

United Arab Emirates

International energy data and analysis

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[full report](#)

Overview

The United Arab Emirates (UAE) is among the world's 10 largest oil producers and is a member of the Organization of the Petroleum Exporting Countries (OPEC) and the Gas Exporting Countries Forum (GECF).

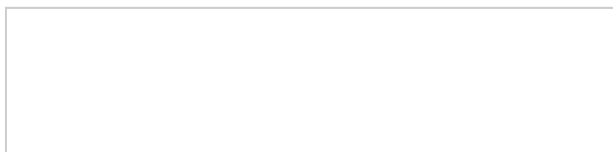
Since declaring independence from the [United Kingdom](#) and uniting in 1971, the UAE—a federation of the seven emirates of Abu Dhabi, Ajman, Al Fujairah, Dubai, Ras al Khaymah, Sharjah, and Umm al Qaywayn—has relied on its large oil and natural gas resources to support its economy. The UAE is currently the sixth-largest petroleum producer in the world. In 2013, hydrocarbon export revenues were \$123 billion, up from approximately \$75 billion in 2010, according to the International Monetary Fund (IMF).¹

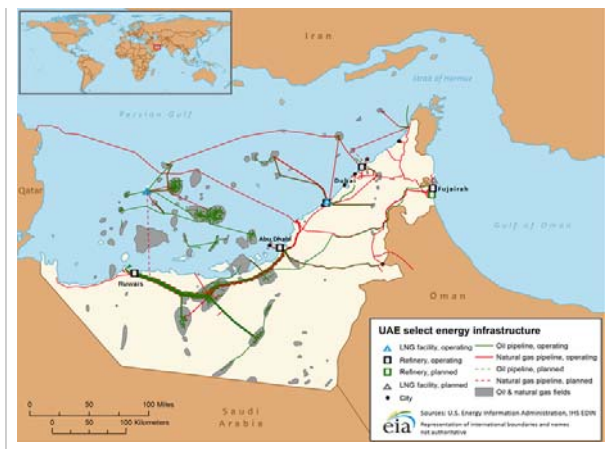
In addition to the growing hydrocarbon economy, the UAE is becoming one of the world's most important financial centers and a major trading center in the Middle East. Investments in nonenergy sectors, such as infrastructure and technology, along with a rapidly recovering real estate sector, continue to provide the UAE with insurance against oil price declines and global economic stagnation. IMF data indicate the UAE's real gross domestic product grew by 5.2% in 2013. However, a sustained decline in oil prices could lead to a reduction in spending in the near future.²

A member of the Organization of the Petroleum Exporting Countries (OPEC) since 1967—when Abu Dhabi joined—the UAE is one of the most significant oil producers in the world. The likelihood of further major oil discoveries is low, but the UAE uses enhanced oil recovery (EOR) techniques to increase the extraction rates of the country's mature oil fields.

Natural gas use in the UAE is rising. Although the country is a member of the Gas Exporting Countries Forum (GECF), domestic demand is likely to draw heavily on the UAE's natural gas resources. Currently, the country both imports and exports liquefied natural gas (LNG) and shares international natural gas pipelines with [Qatar](#) and [Oman](#). The UAE is also one of the world's leaders in the use of natural gas in enhanced oil recovery (EOR) techniques. With natural gas demand rising, the government plans to expand domestic production using EOR techniques to meet the demand for domestic consumption and exports.

The UAE is making notable progress in diversifying its economy through tourism, trade, and manufacturing. However, in the near term, oil, natural gas, and associated industries will continue to account for most of the economic activity in the seven emirates.





Sector organization

Each of the seven emirates is responsible for regulating the oil industry within its borders, creating a mix of production-sharing arrangements and service contracts. In Abu Dhabi, the Supreme Petroleum Council (SPC) sets Abu Dhabi's petroleum-related objectives and policies. Given Abu Dhabi's status as the central player in the UAE's oil industry, the SPC is the most important entity in the country when it comes to establishing oil policy.

The Abu Dhabi National Oil Company (ADNOC) - which operates 16 subsidiaries throughout the oil, natural gas, and petrochemical sector - leads the day-to-day operations and implementation of SPC directives, and it is the key shareholder in nearly all upstream activity in Abu Dhabi. ADNOC's subsidiaries engage in oil and natural gas exploration, processing, and distribution, among other activities. Some of the most notable subsidiaries are the Abu Dhabi Company for Onshore Oil Operations (ADCO), the Abu Dhabi Marine Operating Company (ADMA-OPCO), the Zakum Development Company (ZADCO), and the Abu Dhabi National Tanker Company (ADNATCO), which operates under the same management team as the National Gas Shipping Company (NGSCO).

The Dubai Supreme Council of Energy (DSCE) oversees Dubai's energy-policy development and coordination. The DSCE includes representatives from several key entities, including the Emirates National Oil Company (ENOC), the Dubai Petroleum Establishment (DPE), and the Dubai Nuclear Energy Committee (DNEC). The DSCE seeks to ensure that Dubai's economy has adequate and sustainable access to energy resources.

The other Emirates have small oil and natural gas sectors, but details on their structures are limited.

Natural gas production and regulation are the responsibilities of the individual emirates and are often carried out under the same leadership as their oil sectors. ADNOC leads Abu Dhabi's natural gas sector through its subsidiaries, with the exploration and production of natural gas resources carried out by ADCO and ADMA-OPCO, as in the case of oil. The Abu Dhabi Gas Industries Limited Company (GASCO), created as a joint venture between ADNOC, Shell, Total, and Partex, oversees processing Abu Dhabi's onshore natural gas, as well as the associated gas recovered from onshore oil operations. Another important company in Abu Dhabi's natural gas sector is Abu Dhabi Gas Liquefaction Limited (ADGAS), which controls the production and export of Abu Dhabi's liquefied natural gas (LNG) and liquefied petroleum gas (LPG). The third major participant in Abu Dhabi's natural gas industry is the Abu Dhabi Gas Development Company Limited (Al Hosn Gas), which is responsible for the development of the sour-gas reservoirs in the Emirate's large Shah field. Al Hosn Gas is a joint venture between ADNOC and Occidental Petroleum Company.

The DSCE is also the central figure in Dubai's natural gas sector. Led by the ENOC group—a state-owned entity made up of dozens of subsidiaries—Dubai's natural gas sector operates similarly to its counterpart in Abu Dhabi. The Dubai Natural Gas Company Limited

(DUGAS) oversees engineering, construction, management, and operation of Dubai's natural gas infrastructure.

Contracts

Abu Dhabi bases contract structures on long-term, production-sharing agreements (PSAs) between state-run ADNOC and private actors (primarily large international oil companies) with the state holding a majority share in all projects. With the exceptions of Dubai and Sharjah—which have service contracts to manage their declining reserves—the smaller Emirates all use PSAs similar to those found in Abu Dhabi.

Major international oil companies involved in the UAE oil and natural gas sector include BP, Shell, Total, ExxonMobil, and Occidental Petroleum—which in 2008 secured the first new concession offered by the UAE in more than 20 years. International oil companies involved in the UAE's upstream oil sector received just \$1 per barrel produced under the decades-old ADCO concession. After the legacy concession expired in January 2014, nine companies qualified to submit bids for 5% and 10% stakes in a new 40-year concession offering \$3 per barrel and the ability of companies to book reserves.³ In January 2015, Total was the first company to sign a new contract, agreeing to a 10% participating interest in the onshore concession for 40 years. In April 2015, Japan's Inpex was awarded a 5% concession.^{4 5}

Oil

The UAE is a major oil producer and exporter. In 2014, the country produced an average of 3.5 million barrels per day of petroleum and other liquids, the sixth-highest total in the world.

According to the *Oil & Gas Journal* estimates as of January 2015, the UAE holds the seventh-largest proved reserves of oil in the world at 97.8 billion barrels, with most of the reserves located in Abu Dhabi (approximately 94% of the UAE's total).⁶ The other six Emirates combined account for just 6% of the UAE's crude oil reserves, led by Dubai with approximately 4 billion barrels. The UAE holds approximately 6% of the world's proved oil reserves.

Recent exploration in the UAE has not yielded any significant discoveries of crude oil. What the UAE lacks in new discoveries it makes up for with an emphasis on EOR techniques designed to extend the lifespan of the Emirates' existing oil fields. By improving the recovery rates at the existing fields, such techniques helped the UAE to nearly double the proved reserves in Abu Dhabi over the past decade.

The UAE has several crude streams, including the Murban—a light and sweet (low sulfur) crude that is the country's primary export stream. In July 2014, Abu Dhabi began offering a new crude stream called Das, which is a blend of two existing streams—the Umm Shaif and Lower Zakum crude streams.⁷

Table 1. Top 10 countries for proved oil reserves, Jan. 2015

Country	Billion barrels
Venezuela	298.4
Saudi Arabia	265.8
Canada	173.2
Iran	157.8
Iraq	144.2
Kuwait	101.5

Source: U.S. Energy Information Administration, *Oil & Gas Journal*

United Arab Emirates	97.8
Russia	80.0
Libya	48.3
Nigeria	37.1

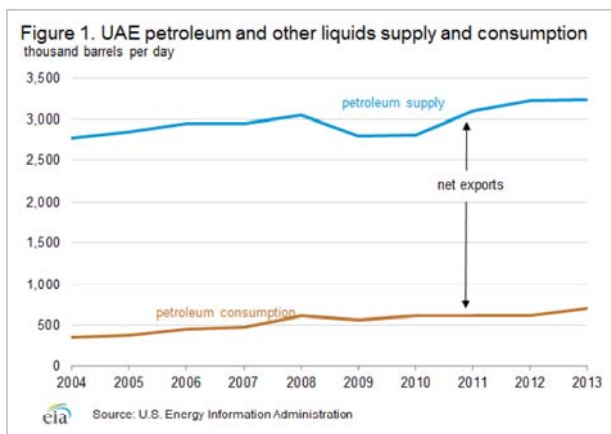
Source: U.S. Energy Information Administration, *Oil & Gas Journal*

Exploration and production

The UAE was the second-largest producer of petroleum and other liquids in OPEC in 2014. The country has an ambitious target of increasing crude oil production by 30% by 2020, despite lower oil prices.

The UAE produced 3.5 million barrels per day (bbl/d) of petroleum and other liquids in 2014, of which 2.7 million bbl/d was crude oil and the remainder was noncrude liquids (condensate, natural gas plant liquids, and refinery processing gain), ranking them second in petroleum production in OPEC behind [Saudi Arabia](#). The UAE was the fourth-largest crude oil producer in OPEC in 2014, behind Saudi Arabia, [Iraq](#), and [Iran](#). The UAE plans to increase crude oil production by 800,000 bbl/d to 3.5 million bbl/d in 2020.⁸ With limited prospects for major discoveries, production increases in the UAE will come almost exclusively by using EOR techniques in Abu Dhabi's existing oil fields. However, EOR projects are typically based on oil prices around \$100 per barrel, which may prove these projects uneconomic at current price levels.

One region that may help the UAE boost oil production is the Zakum petroleum system. ZADCO—owned jointly by ADNOC, ExxonMobil, and the Japan Oil Development Company—manages production from UAE's Upper Zakum field, which currently produces about 590,000 bbl/d.⁹ In July 2012, ZADCO awarded an \$800-million engineering, procurement, and construction contract to Abu Dhabi's National Petroleum Construction Company—along with French firm Technip—with the goal of expanding oil production at the Upper Zakum field to 750,000 bbl/d by 2016. Production from the Lower Zakum field—operated by the Abu Dhabi Marine Operating Company (ADMA-OPCO)—should also increase, with oil production eventually reaching 425,000 bbl/d, increasing from the 345,000 bbl/d it currently produces.



Imports, exports, and consumption

The UAE has one of the highest rates of per capita petroleum consumption in the world.

The UAE is both a major exporter and consumer of petroleum liquids. The U.S. Energy Information Administration (EIA) estimates that the UAE exported more than 2.5 million bbl/d of crude oil in 2014, with most of it going to markets in Asia. In addition to being a major global petroleum exporter, the UAE domestic market relies heavily on petroleum product

imports to meet energy demand. Most of the UAE's petroleum imports are of residual fuel oil, with limited imports of motor gasoline and diesel fuel.

The UAE has a well-developed domestic pipeline network that links oil fields with processing plants and export terminals. The newest export pipeline, the Abu Dhabi Crude Oil Pipeline (ADCOP), runs 236 miles from Habshan to Fujairah and began operations in June 2012. This pipeline gives the UAE a direct link from the rich fields of its western desert to the Gulf of Oman and from there to global markets. With a capacity of 1.5 million bbl/d—and expectations that the capacity will reach 1.8 million bbl/d in the near future—this pipeline will provide the UAE with the ability to export a significant portion of its daily production without passing through the Strait of Hormuz, the world's busiest energy [chokepoint](#), which accounts for 30% of all seaborne-traded oil.

Already one of the world's largest bunkering ports, the export terminal in Fujairah will expand its storage capabilities significantly over the coming years. A new storage terminal in Fujairah was inaugurated in March 2015 with the capacity to hold nearly 16 million barrels of crude oil and petroleum products by 2016.¹⁰ Plans to expand the terminal include three new subsea loading lines, an intermediate pumping station, and three offshore buoys designed for deepwater tanker loading. A planned 200,000 bbl/d refinery is expected to provide fuel for both domestic and export markets when it begins operations in 2020.¹¹ With growing refining and storage capacity as a result of a number of ongoing expansion projects, Fujairah is quickly becoming a critical node in a well-developed refining and export network.

Refining

The UAE has five refining facilities, the largest of which is the Ruwais facility, which was recently expanded from 400,000 bbl/d to 817,000 bbl/d and is expected to be fully operational in the first half of 2015.¹² With this new expansion, total refining capacity in the UAE will approach 1.1 million bbl/d, making UAE the Persian Gulf's fourth-largest refiner. Additionally, there are plans to invest in a new Fujairah refining complex, with a targeted capacity of 200,000 bbl/d by 2020.¹³

The UAE and neighboring Oman plan to build a jointly-operated refinery in the Duqum special economic zone that would have a capacity of 230,000 bbl/d by 2018. DSCE also signed a memorandum of understanding (MOU) with China Sonangol to build a refinery in Dubai, but capacity and schedules have not been released.¹⁴

Table 2. UAE crude oil exports by region, 2014

Region	Share
Asia	96%
Africa	3%
Other	1%

Source: U.S. Energy Information Administration, *Lloyd's List Intelligence*

Natural Gas

The UAE plans to boost domestic natural gas production over the next several years to help meet growing internal demand. Much of the growth could come from the country's large sour (high-sulfur) gas deposits.

The UAE holds the seventh-largest proved reserves of natural gas in the world, at slightly more than 215 trillion cubic feet (Tcf). Despite its large endowment, the UAE became a net importer of natural gas in 2008. This phenomenon is a result of two things: (1) the UAE reinjected approximately 30% of gross natural gas production in 2012 into its oil fields as part of EOR techniques, and (2) the country's inefficient and rapidly-expanding electricity

grid—already taxed by the swift economic and demographic growth of recent decades—relies on electricity from natural gas-fired facilities.

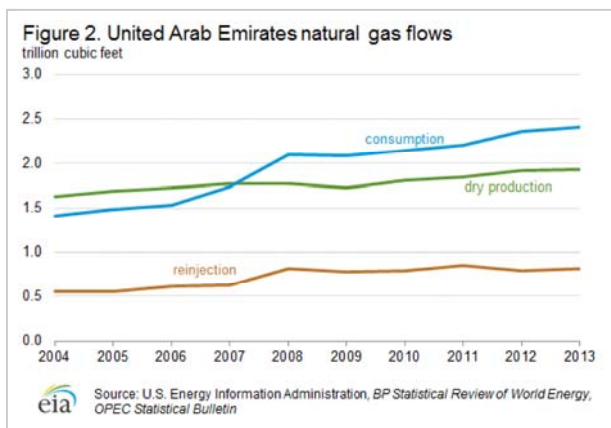
To help meet the growing demand for natural gas, the UAE boosted imports from neighboring Qatar via the Dolphin Gas Project’s pipeline over the past several years. The pipeline runs from Qatar to Oman via the UAE and is one of the principal points of entry for the UAE’s natural gas imports. In addition to the imports from Qatar, Dubai and Abu Dhabi both engage in LNG trading; the former as an importer and the latter as an exporter. The UAE is a member of the Gas Exporting Countries Forum (GECF).

The UAE’s natural gas has a relatively high sulfur content that makes it highly corrosive and difficult to process. For decades, the country simply flared the natural gas from its oil fields rather than undertake the extensive—and expensive—processes associated with separating the sulfur from the natural gas. The technical difficulties of producing the country’s sulfur-rich (sour) gas once posed a great impediment to the development of the UAE’s reserves, but advances in technology and the growing domestic demand for natural gas make the country’s vast reserves an enticing alternative to Qatari imports.

Table 3. Top 10 countries with proved natural gas reserves, Jan. 2015

Country	Trillion cubic feet
Russia	1,688
Iran	1,201
Qatar	872
United States	338
Saudi Arabia	294
Turkmenistan	265
United Arab Emirates	215
Venezuela	197
Nigeria	180
China	164

Source: U.S. Energy Information Administration, *Oil & Gas Journal*



Exploration and production

Already a top-20 global natural gas producer, the UAE has several ongoing projects that could boost the country’s natural gas production over the next several years.

Dry natural gas production in the UAE rose to 1.9 Tcf in 2013, continuing the upward trend that began in the late 1970s. The UAE’s dry natural gas production ranked the country in the

top 20 globally for 2013. Despite the challenges of producing natural gas domestically, the UAE hopes to further boost production to help meet the country's growing demand.

Several recent and ongoing projects—the Onshore Gas Development (OGD), Integrated Gas Development (IGD), and Offshore Associated Gas (OAG) projects—may increase production of the country's natural gas reserves, and could help meet the rapidly growing demand for natural gas in the country. ADNOC is pursuing a large-scale sour-gas development at the Shah field. One of the challenges of the project is that production of the ultra-sour gas yields relatively small quantities of marketable natural gas; in this case, just 504 cubic feet per 1,000 cubic feet produced, even after extensive treatment. The Shah gas field production project came online in January 2015 and is expected to produce 504 million cubic feet per day (MMcf/d) of dry natural gas (from 1 billion cubic feet (Bcf) of gross production) and 50,000 bbl/d of natural gas liquids when it reaches full capacity in late 2015.

Imports, exports, and consumption

The UAE was the first country in the Middle East to export liquefied natural gas (LNG), and has exported more than 250 billion cubic feet of LNG annually, almost exclusively to Asia.

The UAE became a net importer of natural gas in 2008. Consumption in the UAE grew by an average of 6% per year between 2004 and 2013 from 1.4 Tcf to 2.4 Tcf, which was only partially met by domestic production. Natural gas imports grew from 7 Bcf in 2003 to 685 Bcf in 2013, while exports remained relatively flat, rising by just 20 Bcf over the same period to 284 Bcf.

Imports

Most of the UAE natural gas imports come from Qatar, sent via the Dolphin Energy pipeline project. The Dolphin project was the first major interstate pipeline project of its kind in the Persian Gulf, sending Qatari gas from its vast North Field to the UAE and Oman. The pipeline runs from Qatar to Abu Dhabi's Taweelah power stations via a 226-mile subsea pipeline, and from there to the other Emirates and Oman. The pipeline imports help free up Abu Dhabi's natural gas for oil recovery and exports, levels that the Emirate must meet under contract. The pipeline supplies all seven Emirates and meets roughly 26% of the country's natural gas demand.¹⁵ The UAE also imports LNG at a terminal off the coast of Dubai. After canceling plans for a floating storage and regasification unit (FSRU), plans are moving forward to develop a new onshore terminal in two phases.

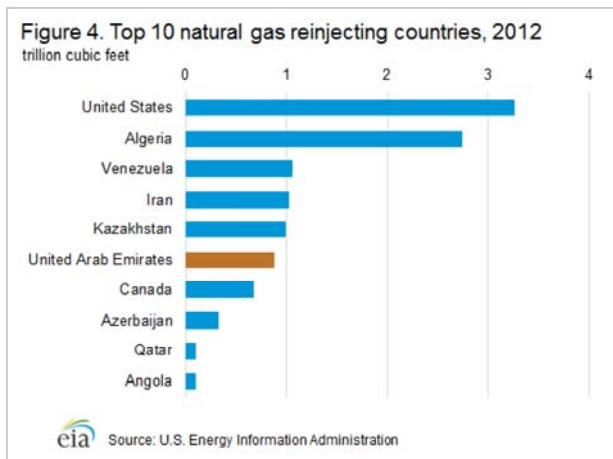
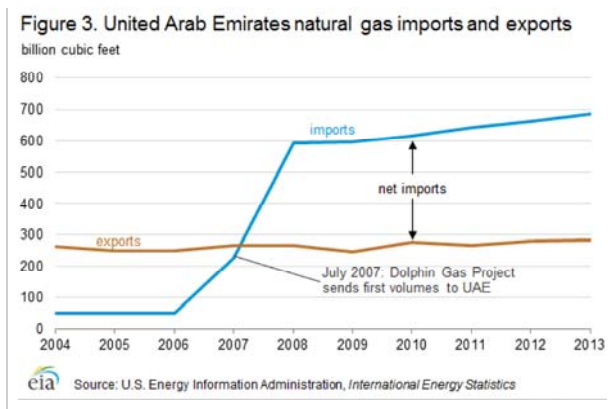
Exports

In 1977, the UAE became the first country in the Middle East to export LNG, sending its first load to the Tokyo Power Company (TEPCO) as part of a long-term supply agreement. The UAE signed a second contract in 1990 to double LNG exports to Japan, and in 1994, a third LNG train at Das Island began operations to help fulfill the terms of the agreement.

In 2013, the UAE exported 284 Bcf of natural gas, mostly in the form of LNG (more than 90%) and the remainder via pipelines. All of the UAE's exported LNG cargoes (260 Bcf) went to Japan.¹⁶ With planned expansion at the terminal at Das Island and the country's new focus on developing its vast natural gas reserves, the UAE could experience export growth in the short to medium term.

Consumption

Natural gas consumption in the UAE reached a record high of more than 2.4 Tcf in 2013.¹⁷ Solid economic growth and the resulting energy demand over the past few years are straining the country's natural gas supplies. The UAE uses a large amount of natural gas in its extensive EOR operations and to operate its many power plants and desalinization plants. Meeting domestic demand will require large import volumes for the foreseeable future. Advances in EOR techniques and carbon capture and storage (CCS) could free up additional volumes for domestic consumption.



Electricity

*The UAE is adding nuclear, renewable, and coal-fired electricity generating capacity, but currently relies primarily on natural gas.*¹⁸

Rapid economic and demographic growth over the past decade pushed the UAE's electricity grid to its limits. Installed fossil fuel generating capacity—which accounts for nearly all of the UAE's capacity—continues to rise, reaching more than 27 gigawatts (GW) in 2013, according to UAE National Bureau of Statistics.¹⁹ The UAE generates most of its electricity—110 billion kilowatt-hours in 2013—using natural gas-fired generation, and a plan to integrate the seven emirates' natural gas distribution networks should help alleviate some of the peak-demand shortfalls experienced in the past. Electricity demand in the UAE reached 105 billion kilowatt-hours in 2013, placing the UAE among the highest electricity consumers per capita in the world.²⁰ Emirates News Agency reported in January 2013 that electricity demand in UAE could grow by 50% by 2020.²¹

There are plans for seven new power plants slated to come online by 2021 with a combined capacity of 9.5 GW, including a recent plan for a clean-coal facility with 1.2 gigawatts (GW) capacity in Dubai.²² The first phase of the clean coal project should begin operating in 2020. Dubai's Integrated Energy Strategy 2030 calls for 12% of generating capacity from clean coal, 12% from nuclear, 5% from solar facilities, and 71% from natural gas by 2030.²³

Despite holding some of the largest resources of oil and natural gas in the world, the UAE plans to diversify its energy mix beyond fossil fuel-fired electricity generation. Current nuclear energy construction projects are expected to add at least 5.6 GW of capacity.²⁴ The first reactor is scheduled to come online in 2017, with the others completed by 2021. Upon

completion of the first reactor, the UAE will become the second country in the region (along with Iran) to have a domestic nuclear program.

To avoid concerns about their use of nuclear technologies, the UAE sought—and received—International Atomic Energy Agency (IAEA) approval for its nuclear project, and committed to forgoing the domestic enrichment and reprocessing of nuclear fuel by signing an agreement that banned the practice within the country. Since 2012, the UAE reached agreements with at least three countries ([Argentina](#), Japan, and [Russia](#)) on cooperation in the nuclear power sector. In addition, the UAE signed a nuclear cooperation agreement with the United States in 2009, and it is a signatory to the Treaty on the Nonproliferation of Nuclear Weapons.²⁵

The UAE is also investing in renewable energy technologies and has committed to produce at least 7% of total power generation from renewable sources by 2020.²⁶ New solar capacity is planned to come online in the next few years, but it will amount to only a small share of total power generation.

State-led entities manage the domestic electricity grid in each of the seven emirates, but the UAE is making progress toward integrating the emirates into a more efficient national grid. This integration coincides with the development of the Gulf Cooperation Council (GCC) Interconnection Grid that will link [Bahrain](#), [Kuwait](#), Oman, Qatar, Saudi Arabia, and the UAE under one regional grid.

Notes

- Data presented in the text are the most recent available as of May 18, 2015.
- Data are EIA estimates unless otherwise noted.

Endnotes

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²International Monetary Fund, *IMF Country Report No. 14/187*, July 2014, page 28.

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¹⁷BP Statistical Review of World Energy, June 2014, pg 27.

¹⁸BMI United Arab Emirates Infrastructure Report, Q4 2013, pg 24-26.

¹⁹UAE National Bureau of Statistics.

²⁰UAE National Bureau of Statistics.

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²⁵UN Office for Disarmament Affairs

²⁶Facts Global Energy, *Gas Insights*, January 30, 2014, Issue 207, pg 2.

Table and figure sources

Table 1. U.S. Energy Information Administration, Oil & Gas Journal, Worldwide Look at Reserves and Production, (January 1, 2015)

Table 2. U.S. Energy Information Administration, Lloyd's List Intelligence (APEX tanker data).

Table 3. U.S. Energy Information Administration, <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=3&pid=3&aid=6>

Figure 1. UAE total oil supply and petroleum consumption, U.S. Energy Information Administration.

Figure 2. U.S. Energy Information Administration, [BP Statistical Review of World Energy 2014](#), *OPEC Statistical Bulletin 2014*

Figure 3. U.S. Energy Information Administration, *International Energy Statistics*.

Figure 4. U.S. Energy Information Administration, *International Energy Statistics*.