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Kuwait



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Background

Kuwait, an OPEC member country, is one of the world's top producers and exporters of crude oil.

Kuwait is a constitutional emirate led by the Emir of Kuwait, a hereditary seat; the Prime Minister and his deputy and council of ministers, who are approved by the Emir; and a popularly elected National Assembly, which can be dissolved by the Emir. Energy policy is set by the Supreme Petroleum Council, is overseen by the Ministry of Petroleum, and is executed by The Kuwait Petroleum 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. Kuwait also allocates 10 percent of its state revenues into the Reserve Fund for Future Generations (RFFG).

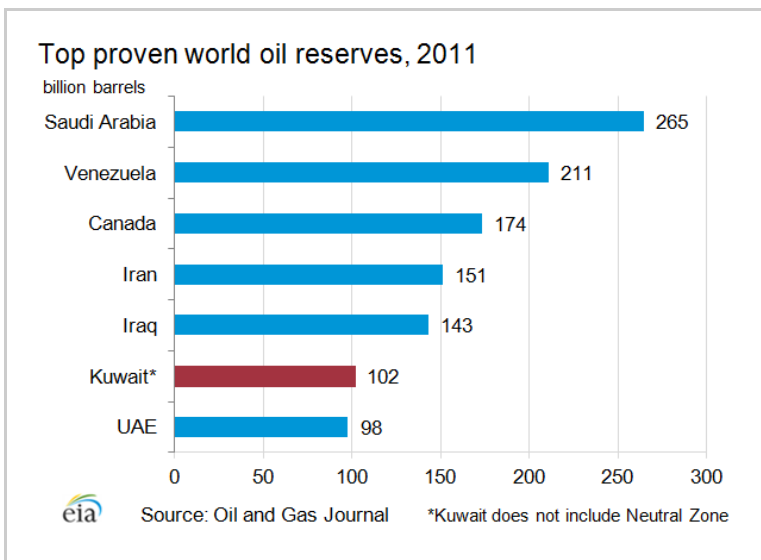
Kuwait is situated at the head of the Persian Gulf and shares its borders with Iraq and Saudi Arabia, including a maritime border with Iran. Like its neighbors, Kuwait is a member of the Organization of Petroleum Exporting Countries (OPEC), exporting the fourth largest volume of oil and petroleum products while maintaining the second smallest land area among the group in 2011. Kuwait's economy is heavily dependent on petroleum export revenues and will continue to be so as it pushes towards a target of 4 million barrels per day (bbl/d) capacity by 2020.



Oil

Kuwait has the world's sixth largest oil reserves and is one of the ten largest exporters of total oil products.

According to *Oil & Gas Journal*, as of January 2012, Kuwait's territorial boundaries contained an estimated 102 billion barrels of proven oil reserves, roughly 7 percent of the world total. Additional reserves are held in the Partitioned Neutral Zone (aka Divided Zone), which Kuwait shares on a 50-50 basis with Saudi Arabia. The Neutral Zone holds an additional 5 billion barrels of proven reserves, bringing Kuwait's total oil reserves to 104 billion barrels. These reserve estimates have been questioned by some analysts and a number of Kuwaiti parliamentarians, with some putting reserves as low as 48 billion barrels.

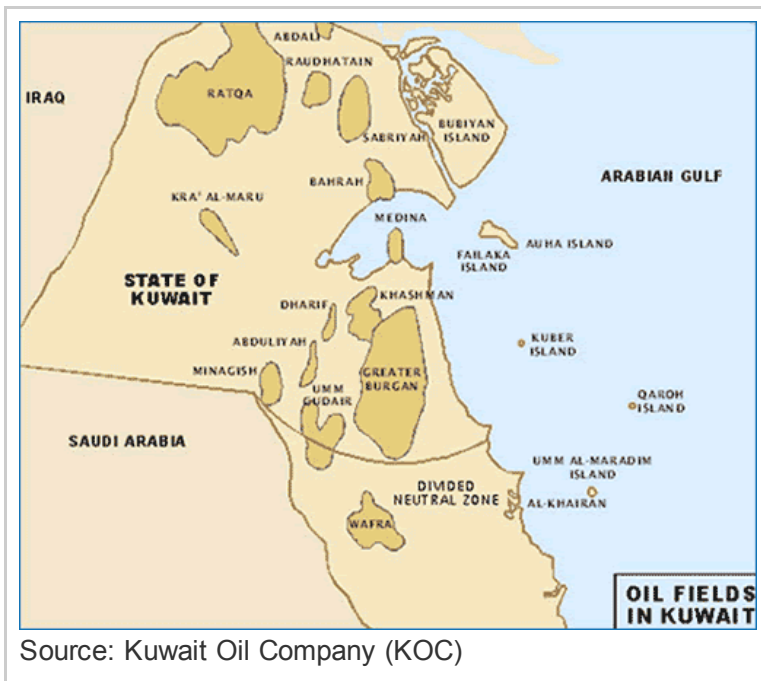


Sector organization

The government of Kuwait owns and controls all development of the oil sector. The Supreme Petroleum Council (SPC) oversees Kuwait's oil sector and sets oil policy. The SPC is headed by the Prime Minister. The rest of the council is made up of six ministers and six representatives from the private sector, all of whom serve three-year terms, and are selected by the Emir. The Ministry of Petroleum supervises all aspects of policy implementation in the upstream and downstream portions of both the oil and natural gas sectors.

The Kuwait Petroleum Corporation (KPC) manages domestic and foreign oil investments. 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 gas sectors. Various subsidiaries of KPC control Kuwait's oil sector. 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). Finally, 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 would eventually be 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 PNZ interests have been transferred to the Kuwait Gulf Oil Company (KGOC). Offshore, a Japanese company, the Arabian Oil Company (AOC) discovered Khafji, Hout, Lulu and Dorra oil fields in the 1960s. The concessions with Saudi Arabia and Kuwait expired in 2000 and 2002, respectively, neither of which was renewed. KGOC was established in 2002 to oversee the 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), manages offshore PNZ production.



Exploration and production

In 2011, Kuwait's total oil production was approximately 2.7 million barrels per day (bbl/d), including its share of approximately 250,000 bbl/d production from the PNZ. Of the country's 2011 production, approximately 2.5 million bbl/d was crude and 200,000 bbl/d was non-crude liquids. Slightly over half of Kuwaiti crude production in 2011 came from the southeast of the country, largely from the Burgan field; production from the north has increased to approximately 540,000 bbl/d. As a member of OPEC, Kuwait agrees to hold production within the organization's targets, which in 2010 meant the country maintained about 320,000 bbl/d of spare crude oil production capacity. In early 2011, as one of the few OPEC members with spare capacity, Kuwait has increased oil production to compensate for the loss of Libyan supplies.

KPC has initiated a \$90 billion expansion plan encompassing both the upstream and the downstream. Included in this are plans to upgrade Kuwait's production and export infrastructure and its tanker fleet, expand exploration, and build downstream facilities, both domestically and abroad, which is expected to boost oil production capacity to 4 million bbl/d by 2020.

Largely as a result of the debate on the nature of foreign participation in the oil sector between the Emir and the National Assembly, exploration in Kuwait has not made significant inroads in the recent past. Discoveries of lighter crudes in the center of the country have been successful, but progress has not moved beyond the planning stages. In 1984, a discovery in South Maqwa was made, revealing light crude of API 35°-40° grade, and after drilling began at Kra'a al-Mara in 1990, significant volumes of 49° API crude was found. Negotiations were begun with Exxon, but the conditions to move this project to full development have not been reached. Many expect Kuwait to classify such a high grade of crude as condensate so as to avoid its qualification for OPEC targets.

Another successful discovery was made in 2006 in the Sabriya and Umm Niqa areas, in the north of the country, which added an estimated 20-25 billion barrels of reserves, although of a much heavier, sour quality. In February 2010, Shell signed an Enhanced Technical Service Agreement (ETSA) to exploit these new discoveries; however, progress has been

slow in boosting production. KOC is also having trouble developing the Lower Fars reservoir of al-Ratqa field. KOC initially negotiated with ExxonMobil, Shell, and Total to develop this field, however KOC subsequently abandoned plans for a joint project development. KPC also signed a memorandum of understanding (MOU) in July 2010 with Japan Oil, Gas, and Metals National Corporation (JOGMEC) to assess the feasibility of injection of carbon dioxide as a potential enhanced oil recovery (EOR) technique.

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 dominant portion of both reserves 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 did not become fully developed until after World War II. Burgan has been producing consistently ever since. Generally, production from Burgan comprises medium to light crudes, with API gravities in the 28°-36° range. Although Burgan's recent production of between 1.1 and 1.3 million barrels per day (bbl/d) accounted for around half of Kuwait's total production, Burgan has a production capacity of 1.7 million bbl/d. KOC is seeking to boost Burgan's capacity largely from the Wara reservoir. A tender for foreign firms to install water injection facilities should be issued by the end of 2011, with the goal of increasing production from Wara to 350,000 bbl/d by 2014, from its current 80,000 bbl/d.

Other production centers in the south of the country include Umm Gudair, Minagish, and Abduliyah. Umm Gudair and Minagish produce a variety of crude oil grades, but largely fall in the medium range, with gravities of 22°-34° API. In January 2003, water injection began at Minagish to enhance oil recovery and offset natural declines in production. An exploration well drilled in 2009 discovered light crude and associated natural gas at Mutriba oil field to the west of Rudhatain. As much as 80,000 bbl/d are expected from this field, with plans for production coming on-stream by 2014.

Northern Kuwait holds the majority of Kuwait's larger fields other than Greater Burgan. Kuwait's second largest source of crude production is from the northern Raudhatain field, with a capacity of 350,000-400,000 bbl/d. Sabriya is adjacent to Raudhatain and adds another 100,000 bbl/d. The frontier fields of al-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. They add another 75,000 bbl/d of production capacity. In August 2010, British Petrofac signed a deal with KOC to boost production capacity at Raudhatain and neighboring Sabriyah fields. In the same month, Kuwaiti and Iraqi officials agreed in principle mutually to develop shared oil fields, as well as to allow an international oil company (IOC) to aid in such projects. It is not clear how the respective state-run oil companies would be involved and to what degree.

Project Kuwait

A focal point of Kuwait's aspirations to attain a production capacity of 4 million bbl/d is Project Kuwait. Proposed in 1998, Project Kuwait was an asserted effort to create proper incentives to attract foreign participation. 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 by IOCs for investment. In order to allow IOC involvement, an "incentivized buy-back contract" (IBBC) arrangement was created, which neither involves production sharing nor 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 barrel" fee, along with allowances for capital recovery and incentive fees for increasing reserves. In May 2007, the Kuwaiti ruling family conceded the responsibility to approve each related IBBC for Project Kuwait to parliament, which has caused further delays. Additionally, more performance-based incentives have been introduced in an enhanced technical service agreement (ETSA) structure, although only one has been awarded so far.

Project Kuwait aims to increase the country's oil production capacity from four northern oil fields Raudhatain, Sabriya, al-Ratqa, and Abdali. This serves as a pivotal component to increase production capacity to 3.5 million bbl/d by 2015, and 4 million bbl/d by 2020, which KOC admits will require the help of IOCs. Some agreements, such as the ETSA with Royal Dutch Shell forged in February 2010 and continued negotiations with other IOCs over EOR developments have enhanced prospects for foreign participation, yet no other final agreements have been made. Production from the north has seen a boost over 2010, approaching 800,000 bbl/d with the installation of a 120,000 bbl/d early production facility at the Sabriya field. Heavy oil is also a major long-term component of Project Kuwait, providing a projected 60,000 bbl/d by 2015 and 270,000 bbl/d by 2020, although this is much lower than the original forecast production of 750,000 bbl/d. Estimated heavy oil reserves of approximately 13 billion barrels are located primarily in the north of Kuwait, with other reserves concentrated in the Neutral Zone.

An unconventional source of potential production over the medium-term will be related to the clean-up of the large pools of crude that have remained since the withdrawal of the Iraqi army during the First Gulf War. The KOC has awarded tenders to HERA Company of Spain, GS Engineering and Construction Corporation of South Korea, and TERI Company of India in February 2012 to aid in soil remediation, which could result in significant crude volumes. The entire operation will take years and cost roughly \$3.5 billion, paid for by the UN reparations fund, however the first phase involves only three sites. The Iraqi army set more than 800 wells ablaze and estimates indicate that as much as 5 million bbl/d were lost over the nine months it took to extinguish the fires. The lakes number in the thousands and were created by the seawater used to put out the fires. There is also the potential that the clean-up could facilitate further exploration and production, as the lakes restrict access to producing areas and known reserves.

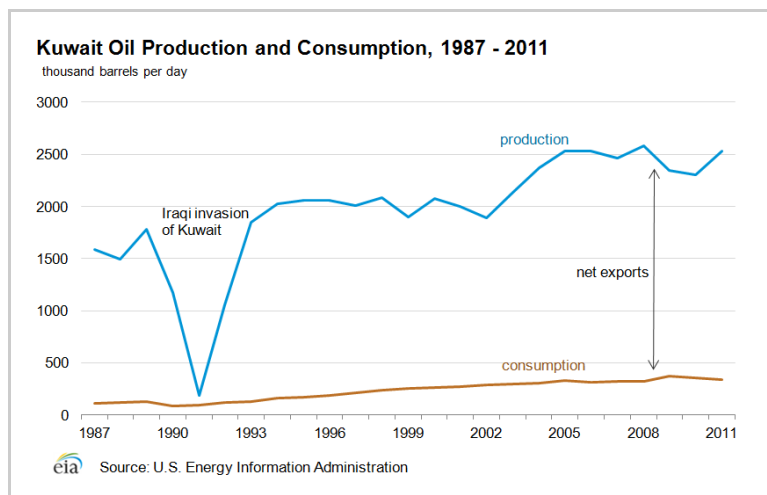
Partitioned Neutral Zone

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 and contains an estimated 5 billion barrels of oil and 1 trillion cubic feet (Tcf) of natural gas. Oil production capacity in the PNZ is currently about 600,000 barrels per day, all of which is divided equally between Saudi Arabia and Kuwait.

Onshore production in the PNZ centers on the Wafra oil field. In production since 1954, Wafra is the largest of the PNZ's onshore fields with approximately 3.4 billion in proven 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 240,000 bbl/d, but is in decline. A full field steam injection project is being considered, but a final investment decision is not expected before 2013.

The production capacity of offshore fields in the PNZ is 350,000 bbl/d, with plans to double production to 700,000 bbl/d by 2019. Nearly 90 percent of current production comes from

Khafji. Offshore production is about four times as expensive in the PNZ as in the rest of Kuwait. Production offshore originates from Khafji, an extension of Saudi Arabia's Safaniyah (the world's largest offshore field); Hout, which is also an extension of Safaniyah; and Dorra, an extension of Iran's Arash and shared with KSA. Dorra is not currently under production, pending resolution of boundary demarcation negotiations and plans for joint development between Kuwait and Iran.



Exports and consumption

In 2011, Kuwaiti exports of crude oil amounted to about 1.8 million bbl/d. Most Kuwaiti crude oil is sold on term contracts. Kuwait's crude exports are all a single blend of all its crude types. The largest proportion is the medium Burgan crude, which is blended with heavier, more sour crude from northern fields, as well as marginal amounts from Minagish and Umm Gudair. Kuwait's single export blend ("Kuwait Export") has a specific gravity of 31.4°API (a typical medium Mideast crude), and is generally considered sour, with 2.52 percent sulfur content. In 2011, the Asia-Pacific region received approximately 1.5 million bbl/d, while exports to the United States totaled 191,000 bbl/d, and Europe received around 80,000 bbl/d.

With the majority of its export volumes headed to Asian markets, the most significant benchmark for Kuwaiti exports is the Oman-Dubai, to which it sells at a slight discount. As of the beginning of 2010, the price of Kuwaiti crude oil for American customers was tied to the Argus Sour Crude Index (ASCI), a weighted average of various North American medium, sour crudes. European buyers purchase from a benchmark linked between a Brent weighted-average and Saudi Arab Medium.

Mina al-Ahmadi is the country's main port for the export of crude oil. Kuwait also has operational oil export terminals at Mina Abdullah, Shuaiba, and at Mina Saud, otherwise known as Mina al-Zour. To handle increased production generated by Iraq and the northern fields, a new terminal is planned for construction on Bubiyan Island.

Kuwait consumes only a small portion of its total petroleum production. The country consumed a total of 339,000 bbl/d in 2011, leaving the vast majority of its production available for exports; however, domestic consumption has been steadily increasing partially as a result of increased petroleum-fired electricity generation.

Downstream

Oil & Gas Journal puts nameplate refining capacity in Kuwait at 936,000 bbl/d. This production capacity is derived from three refinery complexes: al-Ahmadi, Abdullah, and al-Shuaiba. All of the refineries are located in close proximity to the coastline, about 30 miles south of Kuwait City and are owned and operated by Kuwait National Petroleum Company (KNPC). Kuwait is a large exporter of refined products, as refining capacity is about three times the level of domestic demand for petroleum. The largest refinery is Mina al-Ahmadi was built in 1949 and has a capacity of 466,000 bbl/d. Mina Abdullah and al-Shuaiba have a nameplate capacity 270,000 bbl/d and 200,000 bbl/d, respectively.

Kuwait Petroleum International (KPI), also known as Q8, manages KPC's refining and marketing operations internationally. Its operations include approximately 4,000 retail stations across Belgium, Spain, Sweden, Luxembourg, and Italy. KPI has interests in two refineries, owning an 80,000 bbl/d refinery in Rotterdam, Netherlands and a 50:50 joint venture with Italian major ENI in the 240,000 bbl/d capacity refinery in Milazzo, Italy.

Kuwait is seeking to cultivate downstream interests in markets with high potential demand growth; the Asian market in particular, specifically China, Vietnam, and Indonesia. In China's Guangdong Province, KPC is negotiating a refinery and petrochemical joint venture with China's Sinopec, with a remaining stake to be allocated to a third company in the near future. The plant will feature a 300,000 bbl/d capacity refinery, which will also have an ethylene steam cracker with the capacity to produce 1 million tons per year (mtpa). In March 2011, China's National Development and Reform Commission (NDRC) gave final approval to the project, making Kuwait the second Arab oil producer behind Saudi Arabia to have a major downstream facility in China. Sinopec has announced a planned commission date of 2014, however analysts predict a much longer timeframe, with a likely start-up in 2018-2019. Kuwait aims to increase its exports from 200,000 bbl/d to 500,000 bbl/d with the conclusion of the refinery.

Kuwait Petroleum International (KPI) joined with PetroVietnam and Japanese Idemitsu in April 2008 to construct a 200,000 bbl/d refinery in Nhi Son, Vietnam. In November 2010, the Vietnamese government approved the project, which is expected to be completed by 2014. KPI currently holds a 35 percent stake, which will be reduced for PetroVietnam to take a majority stake once the refinery comes on-line. Indonesian officials have also announced a possible \$8-9 billion, 300,000 bbl/d refinery with KPC on the island of Java.

Clean Fuels Project/Al-Zour

Two long delayed projects comprise Kuwait's ambitious downstream plans: the Clean Fuels Project and the al-Zour refining facility. These two projects have an estimated combined cost of over \$31 billion. The Clean Fuels Project (CFP) is the project under which Kuwait's existing refineries will be upgraded. Due to the rapid rise of domestic demand, including expansions in the petrochemical sector, and increased demand for higher quality products in Kuwait's traditional export markets, these two projects are progressing with increased urgency. In June 2011, the Supreme Petroleum Council (SPC) approved both projects.

The two elements of the general overhaul of Kuwait's refining sector seek to build the al-Zour refinery, retiring old units and installing new components, while shutting down the al-Shuaiba refinery altogether. A crude distillation unit (CDU) will be taken out of commission

at the Mina al-Ahmadi, while Mina Abdullah will lose a number of components, but its overall capacity will increase by 184,000 bbl/d.

The al-Zour refinery was originally tendered in 2008, but political opposition led to the cancellation of the bid round. This forced KPC to compensate those companies who had spent resources preparing their bids, placing the entire project on hold. The cancellation resulted in significant costs to KPC, as they needed to compensate Dow for the capital it had already deployed in preparations and acquisitions.

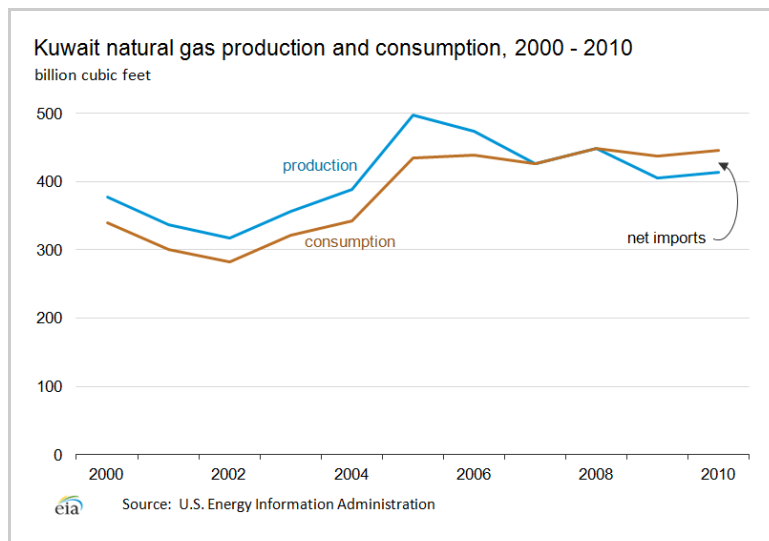
Natural gas

Kuwait has recently become a net importer of natural gas, leading the country to focus more on natural gas exploration and development for domestic consumption.

According to *Oil & Gas Journal*, as of January 2012, Kuwait had an estimated 63 trillion cubic feet (Tcf) of proven natural gas reserves. Kuwait's intent to diversify its economy has spurred an extensive drive in natural gas exploration. Vast discoveries of non-associated gas in the north of the country attracted interest from international oil companies (IOCs), however contract structures and political uncertainty remain principal impediments to any rapid expansion of both reserves and production. Additionally, new discoveries are geologically more complex, being mainly tight and sour gas deposits which require more sophisticated and costly development.

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) in order to bring in IOCs to develop more difficult projects. In February 2010, Shell signed an enhanced technical service agreement (ETSA) for the 2006 natural gas discoveries in the north, known as the Jurassic fields, amounting to 35 Tcf of reserves in place, the nature of which are too sour for local firms to develop.



Exploration and production

In 2010, Kuwait produced 1.13 billion cubic feet per day (Bcf/d) of natural gas. This volume was an increase of around 2 percent compared with 2009. Given the predominance of associated natural gas in Kuwaiti production, domestic natural gas supplies increased at a small rate as a result of lower OPEC crude production quotas. Kuwait increasingly requires supplies of natural gas for the generation of electricity, water desalination, and petrochemicals, as well as increased use for enhanced oil recovery (EOR) techniques to boost oil production. Kuwait is shifting its exploration drive in order to focus on natural gas discoveries to mitigate imports of liquefied natural gas (LNG) and decrease the proportion of oil used domestically. KOC has announced a production target of 4 Bcf/d by 2030, about four times the current production level.

Associated natural gas production makes up the vast majority of Kuwait's overall production. In 2010, approximately 1 billion cubic feet per day (Bcf/d) was produced from associated gas, while non-associated gas production amounted to only 150-200 million cubic feet per day (MMcf/d). Production of non-associated natural gas from the north is seen as the most promising future source of natural gas production growth. Given Kuwait's fiscal and political climate, not much progress has been made in exploring the mainly offshore prospects, leaving Kuwait to focus on its natural gas discoveries in the north.

The Jurassic non-associated gas field was discovered in 2006, with an estimated 35 Tcf of reserves. This project has been described as the most difficult in the world, for its geologic composition and the technical complexities that this presents. A first phase envisioned 175 MMcf/d and 50,000 bbl/d of condensate by 2008 however it seems to have reached a production plateau at 140 MMcf/d. The second phase is being constructed by Kharufi National and Saipem, with a projected capacity of 500 MMcf/d due to come online by 2013. Original development plans of Jurassic forecast production of 600 MMcf/d by 2012 and 1 Bcf/d and 350,000 bbl/d of light crude or condensate, the classification of which is still undetermined, by 2015, although industry experts see this as unlikely, if not impossible, at this point. Shell has been developing the Jurassic project through its 2010 ETSA.

The other prospect for non-associated natural gas production is the Dorra gas field offshore PNZ. This field is shared by Kuwait, Saudi Arabia, and Iran, which calls the field Arash. Kuwait and Saudi Arabia have already announced plans to begin production at Dorra by 2017, providing an additional 500-800 MMcf/d. Iran, in response, has indicated that it will develop its own side of the field in the near future. Political tensions between the Gulf States and Iran are likely to preclude any near-term settlement of mutual development.

Kuwait is also expanding its gas processing infrastructure in order to meet rising domestic demand. Daelim of South Korea is currently constructing Kuwait's fourth gas processing plant, its largest to date at 800 MMcf/d. This unit will be on the site of the Ahmadi refinery and give Kuwait a gas processing capacity of 2.3 Bcf/d by 2013. A fifth train of an additional 800 MMcf/d is also in the planning stages, taking potential capacity over 3 Bcf/d. However, neither the current production plans nor the expansion of processing facilities is expected to meet fully the growing levels of domestic demand.

Consumption and imports

In 2010, Kuwait consumed approximately 446 Bcf of natural gas, which is equal to 1.2 Bcf/d. Since 2007, Kuwait has consumed as much or more natural gas than it has produced. This

has compounded the problem of electricity outages by making the availability of feedstock precarious. As such, Kuwait has had to resort to imports of liquefied natural gas (LNG) to make up for this supply gap. In 2010, Kuwait imported 270 MMcf/d of LNG, largely from regional neighbors Yemen and Oman. Re-exports of LNG from Qatar via Abu Dhabi were also needed to meet demand, as Saudi Arabia rebuffed a pipeline proposal linking Qatar to Kuwait through Saudi Arabia's territorial waters in 2006. Kuwait's electricity demand, the generation of which is fueled increasingly by natural gas, has outpaced natural gas production during the summer months, resulting in the shutdown of refinery and petrochemical operations to meet the increased demand of electricity.

In June 2009, Kuwait signed a deal with Shell to import LNG, receiving the first cargo in August 2009. KPC made another deal with international energy trading firm, Vitol, in April 2010, which will supply Kuwait with LNG cargoes through 2013. Kuwait takes delivery of the LNG at the Persian Gulf's first regasification terminal, Mina al-Ahmadi GasPort. The regasification capacity of al-Ahmadi is approximately 500 MMcf/d of LNG.

Kuwait has also recently exhibited interest in supplies from the impending natural gas project in Southern Iraq. Royal Dutch Shell, Mitsubishi, and Iraqi state-owned Southern Oil Company (SOC) are developing infrastructure to gather associated natural gas from Iraq's southern oil fields. A potential pipeline from Iran's South Pars gas field has been placed on hold, as political considerations make the project less likely. These prospective imports would still not mitigate the need for continued LNG imports.

Electricity

Kuwait's electric sector has not expanded despite demand growth of 8 percent per year.

Kuwait has an installed electric generation capacity of 13,000 MW, which was slightly above peak demand of 10,500 MW in the summer of 2010. Electric generation comes from Kuwait's existing power plants: Doha East, Doha West, Shuaiba North, al-Subiya, al-Sabiya, Abdaliyah, Shuwaikh, al-Zour North, and al-Zour South.

In 2010, Kuwait had overall electric generation of 51 billion kilowatt hours (kWh). Kuwait has come to embody the difficulties facing the region's electricity networks, with rapid demand growth causing rolling blackouts at times of peak energy demand. Slow implementation of development plans, as well as a lack of feedstock, has served to create shortages in electricity supply during the hot summer months. Formerly having one of the largest reserve margins in the region, Kuwait is perpetually in a state of electricity supply shortage. In the past decade, the development of Kuwait's electric sector has stalled due to political factors, despite consistent annual demand growth of 8 percent. Only one power plant was commissioned during that time, bringing a comfortable reserve margin to a shortage beginning in 2006.

Given the rapidly increasing demand over the past decade, the Kuwaiti government has unveiled an extensive development plan for the electric grid. Kuwait is in the planning stages to bring on an additional power plant with a generating capacity of 1,500 MW in the near future and plans to add 10,000 MW, nearly doubling its generation capacity by 2015-2020 to meet eventually the expected demand of 25,000 MW by 2030.

In order to achieve this, Kuwait will employ public-private projects (PPPs), as well as

independent water and power projects (IWPP). Kuwait is the last Gulf country to incorporate the private sector into the development of its electric sector. The first evidence of private sector participation is the expansion project of the al-Subiya complex built by General Electric (GE) and Hyundai Heavy Industries of South Korea. In July 2012, GE and Hyundai completed the 700 MW expansion of the power plant to its nameplate capacity of 2000 MW. The power plant is a combined-cycle facility, using natural gas primarily, with fuel oil as a back-up. It will be the first new power plant to become operational in over 20 years. It will add needed reserve capacity to the electric system, going into the peak demand months of summer. Five other power plants are in various stages of development to achieve the forecast capacity and bring an adequate buffer between peak demand and generation capacity.

Kuwaiti Planned Power Plants

Project	Generation Capacity	Plant Type
Al-Zour North	4,800 MW (4 Phases)	Gas Turbine
Al-Julaia	1,000 MW	Gas Turbine
Shuwakh	2,000 MW	Gas Turbine
Shuaiba South	1,400 MW	Steam Turbine
Doha East	2,300 MW	Steam Turbine
Total Capacity	11,500 MW	

Sources: Ministry of Electricity and Water, MEES, MEED

Nuclear power

In the long-term, Kuwait is planning to utilize nuclear energy. In March 2009, Kuwait announced its intention to establish a nuclear commission. Subsequently, in January 2010, the head of the National Nuclear Energy Committee announced a 20-year cooperative deal with the the French Atomic Energy Commission in the development of nuclear power in Kuwait. Kuwait announced that it is considering four nuclear power plants, set to become operational by 2022 and has agreed to allow International Atomic Energy Agency (IAEA) inspectors into any future nuclear sites. An additional nuclear agreement with the United States has been discussed, but not finalized.

Gulf Cooperation Council (GCC) grid

The Gulf Cooperation Council (GCC), of which Kuwait is a member, faces rapidly increasing demand growth in electricity. As a result, the six Gulf countries of UAE, Kuwait, Qatar, Bahrain, Saudi Arabia, and Oman began a region-wide power grid. This three phase project, completed in late 2012, connected the Northern System — Kuwait, Bahrain, Saudi Arabia, Qatar — to the Southern System — UAE, and Oman. Some analysts believe the GCC Grid has the potential to expand into North Africa and eventually link with Europe's power grids. Kuwait has already had to utilize regional electricity imports from the Northern System, as it has been plagued by electricity supply shortfalls. In addition to meeting the growing electricity demands and sharing electricity reserve requirements in the Gulf States, the integrated power grids will reduce power outages in the short-term and increase power exchange across seasons and time zones.

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