



Independent Statistics & Analysis

U.S. Energy Information
Administration

Country Analysis Brief: Egypt

Last updated May 24, 2018

Overview

Egypt is the largest non-OPEC oil producer in Africa and the third-largest dry natural gas producer on the continent. The country also serves as a major transit route for oil shipped from the Persian Gulf to Europe and to the United States.

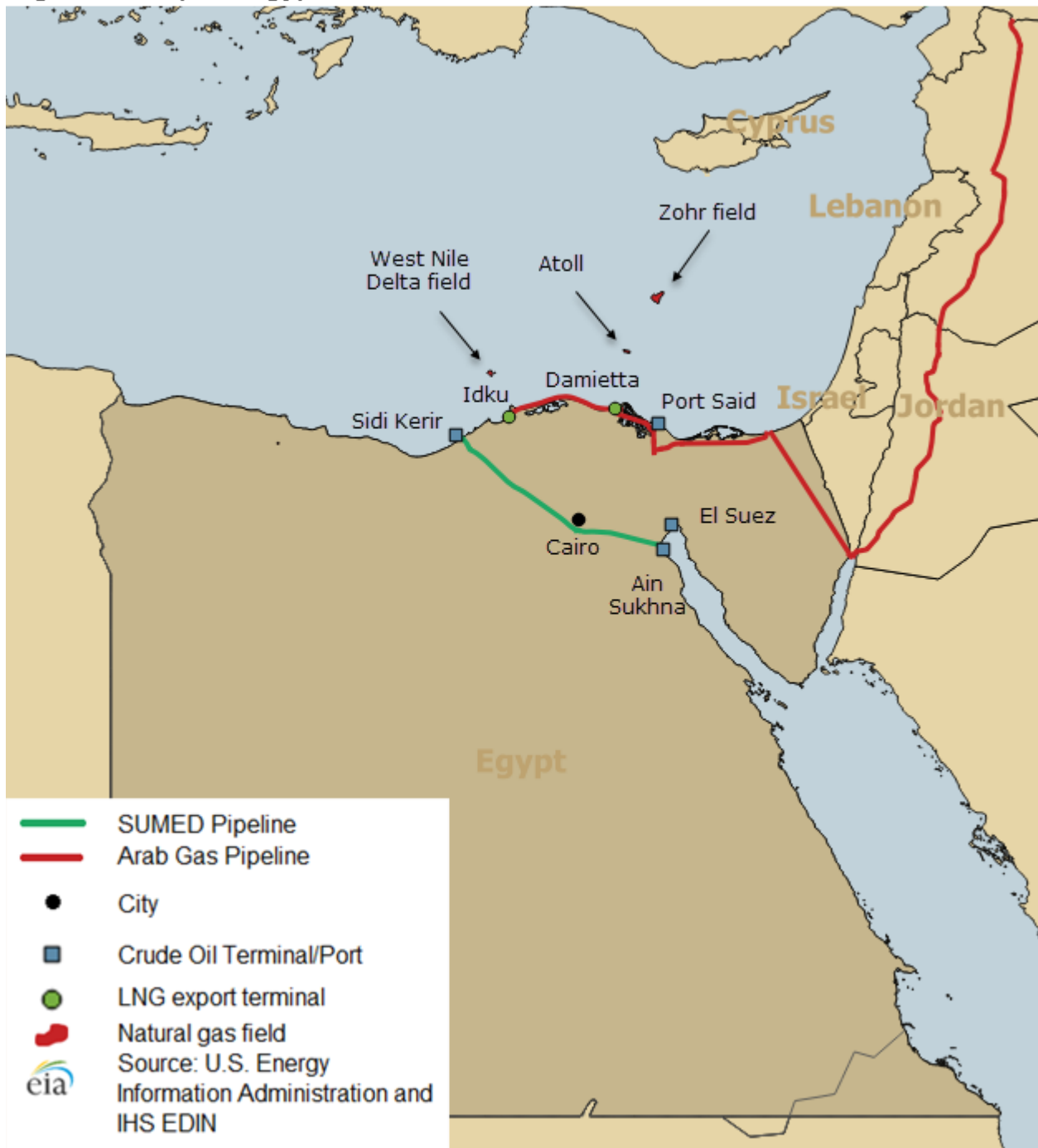
Egypt is the largest oil producer in Africa outside of the Organization of the Petroleum Exporting Countries (OPEC) and the third-largest natural gas producer on the continent following Algeria and Nigeria. Egypt plays a vital role in international energy markets through its operation of the Suez Canal and the Suez-Mediterranean (SUMED) Pipeline.

The Suez Canal is an important transit route for oil and liquefied natural gas (LNG) shipments traveling northbound from the Persian Gulf to Europe and to North America and for shipments traveling southbound from North Africa and from countries along the Mediterranean Sea to Asia. Fees collected from these two transit points are significant sources of revenue for the Egyptian government.

The 2011 revolution led to an economic downturn, and the country experienced a sharp decline in tourism revenue and foreign direct investment, according to the International Monetary Fund (IMF). However, economic conditions have improved over the past few years, and financial support from the United Arab Emirates (UAE), Saudi Arabia, and Kuwait has helped Egypt address its increasing domestic demand for energy.¹

As part of the conditions outlined by the IMF's economic reform package, the Egyptian government is implementing a reform program that will eliminate energy subsidies to reduce spending and strengthen its fiscal position. Energy subsidies are expected to decline to 2.4% of GDP in fiscal year (FY) 2017 – 18 (ending June 30, 2018), from a peak of 5.9% of GDP in FY 2013 – 14.² Energy subsidies have contributed to Egypt's large budget deficit and to financial challenges for its national oil company, the Egyptian General Petroleum Corporation (EGPC). Subsidies have also deterred foreign operators from investing in the sector. However, quicker-than-expected progress on implementing reforms and recent natural gas discoveries have led to renewed interest among foreign investors in Egypt's energy sector.

Figure 1. Map of Egypt



Sector Organization

Oversight and management of the petroleum sector falls under five state-owned enterprises (SOE), according to Egypt's Ministry of Petroleum:³

- Egyptian General Petroleum Corporation (EGPC)
- Egyptian Natural Gas Holding Company (EGAS)

- Egyptian Petrochemicals Holding Company (ECHEM)
- Egyptian Mineral Resources Authority (EMRA)
- Ganoub El-Wadi Holding Company (Ganope)

ECHEM is responsible for developing the petrochemical sector, and EMRA is responsible for mineral resources assessment and geological mapping of the country. EGPC and Ganope both manage upstream oil activities and issue upstream licenses. Ganope specifically focuses on activity in the southern region, and EGPC on the rest of the country.⁴ EGAS oversees the development, production, and marketing of natural gas and is also responsible for organizing international exploration bid rounds and awarding natural gas exploration licenses. EGAS and EGPC participate with international companies to develop and operate oil and natural gas fields.⁵

International oil companies (IOCs) play a large role in Egypt's upstream oil sector, holding shares in producing assets in partnership with EGPC. BP, Eni, Royal Dutch Shell (through the acquisition of BG), and Apache are the major oil and natural gas companies active in Egypt. The first three companies have primarily invested offshore, and Apache has invested in the onshore Western Desert, where Shell and Eni are also operating.⁶ The downstream sector is state-controlled and does not have any private investment, with the exception of marketing and storage activities, leaving EGPC and its subsidiaries as the sole players.⁷

Petroleum and Other Liquids

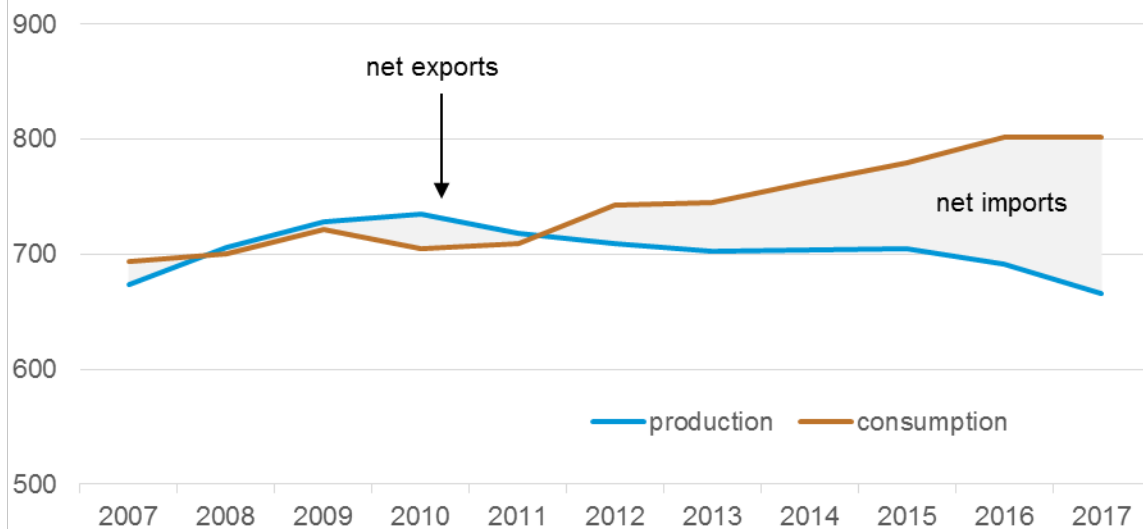
Egypt's oil consumption currently outpaces oil production, and one of the country's major challenges is to satisfy increasing oil demand amid falling production.

Estimates of Egypt's crude oil reserves vary across sources. The *Oil & Gas Journal* (OGJ) estimates that proven reserves in Egypt have held at a constant 4.4 billion barrels since 2011, an increase from 3.7 billion barrels in 2010.⁸ However, according to the *Economist Intelligence Unit* (EIU) and 2017 *BP Statistical Review of World Energy*, Egypt's proven reserves have declined from a peak of approximately 4.5 billion barrels in 2010 to about 3.5 billion barrels in 2016. According to the EIU, the decline in reserves is a result of maturing oil fields and a lack of new discoveries to fully offset the decline.⁹ Crude oil production has been steadily declining over the past decade as a result of the overall decline in output from its legacy onshore fields. Egypt has maintained a sustained level of exploration activity, but many of the significant finds have been natural gas rather than oil.

In 2017, Egypt's petroleum and other liquids production averaged 666,000 barrels per day (b/d) (Figure 1). Most of the crude oil production in Egypt comes from the Western Desert and Gulf of Suez, and the remainder is produced in the Eastern Desert, Sinai, Mediterranean Sea, Nile Delta, and Upper Egypt. However, condensate and natural gas liquids production have increased over the past decade as a result of increasing natural gas production, partially offsetting declines in crude oil production.¹⁰

One of Egypt's main challenges is to satisfy increasing domestic oil demand amid falling production. Egypt's oil consumption currently outpaces its oil production. Total crude oil consumption increased by approximately 16% since 2007, averaging 802,000 b/d in 2017, and it is expected to continue growing, even when accounting for the phasing out of subsidies.

Figure 2. Annual petroleum and other liquids production and consumption in Egypt
thousand barrels per day



Source: U.S. Energy Information Administration

Refining and Refined Oil Products

Egypt has the largest oil refining capacity in Africa, although it operates well below capacity. Egypt's aging refineries lack the capacity to produce higher-end petroleum products, relying on imports to make up for the shortfall.

Egypt has the largest refining sector in Africa, but most of the refineries are operating at levels lower than capacity because of aging and maintenance issues. Its refineries mostly process domestically produced crude oil, and refined products are mostly sold to local markets.

The Egyptian government has sought to expand its refining capacity, but a number of upgrades and greenfield refineries have been delayed. A 60,000 b/d planned expansion of the MIDOR refinery was expected to be finished by 2018, but completion has been delayed until the early 2020s. Similarly, the expansion of the Mostorod refinery (Mostorod II project), developed by the [Egyptian Refining Corporation \(ERC\)](#) -- a public-private partnership financed by Qalaa Holdings (formerly Citadel Capitol) and EGPC -- had an initial completion date of 2017, but construction has stalled because of financing issues. Construction of this expansion is likely to continue, but it is unclear if it will be finished by 2020.¹¹

Estimates of Egypt's oil refining capacity vary. The 2017 *OPEC Annual Statistical Bulletin* and OGI estimate Egypt's refining capacity at 726,300 b/d and 727,000 b/d, respectively, while the 2017 *BP Statistical Review of World Energy* has a higher estimate at approximately 810,000 b/d.¹² Nevertheless, all these estimates qualify Egypt as the largest holder of oil refining capacity in Africa. A bottom-up approach of estimating total refining capacity by calculating the topping capacity of each of Egypt's refineries results in a capacity of 721,500 b/d, as illustrated in the table below.

Table 1. Egypt's oil refineries, 2018

Refinery Operator	Location	Ownership	Nameplate Capacity (b/d)
Cairo Petroleum Refining Co.	Mostorod (Cairo)	EGPC (100%)	142,000
Alexandria Petroleum Co.	Alexandria (El-Mex)	EGPC (100%)	100,000
Nasr Petroleum Co.	El Nasr	EGPC (100%)	143,000
Middle East Oil Refinery (MIDOR)	Alexandria	EGPC (78%), Suez Canal Bank (2%), ENPPI (10%), Petrojet (10%)	100,000
Amreya Petroleum Refining Co.	Amreya (Alexandria)	EGPC (100%)	75,000
Suez Petroleum Processing Co.	Suez	EGPC (100%)	68,000
Assiut Petroleum Refining Co.	Assiut	EGPC (100%)	50,000
Cairo Petroleum Refining Co.	Tanta	EGPC (100%)	35,000
Nasr Petroleum Co.	Wadi Ferain	EGPC (100%)	8,500
Total			721,500
Planned expansions			Additional Capacity (b/d)
Assiut expansion			12,700
MIDOR refinery expansion			60,000
Mostorod refinery expansion			84,000
Total			156,700

Source: Arab Oil & Gas Directory, Egyptian General Petroleum Company, Business Monitor International Ltd., IHS Markit, Middle East Economic Survey

According to data from 2017 *OPEC Annual Statistical Bulletin*, Egypt's refined petroleum output averaged 501,800 b/d in 2016, suggesting that, based on OPEC's figures, refinery utilization was about 69%.¹³ IHS Markit and BMI Research attribute low utilization rates to aging refineries. Most of Egypt's existing refineries are not complex, which prevents them from efficiently producing the more sought after, higher-end products such as diesel, LPG, and gasoline, and requiring imports to make up for the shortfall in domestic supply.¹⁴

Natural Gas

Egypt became a net importer of natural gas in 2015 as a result of growing domestic demand and declining production levels. Substantial natural gas discoveries have generated significant interest among business investors and may potentially boost production and allow Egypt to become a net exporter again in the medium term.

Similar to crude oil reserves, estimates of natural gas reserves also vary across publications. OGJ estimates that natural gas reserves in Egypt were a constant 77.2 trillion cubic feet (Tcf) since 2011, an increase from 58.5 Tcf in 2010.¹⁵ According to the 2017 *BP Statistical Review of World Energy*, Egypt held approximately 65.2 trillion cubic feet (Tcf) of proved natural gas reserves at the end of 2016, which is an increase from the 2010 estimate of almost 59 Tcf and the fourth-largest amount in Africa, after Nigeria, Algeria, and Mozambique.¹⁶ Total natural gas reserves are expected to significantly increase within the next few years because of the recent natural gas discoveries. Despite new discoveries, Egypt's dry

natural gas production declined by 31% from 2012 to 2016, leading to net imports since 2015. Egypt produced approximately 4.0 billion cubic feet per day (Bcf/d) of dry natural gas and imported 1.0 Bcf/d in 2016 (Figure 2). To satisfy growing domestic demand, Egypt has had to divert its natural gas supply away from exports to the domestic market and to rely on liquefied natural gas (LNG) imports to address the shortfall in consumption. Egypt acquired two floating storage and re-gasification units (FSRUs) in 2015; plans for a third FSRU were canceled in 2016 because of higher anticipated domestic production.¹⁷ Much of the natural gas consumed in Egypt is used to fuel electric power plants (Figure 3), and the Egyptian government encourages households, businesses, and the industrial sector to consider natural gas as a substitute for petroleum products and coal.

The Egyptian government has fast-tracked the development of the Zohr and Atoll fields and the West Nile Delta (WND) project. These fields are expected to make substantial additions to overall supply. Discovered in August 2015 and labeled as the largest offshore natural gas field in the Mediterranean, the Zohr gas field has an estimated reserve of 30 Tcf and is currently producing 0.4 Bcf/d. Natural gas production began in 2017 and is expected to produce 1 Bcf/d after the first phase of the project is completed in 2018; peak plateau production is estimated at 2.7 Bcf/d and is expected to be reached by the end of 2019.¹⁸ Eni holds the largest stake at 50%, with Rosneft, BP, and Mubadala Petroleum owning 30%, 10%, and 10% stakes, respectively.¹⁹ Natural gas production at the Atoll field also began in February 2018 and is currently producing 0.35 Bcf/d of natural gas and 10,000 b/d of condensate. Production began seven months ahead of schedule and the field has an estimated 1.5 Tcf of natural gas and 31 million barrels of condensates, with other areas still under evaluation.²⁰ Developed as two separate projects to speed up development, the WND project started producing natural gas in March 2017 and is currently producing more than 0.7 Bcf/d and 1,000 b/d of condensate; the two projects are expected to be fully online in 2019 and to produce close to 1.5 Bcf/d, all of which is expected to feed into Egypt's national electricity grid. BP is the main operator and holds an 82.75% stake. DEA Deutsche Erdoel AG holds the remaining 17.25% stake.²¹ Although the government hopes the new discoveries coming online will allow the country to resume natural gas exports, imports will most likely still be needed to satisfy domestic demand, albeit at smaller volumes.

Figure 3. Dry natural gas production and consumption in Egypt

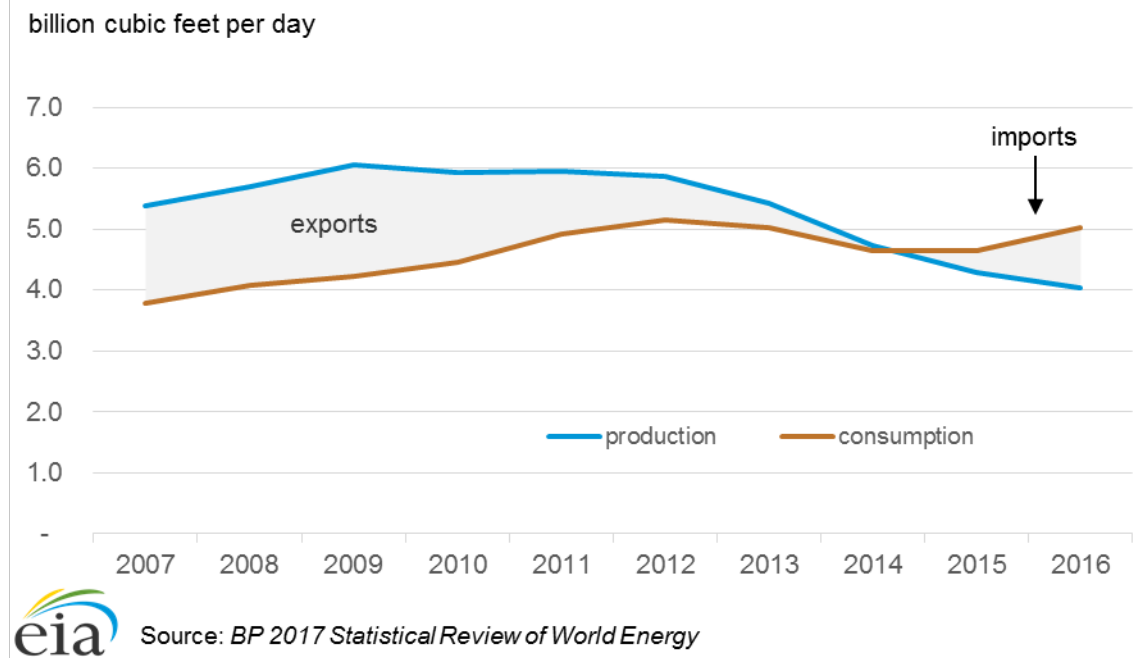
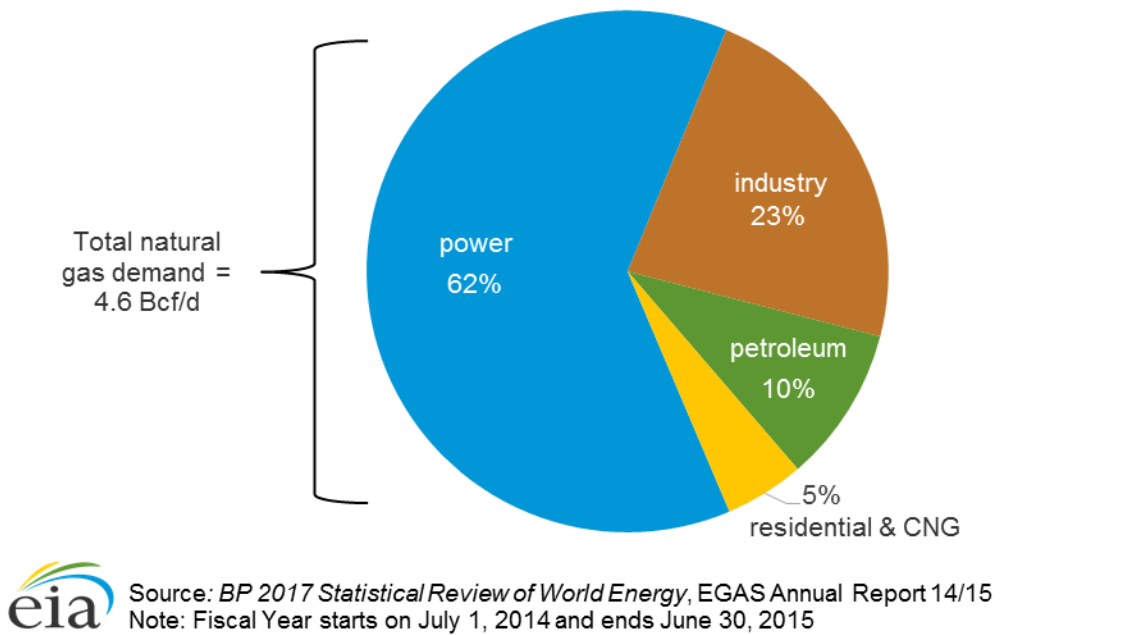


Figure 4. Natural gas demand by sector, fiscal year 2015



Trade

Egypt plays a central role in the transit of crude oil between the Gulf states and the Mediterranean region. Natural gas is exported at much smaller volumes because domestic energy needs have taken priority over trade. Recent major natural gas discoveries could potentially lead to increasing exports in the medium term.

Petroleum and Other Liquids Trade

The [Suez Canal and the Suez-Mediterranean \(SUMED\) Pipeline](#) are two major routes for crude oil and natural gas shipments, allowing Egypt to play a significant role in global crude oil and natural gas trade. [The Suez Canal and SUMED Pipeline are crude oil and LNG transit chokepoints](#) that have strategic significance not only for Egypt but also for global crude oil and LNG trade. Closure of both the Suez Canal and the SUMED Pipeline would require tankers to divert around the southern tip of Africa, adding approximately 8–10 or 15 days of transit to the United States or Europe, respectively, and also leading to increased shipping costs.²²

The Suez Canal is approximately 120 miles long and connects the Red Sea and the Gulf of Suez with the Mediterranean Sea. Northbound oil flows through the Suez Canal are larger than southbound oil flows. Northbound oil flows come primarily from the Persian Gulf countries and are destined for Europe and, to a lesser extent, for the United States. Russia, Turkey, the Netherlands, Algeria, and Libya are the significant oil exporting countries that contribute to southbound oil flows, and these exports are primarily destined for Asian markets.

The 200-mile long SUMED Pipeline transports crude oil through Egypt from the Red Sea to the Mediterranean Sea. Crude oil flows through two parallel pipelines that have a total capacity of 2.34 million b/d. Oil flows north from the Ain Sokhna terminal along the Red Sea coast to the Sidi Kerir terminal on the Mediterranean Sea. The SUMED Pipeline is also used for lightering vessels. Vessels exceed the Suez Canal's draft limitations can offload their crude oil at the SUMED Pipeline, go through the Suez Canal, and re-load the crude oil at the other end in the Mediterranean.²³

Natural Gas Exports

The Arab Gas Pipeline

Egypt began exporting natural gas via the Arab Gas Pipeline (AGP), a natural gas pipeline that originates in Egypt and connects to Israel, Jordan, Syria, and Lebanon. The AGP was sabotaged more than a dozen times between 2011 and 2012 and resulted in substantial natural gas supply disruptions to Jordan and Israel. In 2012, Egypt halted natural gas exports to Israel by canceling its long-term supply contract to Israel because of a payment dispute.²⁴ AGP pipeline exports, which peaked at 0.5 Bcf/d in 2009, stopped after 2014 (Table 1).²⁵

Liquefied Natural Gas (LNG)

The Suez Canal transit route also has LNG flows in both directions, accounting for a substantial amount of global LNG trade. Southbound LNG transit primarily originates in Nigeria, France (as re-exports), and Trinidad and Tobago, and most LNG is exported to Egypt, Jordan, and Japan. Nearly all northbound transit originates from Qatar and is exported to European markets.²⁶

Egypt has two LNG export facilities with a combined capacity of 586 Bcf per year. The Spanish-Egyptian Gas Company (SEGAS) LNG facility in Damietta is a single LNG train with a capacity of 240 Bcf per year and is owned by Union Fenosa Gas (80%) and by EGPC and EGAS (10% each). The SEGAS LNG facility began production in December 2004, but had operated below its nameplate capacity until the plant closed in December 2012 as a result of growing domestic energy demands.²⁷

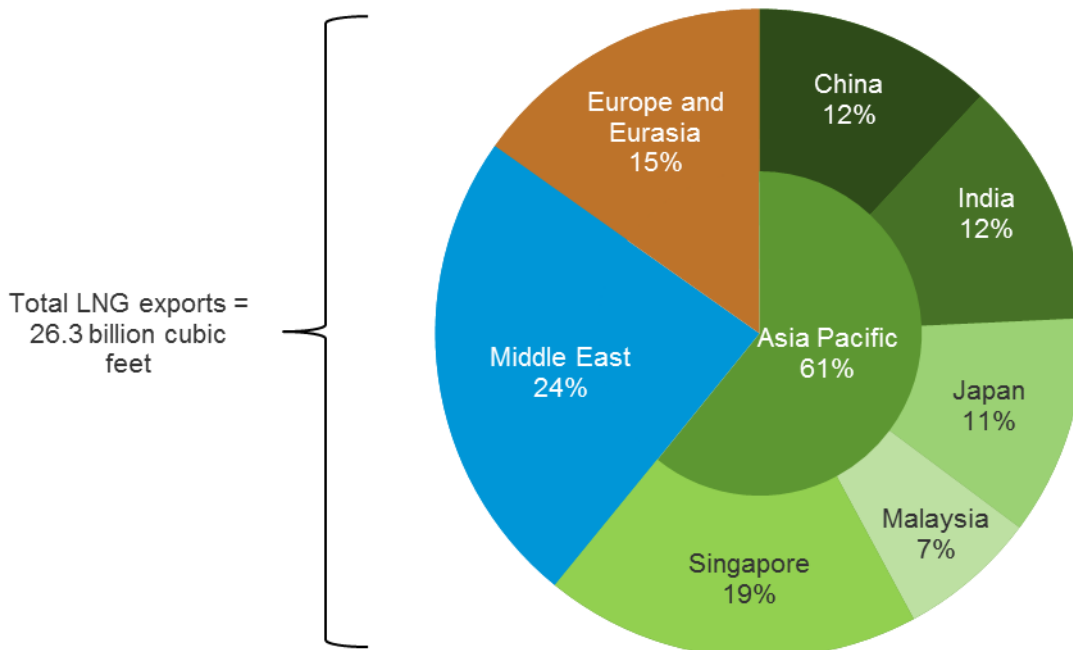
Egypt's other LNG facility, the Egyptian LNG project (ELNG), is located at Idku and is a joint venture that includes Shell, Petronas, EGAS, EGPC, and ENGIE. The facility has two LNG trains, each having a capacity of 172.8 Bcf per year. ELNG began production in May 2005, but the facility was idle from late 2014 to April 2016; it has since sporadic exports of LNG. In 2016, Egypt exported approximately 26 Bcf of LNG (Table 1). Most of the exports went to the Asia-Pacific (61%) and the Middle East (24%), according to the 2017 *BP Statistical Review of World Energy* (Figure 4).

Table 2. Egypt's natural gas exports

Billion cubic feet	2012	2013	2014	2015	2016
Pipeline Exports	32	42	11	0	0
LNG Exports	235	133	15	0	26
Total Exports	267	175	25	0	26

Source: *BP 2017 Statistical Review of World Energy*, Cedigaz

Figure 5. Egypt 2016 LNG exports by country/region



Source: *BP 2017 Statistical Review of World Energy*

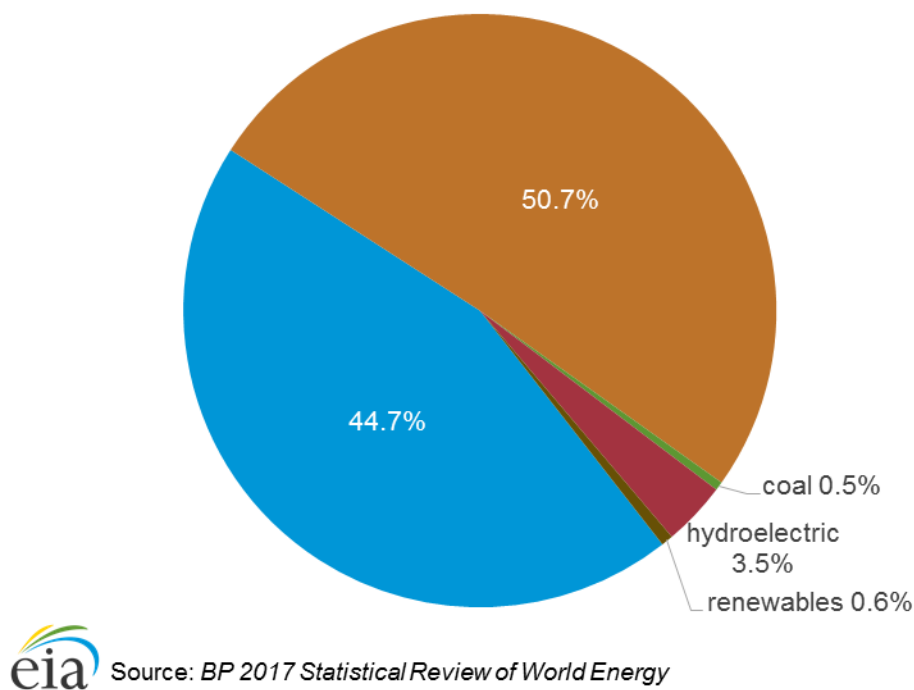
Energy Consumption

Egypt is the largest oil and natural gas consumer in Africa, accounting for about 22% of petroleum and other liquids consumption and 37% of dry natural gas consumption in Africa in 2016. The reduction of energy subsidies may dampen consumption growth in the near term, but energy consumption is expected to continue growing in the long term.

Egypt is the largest oil and natural gas consumer in Africa, accounting for about 22% of petroleum and other liquids consumption and 37% of dry natural gas consumption in Africa in 2016.²⁸ The rapid growth of oil and natural gas consumption has been driven by increased industrial output, economic growth, energy-intensive natural gas and oil extraction projects, population growth, an increase in private and commercial vehicle sales, and energy subsidies. Egypt's total primary energy consumption was approximately 3.61 quadrillion British thermal units in 2016, according to the 2017 *BP Statistical Review of World Energy*.²⁹ Oil and natural gas are the primary fuels used to meet Egypt's energy needs, accounting for 95% of the country's total energy consumption in 2016 (Figure 5).

According to Business Monitor International (BMI) Research, the increase in fuel prices stemming from a reduction in energy subsidies decreased consumption growth to 3% in 2015, from an average of 4% in 2012 through 2014. Although a subsequent energy subsidy reduction coupled with the value-added tax (VAT) increase to 14% in 2017 resulted in significant increases in diesel and gasoline prices and may dampen consumption growth in the near term, energy consumption is expected to continue growing in the long term, given growth in the transportation sector, a growing population, and an improving economy.³⁰

Figure 6. Primary energy consumption by fuel, 2016



Electricity

Egypt experiences frequent electricity blackouts because of natural gas supply shortages and inadequate generation and transmission capacity. The Egyptian government has focused on investing in the power sector and on diversifying its energy mix to accommodate growing energy demand.

According to IHS Markit, the power market in Egypt is primarily operated by SOEs. The Egyptian Electricity Holding Company and the Egyptian Electricity Transmission Company manage the generation and transmission segments, respectively, and nine other SOEs manage the distribution segment. The Egyptian Electricity Utility and Consumer Protection Regulatory Agency is the power market regulator, and the Ministry of Electricity and Energy (MOEE) provides oversight on the six power authorities operating in the electricity sector and sets electricity prices for all sectors in the country.³¹

In February 2015, the government approved a new law that allows the privatization of electricity production, transmission, and distribution. The 2015 Electricity Law represents a shift away from a state-directed management role to a regulatory one in the power sector, which could potentially bring in much-needed investment from the private sector by creating a more attractive business environment.³²

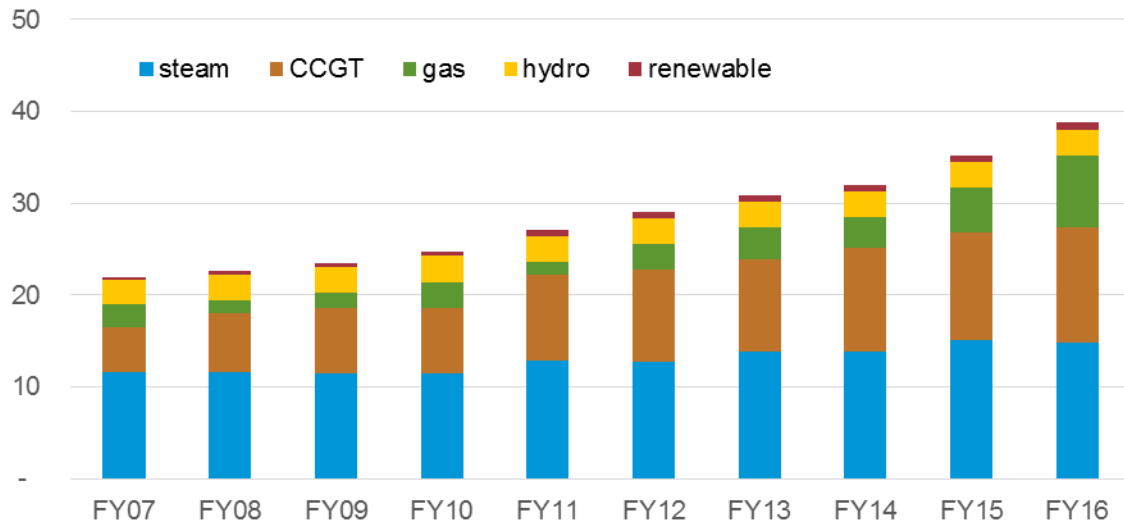
According to the MOEE, Egypt has a total installed capacity of 38.86 gigawatts (GW) and generated 186.32 gigawatthours (GWh) in FY 2015–16. Conventional thermal generation accounted for approximately 90% of generation capacity in Egypt, and natural gas-fired generation accounted for approximately 75% of total generation output. Given the development of natural gas projects in the country, natural gas-fired generation is expected to remain the dominant fuel source for generation (Figures 7 and 8).³³

Egypt has suffered from electricity shortages, particularly in the summer when consumption levels are highest, because of aging infrastructure and inadequate generation and transmission capacity. According to the International Trade Administration, the government has focused on increasing investment in the power sector and diversifying its energy mix to address these gaps. New projects under development include power plants fueled by coal, solar, and wind.³⁴

Egypt is also planning to expand its power system interconnection with countries in the Middle East and Africa. Egypt and Saudi Arabia signed a \$1.6 billion deal to connect the two countries with a 3 GW electricity cable. This connection will provide both Saudi Arabia and Egypt with additional power to mitigate peak demand shortfalls. The project completion date has been postponed and is reportedly in the process of finalizing bidding tenders for transformers, lines, and substations.³⁵ Egypt's electric transmission grid is already connected to transmission grids in Jordan, Syria, Iraq, Turkey, and Libya, according to BMI. Egypt is also part of the Nile Basin Initiative and has tentative plans to interlink its transmission grid with nearby African countries in the organization.³⁶

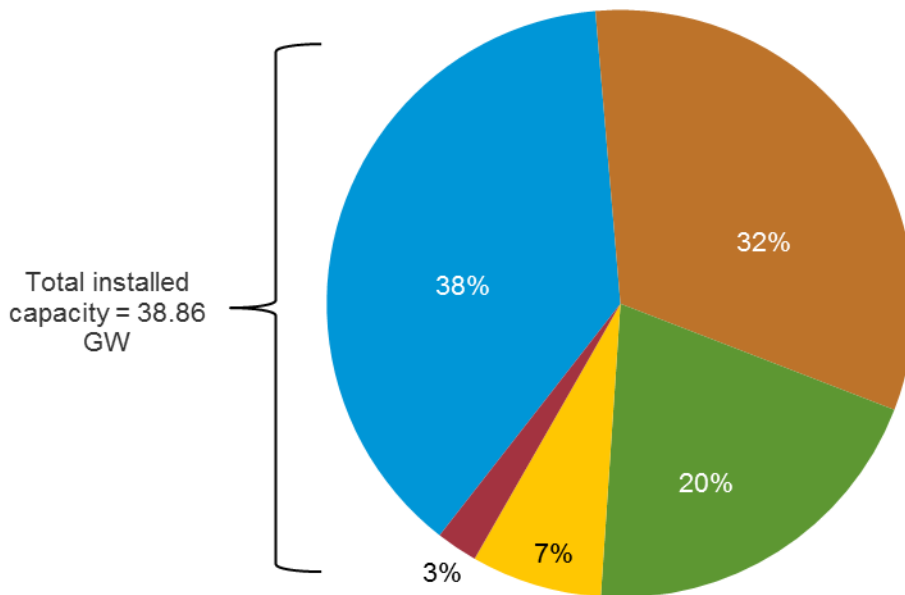
Figure 7. Installed capacity by fuel source, fiscal year

gigawatts



Source: *Egypt Electric Holding Company Annual Report 2015/16*

Figure 8. Installed capacity by fuel source, fiscal year 2015/16



Source: *Egyptian Electricity Holding Company Annual Report 2015/2016*
 Note: Fiscal year begins July 1, 2015 and ends June 30, 2016

Renewable Energy Sources

Hydroelectricity

Hydropower is Egypt's third-largest energy source after natural gas and oil. According to the most recent estimates by BMI Research, Egypt has an installed capacity of 2.8 GW and generated 13.8 terawatt-hours (TWh) of hydroelectricity in 2016, accounting for about 7.2% of Egypt's total power generation (Table 3).³⁷ Most of the country's hydroelectricity comes from the Aswan High Dam and the Aswan Reservoir Dams across the Nile River. However, most of the Nile River's hydropower potential has already been exploited.

Ethiopia's plans to build the 6 GW, \$4.8 billion Grand Ethiopian Renaissance Dam (GERD) on the Blue Nile River have prompted concerns about water shortage to Egypt's Aswan High Dam and the effects on industries dependent on the Nile River as a water source in Egypt.³⁸ In 2015, Ethiopia, Egypt, and Sudan signed the Declaration of Principles agreement to conduct studies on the potential impact GERD will have on the Nile River, however, interstate dialogue has not produced any concrete steps to manage the economic and environmental impact the dam will have once it becomes operational. GERD is reportedly expected to be completed by 2018 and will be the largest hydropower plant in Africa.³⁹

Table 3: Egypt's hydroelectric plants, fiscal year 2015/16

Refinery Operator	Commissioning Date	Installed Capacity (MW)
High Dam	1967	2,100
Aswan Dam 1	1960	280
Aswan Dam 2	1985 - 1986	270
Esna	1993	86
Naga Hamadi	2008	64
Total		2,800

Source: *Egyptian Electricity Holding Company Annual Report 2015/16*

Solar

Egypt has strong potential for developing renewable energy resources, and the government has an ambitious target of developing 4.3 GW of wind and solar power generation capacity by 2018. According to IHS Markit, Egypt currently has only 30 MW of solar power generation capacity, but international companies and institutions have shown strong interest in developing Egypt's renewables sector.⁴⁰ Norway's Scatec Solar has reached financial closure on a deal to build six solar photovoltaic (PV) plants with a combined capacity of 400 MW as part of a 1.8 GW solar park which the government is looking to develop at Benban.⁴¹ Saudi firm Acwa Power has also reached financial closure on a deal for three solar PV plants with a total capacity of 120 MW at the same location. These plants are expected to begin operating in 2018.⁴²

Wind

Egypt has abundant wind power resources, especially in the Gulf of Suez and the Nile Valley. According to IHS Markit, Egypt has a total wind power generation capacity of 753 MW generated by the Zafarana (547 MW), Gebel El-Zeit (200 MW), and the Hurghada (5 MW) wind farms. The government plans to

increase wind power generation capacity to 7.2 GW by 2020 and currently has a number of wind power projects totaling 2 GW of generation capacity under development or construction.⁴³

Nuclear Power

Egypt maintains a nuclear research program and operates two research nuclear reactors, but Egypt has no commercial nuclear power. Although Egypt is planning to add nuclear power to its energy mix and has signed a preliminary agreement with Russian state nuclear corporation Rosatom to construct a commercial plant in El Dabaa. Construction has been repeatedly delayed, and it is unlikely that the plant will be operational in the near or medium term.⁴⁴

Notes

- Data are EIA estimates unless otherwise noted.

Endnotes

¹ “Arab Countries in Transition: An Update on Economic Outlook and Key Challenges,” International Monetary Fund, April 9, 2014, page 10, accessed 2/27/2018, <https://www.imf.org/external/np/pp/eng/2014/040914.pdf>. “Egypt: Promoting Poverty Reduction and Shared Prosperity,” World Bank Group, Systematic Country Diagnostic, September 2015, pg. 6, accessed 2/27/2018, <http://documents.worldbank.org/curated/en/853671468190130279/pdf/99722-CAS-P151429-SecM2015-0287-IFC-SecM2015-0142-MIGA-SecM2015-0093-Box393212B-OUO-9.pdf>.

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¹³ [2017 Annual Statistical Bulletin](#). Organization of the Petroleum Exporting Countries, 52nd ed., (Table 4.6), pg. 45.

¹⁴ “Egypt: Downstream Profile,” IHS Markit, October 2017. “Egypt Oil & Gas Report, Q4 2017,” Business Monitor International Research, September 2017, pg. 28.

¹⁵ Worldwide look at reserves and production [Table], *Oil & Gas Journal*, January 1, 2018; January 1, 2010.

¹⁶ Worldwide look at reserves and production [Table], *Oil & Gas Journal*, January 1, 2018.

¹⁷ “Egypt LNG Market Report,” IHS Markit, November 7, 2017.

¹⁸ “Zohr Gas Field,” www.offshore-technology.com, accessed 3/30/2018, <https://www.offshore-technology.com/projects/zohr-gas-field/>. “Egyptian gas sector poised for growth,” www.newsbase.com, Afroil Issue 721, Week 1, January 9, 2018, pg. 6. “Zohr: from promise to reality,” www.eni.com, accessed 3/30/2018, https://www.eni.com/en_IT/company/fuel-cafe/zohr-infographic-egypt.page.

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