitutional ban, international oil companies (IOCs) were allowed involvement through Enhanced Technical Service Agreements (ETSA) and through agreements to assist Kuwait in enhanced oil recovery (EOR) of its mature fields. Royal Dutch Shell, in February 2010, signed an ETSA to develop the Jurassic natural gas field in northern Kuwait, although progress to boost production has been slow. KOC is also having trouble developing the Lower Fars reservoir of the northern Ratqa field. KOC initially negotiated with ExxonMobil, Shell, and Total to develop this field, but KOC subsequently abandoned plans for a joint project development. KOC also signed a memorandum of understanding (MOU) in July 2010 with Japan Oil, Gas, and Metals National Corporation (JOGMEC) to assess the feasibility of carbon dioxide injection as a potential EOR technique.

KPC announced a $75-billion capital spending plan over five years (2015-20) for the upstream sector ($40 billion) and the downstream ($35 billion) sector, according to MEES. In efforts to continue economic reform and funding for large infrastructure projects, this plan encompasses some of the delayed projects that were part of the five-year spending plan expiring at the end of 2014. Kuwait intends to upgrade its production and export infrastructure, expand exploration, and build downstream facilities, both domestically and abroad. This effort is expected to boost total oil production capacity to 4 million bbl/d by 2020, and it is projected that the production capacity would be maintained through 2030. To achieve its 2020 target, IOC investment and participation will be necessary.

Much of Kuwait's reserves and production are concentrated in a few mature oil fields discovered in the 1930s and 1950s. The Greater Burgan oil field, which comprises the Burgan, Magwa, and Ahmadi reservoirs, makes up the main portion of both reserves

Kuwait year end proved gas reserves
Trillion cubic metres

Source: BP Statistical Review

and production. Burgan is widely considered the world's second-largest oil field, surpassed only by Saudi Arabia's Ghawar field. Greater Burgan was discovered in 1938, but it did not become fully developed until after World War II. The Greater Burgan has been producing consistently since production began. Generally, production from the Greater Burgan is medium to light crudes, with API gravities in the 28° to 36° range. Although the Greater Burgan's recent production of between 1.1 and 1.3 million bbl/d accounted for about half of Kuwait's total production, Burgan could be further developed to produce as much as 1.7 million bbl/d. KOC is seeking to boost the Greater Burgan's capacity largely from the Wara reservoir through enhanced oil recovery methods such as seawater and carbon dioxide injection.

Other production centers in the southwest region of the country include Umm Gudair, Minagish, and Abduliyah. Umm Gudair and Minagish produce a variety of crude oil grades, which largely fall in the medium range, with gravities of 22° to 34° API. In January 2003, water injection began at Minagish to enhance oil recovery and offset natural production declines. According to MEES, Kuwait plans to continue employing EOR techniques in the fields in western Kuwait to maintain output of 500,000 bbl/d from the region.

Northern Kuwait holds the majority of Kuwait's larger fields apart from the Greater Burgan field. Kuwait's second-largest source of crude production is from the northern Raudhatain field that has a capacity of 450,000 bbl/d, according to IHS Energy. The Sabriya field, adjacent to Raudhatain, adds another 100,000 bbl/d. The frontier fields of Ratqa, the southern extension of Iraq's Rumaila structure, and the smaller Abdali field were both obtained after the new border was established in 1993, following the end of the Persian Gulf War. In August 2010, British company Petrofac signed a deal with KOC to boost production capacity at Raudhatain and neighboring Sabriyah fields. Also, Kuwaiti and Iraqi officials agreed in principle to jointly develop shared oil fields, as well as to allow IOCs to aid in such projects.

Project Kuwait

Project Kuwait is a focal point of Kuwait's aspirations to attain a production capacity of 4 million bbl/d. Proposed in 1998, Project Kuwait was a concerted effort to create proper incentives to attract foreign participation, particularly for the country's northern fields. The contract structure that resulted was challenged as unconstitutional, and the National Assembly has impeded progress of Project Kuwait for a number of years. Kuwait's constitution bars foreign ownership of the country's natural resources, which precludes the product-sharing agreements (PSAs) that provide the desired incentive for IOC investment. To allow IOC involvement, an incentivized buy-back contract (IBBC) arrangement was created, which does not involve production sharing or concessions.

The structure of the IBBC agreements allows the Kuwaiti government to retain full ownership of oil reserves, control over oil production levels, and strategic management of the ventures. Foreign firms are to be paid a per unit (or barrel) fee, in addition to allowances for capital recovery and incentive fees for increasing reserves. In May 2007, the Kuwaiti ruling family conceded the responsibility of approving each related IBBC for Project Kuwait to the National Assembly, which has caused further delays. Additionally, more performance-based incentives have been introduced using the enhanced technical service agreement structure.

The ETSA forged between Kuwait and Royal Dutch Shell in 2010 was designed to raise associated light oil and condensates from the Jurassic natural gas field and to enhance prospects for foreign participation. Parliamentary investigations of the ETSA with Shell have delayed progress to increase output from the Jurassic field over the past few years and have hindered investments from other international companies. KOC intends to raise light oil production at the Jurassic field to 350,000 bbl/d from current output of less than 200,000 bbl/d.

Apart from associated oil production at the Jurassic field, Project Kuwait aims to increase the country's oil production capacity primarily from four northern oil fields (Raudhatain, Sabriya, Abdali, and Ratqa) and targets nearly 1.1 million bbl/d of output from the fields, up from about 700,000 bbl/d in 2014. This addition will serve as a pivotal component to increase overall oil production capacity to 4 million bbl/d by 2020. KOC announced it plans to spend $15 billion to expand output from non-heavy oil formations in the Sabriya and Raudhatain fields by about 300,000 bbl/d. Heavy oil from the Ratqa field is a major component of Project Kuwait, and it is expected to provide 60,000 bbl/d by 2017 in the first phase, 270,000 bbl/d by 2020 in the second phase, and 270,000 bbl/d by 2030 in a third phase. KOC tendered bids for engineering and procurement contracts for the Ratqa field in 2014.

An unconventional source of potential production will come from the clean-up of the large pools of crude oil that have remained since the withdrawal of the Iraqi army after the Persian Gulf War in 1991. In February 2012, KOC awarded tenders to HERA Company of Spain, GS Engineering and Construction Corporation of South Korea, and TERI Company of India to aid in soil remediation, which could result in significant crude oil volumes. The entire operation will take a number of years and cost roughly $3.5 billion, paid for by the United Nations reparations fund. However, the first phase involves only three sites. During the Persian Gulf War, the Iraqi army set more than 800 wells on fire, and estimates indicate that as much as 5 million bbl/d were lost over the nine months it took to extinguish the fires, which resulted in the creation of thousands of crude oil lakes. Additionally, the crude lakes restrict access to producing areas and known reserves, which further restricts exploration and production.

Partitioned Neutral Zone

The Partitioned Neutral Zone (PNZ) was established in 1922 to settle a territorial dispute between Kuwait and Saudi Arabia. The PNZ encompasses a 6,200 square-mile area that contains an estimated 5 billion barrels of oil and 1 trillion cubic feet (Tcf) of natural gas, according to OGJ. Oil production capacity in the PNZ was 520,000 bbl/d in 2013, all of which was divided equally between Saudi Arabia and Kuwait.

Onshore production in the PNZ centers on the Wafra oil field, which began producing oil in 1954. Wafra is the largest of the PNZ's onshore fields with approximately 3.4 billion barrels in proved and probable reserves. Wafra has related production facilities and gathering centers with South Umm Gudair and South Fuwaris. Onshore production in the PNZ has a capacity of 300,000 bbl/d, but it is in decline. A full-field steam injection EOR project led by Chevron is under development to offset field declines and boost production of the heavy oil play by more than 80,000 bbl/d during the first phase. The project is experiencing delays, and Chevron expects the front-end engineering and design to commence in 2015.

The production capacity of offshore fields in the PNZ is less than 300,000 bbl/d, and Khafji Joint Operations, the joint venture developing the offshore capacity of the PNZ, plans to increase production to 400,000 bbl/d by 2019, according to the Wall Street Journal. Production offshore originates from a handful of major fields–Khafji, an extension of Saudi Arabia's Safaniyah (the world's largest offshore field); Hout, which is also an extension of Safaniyah; and Durra, an extension of Iran's Arash and shared with Saudi Arabia. Production at Durra is pending resolution of boundary demarcation negotiations and plans for joint development between Kuwait, Saudi Arabia, and Iran. Kuwait exited the Khafji expansion project in 2013 as a result of the country's political debate over project funding.

Natural gas

According to the Oil & Gas Journal, as of January 2014, Kuwait had an estimated 63 trillion cubic feet (Tcf) of proved natural gas reserves. Natural gas reserves have remained at the same level since 2006. Kuwait's intent to diversify its economy has spurred an extensive focus on natural gas exploration. Vast discoveries of nonassociated gas in the northern region of the country attracted interest from IOCs. However, contract structures and political uncertainty remain principal impediments to any rapid expansion of either reserves or production. Additionally, new natural gas discoveries are geologically more complex, mainly tight and sour natural gas deposits that require more sophisticated development and have higher capital costs.

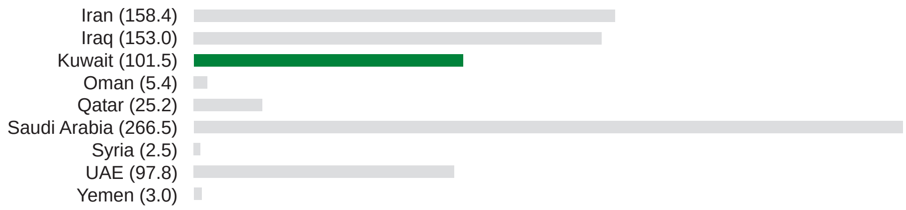
Sector organization

As in the oil sector, all of the natural gas resources are owned by the Kuwait Petroleum Corporation (KPC). The Kuwaiti constitution prohibits any use of production-sharing agreements (PSAs) that allow for an equity stake by an IOC in development projects; therefore, Kuwait is using technical service agreements (TSAs) to bring in IOCs to develop more difficult projects. In February 2010, Royal Dutch Shell signed an ETSA to develop the 2006 natural gas discoveries in northern Kuwait, known as the Jurassic fields, which contain 35 Tcf of reserves in place, the nature of which are too sour for local firms to develop.

Source: Energyfiles.com, OPEC, Energy Information Agency

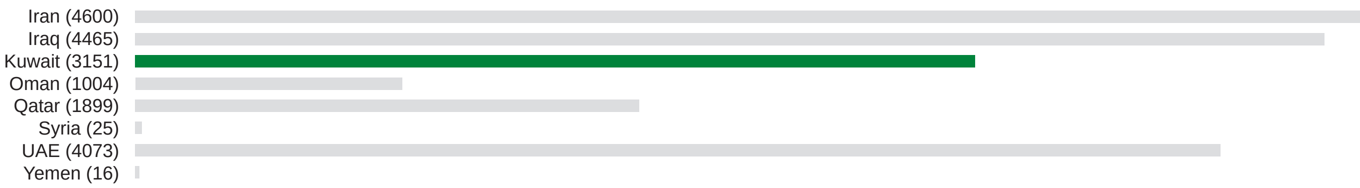
Country Review Kuwait

Proved oil reserves at 2016 year end (billion bbls)



Proved gas reserves at 2016 year end (trillion cubic metres)

2016 Oil production (thousand bbls per day)



2016 gas production (billion cubic metres)

Source: BP Statistical Review