Energy in Egypt:
Background and Issues

American Security Project

Background Report

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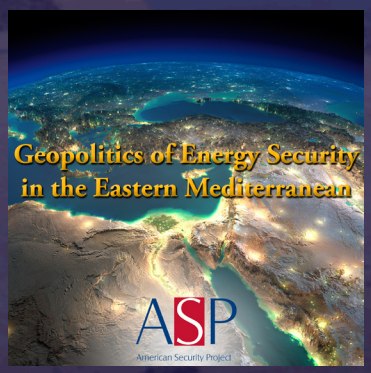
Sungtae Park

March 2015



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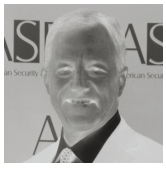

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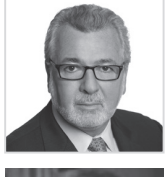

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Energy Security

In this Report:

While Egypt produces its own oil and gas, the country is a net importer of both products and faces many other social and economic challenges, including potential electricity and water shortages. To address such problems, the Egyptian government under President Abdel Fattah el-Sisi is making serious efforts to bring more investment into its oil and gas sector while seeking to diversify Egypt's sources of energy. Given the country's political, economic, and social challenges, whether the Egyptian government will be able to achieve its objectives remains to be seen.

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IN BRIEF

- Egypt is a producer of oil and gas. The country had once exported both products but is now a net importer of hydrocarbon resources, as rising demand and falling or stagnating production have altered the balance.
- The government's inability to provide adequate electricity to Egyptians has become a serious source of political and social instability. Observers expect that blackouts this summer could create problems for the el-Sisi government.
- The falling price of oil has been helping the Egyptian government in its efforts to reduce its budget deficit and energy subsidies but will likely not affect the energy shortages that ordinary Egyptians might face in the upcoming summer. Moreover, low prices mean Persian Gulf states might have less ability to support Egypt financially.
- The el-Sisi government is making serious efforts to bring more investment into its oil and gas sector while seeking to diversify Egypt's sources of energy. Egypt is using more coal, developing solar and wind energy, is exploring shale gas, and has plans to pursue nuclear power. Given the country's political, economic, and social challenges, whether the Egyptian government will be able to achieve its objectives remains to be seen.
- Egypt is vulnerable to environmental stress. While Egypt is a large country, most of its population lives along the Nile River, meaning that any change in the sea level or the flow of the river could cause displacement of millions of Egyptians, less fresh water supply, and harmful effects on the overall economy. Such a development could result in significant political and social instability.

About the Author

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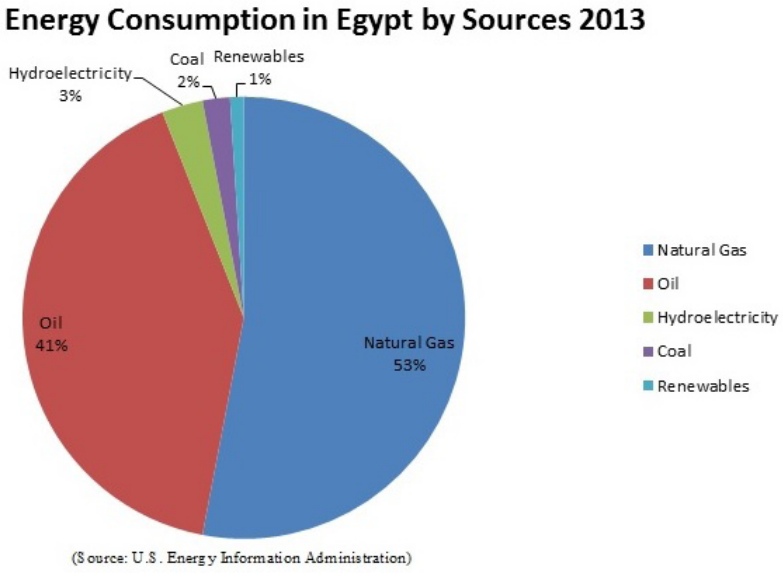
Energy in Egypt: Background and Issues



Oil

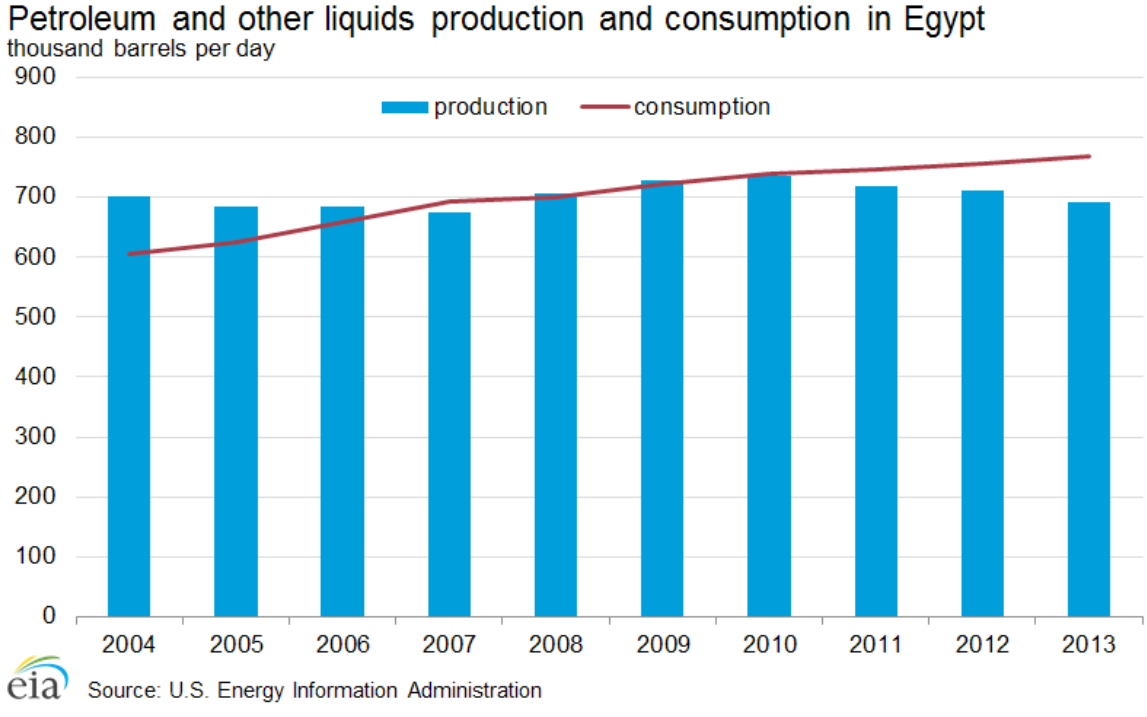
Total Production (January 2015): 680,000 bbl/day[1]
Global Share – Production (January 2015): 0.72%[2]
Proven Reserves (End of 2013): 3,900,000,000 bbl[3]
Global Share – Proven Reserves (End of 2013): 0.2%[4]
% of Total Domestic Consumption (2013): 41%[5]
Imports (Late 2013): 80,000 bbl/day[6]
Exports (2013): 189,000 bbl/day[7]
Export Destinations (2013): EU (56%), India (28%), China (13%), Others (3%)[8]

Egypt is the largest non-OPEC (Organization of the Petroleum Exporting Countries) oil producer in Africa and is the largest consumer of oil on the continent. The country's use of oil accounts for 20 percent of Africa's total consumption.[9] Moreover, Egypt has Africa's largest oil refinery capacity.[10] The country's Suez Canal is also a critical maritime chokepoint for oil originating from the Persian Gulf destined for Europe and North America.

While a major producer, Egypt is an importer of oil because the country's consumption of oil has been increasing by approximately 3 percent per year over the past decade due to economic and population growth. While production has been unable to meet the demand, consumption has outpaced production in 2010.[11] Egypt's production of oil peaked during the 1990s at over 900,000 bbl/day.[12] The country's refinery output has been dropping significantly since 2009, although it is expected to increase this year.[13] Dealing with the growing demand and falling production is Egypt's main challenge in the oil sector.

The recent drop in the global price of oil has been beneficial for Egypt. The falling price has helped Cairo reduce its budget deficit, as energy subsidy programs shrink. Petroleum products were subsidized by 100 billion Egyptian pounds ($14 billion) in the 2014-2015 fiscal year.[14] The falling price helps Cairo's on-going attempt to reduce fuel subsidies, which will fall by approximately 30 percent - 30 billion Egyptian pounds ($4.2 billion).[15] Furthermore, average Egyptians will benefit from lower inflation, adding to Egypt's social and political stability.[16]

Cutting subsidies, however, might not prevent fuel shortages during the upcoming summer season which could potentially see severe political and social unrest.[17] The falling price of oil also means that the major Persian Gulf states will have less ability to financially prop up the Egyptian state. Indeed, Kuwait and UAE in February announced that their aid to Egypt will soon be cut, although investment remains possible.[18] The amount of remittance from Egyptians working in the Gulf states and the number of tourists from the Persian Gulf region are also expected to decrease.[19]



Natural Gas

Total Production: 2 trillion cubic feet per year (2013)[20]
Global Share - Production: 1.7% (2013)[21]
Proven Reserves: 65.3 trillion cubic feet (2013)[22]
Global Share – Proven Reserves: 1% (2013)[23]
% of Total Domestic Consumption: 53% (2013)[24]
Imports: The first shipments of liquefied natural gas imports will arrive in March 2015.[25]
Exports: 0.1 trillion cubic feet per year (2013)[26]
Export Destinations (2013): Asia (82%), Europe (7%), South America (6%), Middle East (5%)[27]

Egypt is the second largest producer of natural gas in Africa after Algeria, yet Egypt's production has decreased by approximately 3 percent every year between 2009 and 2013.[28] The country does have multiple areas of undeveloped reserves, but Cairo had not been able to afford their development, as the Egyptian government had not offered high enough prices to foreign firms capable of developing the reserves.[29] As with oil, Egyptian consumption of natural gas has been increasing by approximately 7 percent per year over the past decade.[30] The increasing level of consumption combined with the decreasing level of production meant that Egypt was only able to export 5 percent of its total natural gas production in 2013.[31]

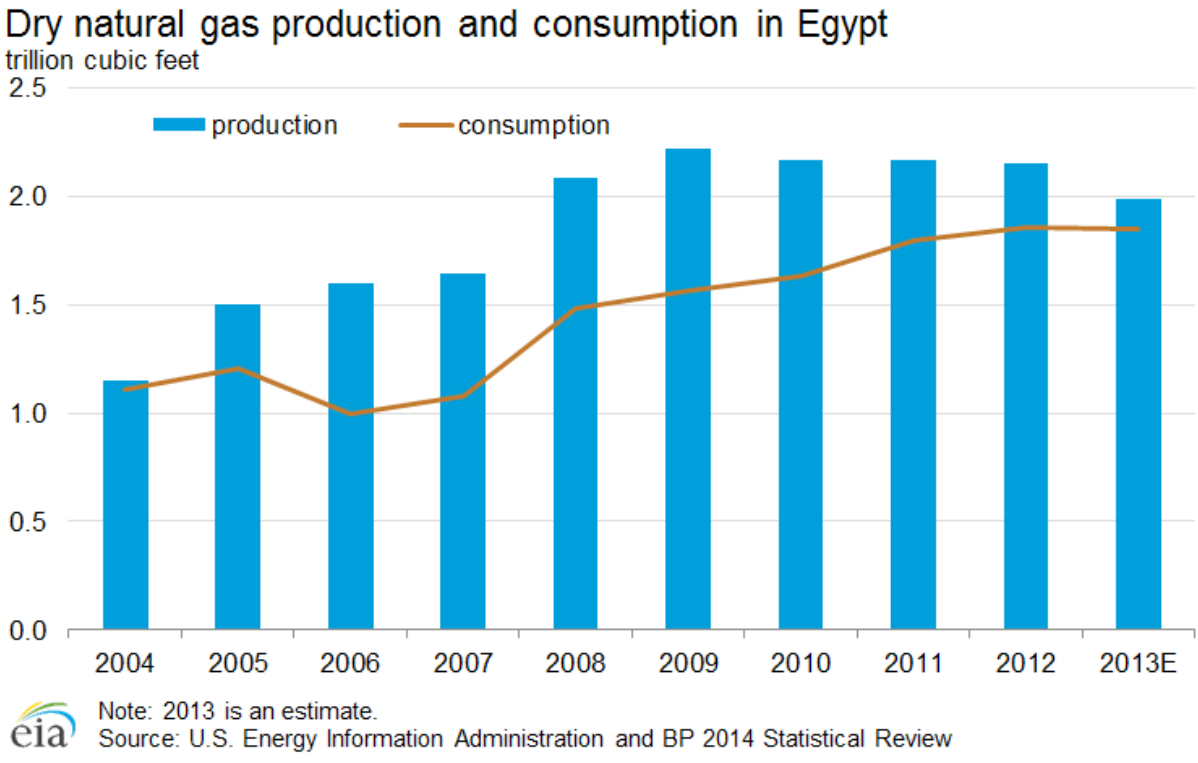
In 2015, Egypt will begin to import liquefied natural gas (LNG).[32] Cairo signed an agreement with Algeria in December 2014 to import six shipments of LNG between April and September 2015. Egypt signed a contract with Noble Energy in February 2015 to import natural gas from an Israeli offshore gas field in the future. Cairo also signed an agreement with Gazprom to import LNG from Russia.[33]

Then-Egyptian Minister of Defense Abdel Fattah el-Sisi walking with U.S. Secretary of State John Kerry
Source: US Department of State

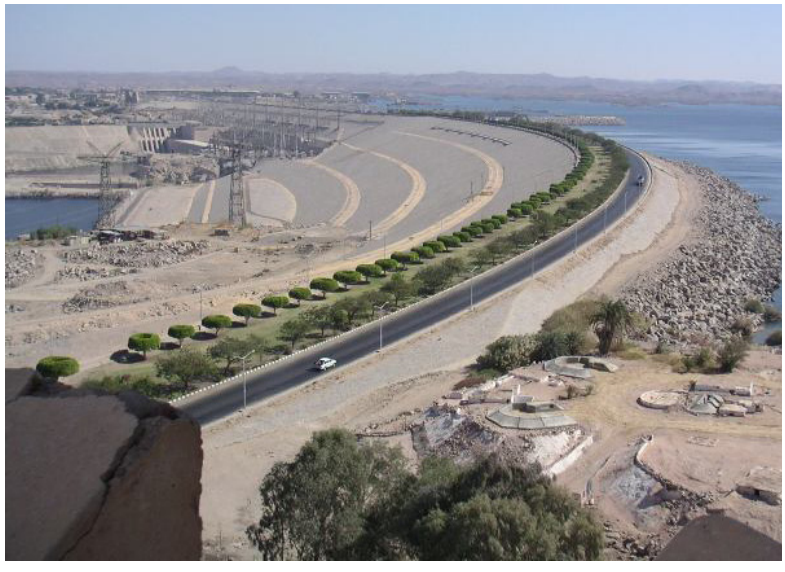
At the same time, Cairo is attempting to reform its energy sector to lure in more foreign investment with higher energy prices in order to develop Egypt's undeveloped gas fields. By doing so, Cairo hopes to stop importing gas by 2020, although the goal is unlikely to be achieved.[34] In January 2015, the Egyptian government signed fifteen new deals to explore and develop the country's gas fields.[35] In March 2015, Cairo reached an agreement with BP to explore Egypt's offshore natural gas reserves.[36] While the Egyptian government seems determined to reform its energy sector and develop its undeveloped reserves, Cairo faces real hurdles. The poor business environment in the country means that businessmen are reluctant to invest. The el-Sisi government also faces short term political risks, as the summer approaches and the possibilities of energy shortage loom large.

Shale Gas

Egypt has 100 trillion cubic feet of technically recoverable shale gas in unproven reserves.[37] In December 2014, Cairo signed its first contract to explore and drill shale gas wells with Apache and Shell; the project will take place in the desert region of western Egypt.[38]



Hydroelectricity



Hydroelectricity makes up about **3 percent** of Egypt's energy consumption.[39] In 2012, the country produced approximately 13.2 billion kilowatt-hours of electricity from hydropower, mostly from the Aswan High Dam and the Aswan Reservoir Dams, using the water from the Nile River.[40] According to a report by the U.S. Energy Administration, much of the Nile River's hydropower potential in Egypt has already been exploited.[41] In January 2015, the Egyptian government announced that it plans to construct additional hydroelectric power stations with the aid of China, although the new stations are not likely to contribute much to Egypt's hydroelectric capacity.[42]

Egypt does not control the entire Nile River. Significant portions of the river are located in Ethiopia, South Sudan, and Sudan. Currently, Ethiopia is in the process of constructing a major power dam, the Grand Ethiopian Renaissance Dam. The project could temporarily affect the operation of Egypt's hydroelectric power plants, in addition to affecting the country's overall water supply for the duration of the dam's construction.[43] Given that hydropower comprises only 3 percent of Egypt's energy consumption, the negative effect on the overall power supply is unlikely to be devastating, but any resulting water shortages could be highly detrimental for Egypt's restive population. The dam, expected to be completed in September 2015, has been about half way finished as of late 2014 and is a major source of contention between Cairo and Addis Ababa, particularly as Egypt is currently in a state of great political, economic, and social uncertainty.[44]

Once the project is completed, however, it could produce approximately 6,000 megawatts of energy and bring benefits to both Egypt and Ethiopia, as well as other East African countries that might be able to draw electricity from the dam.[45] According to an expert, "[t]he Renaissance Dam covers the electricity shortage in Egypt during rush hours, while Ethiopia regains electricity during the dam's pause and during drought periods when there is no water to activate the dam."[46] In March 2015, Egypt, Ethiopia, and Sudan came to an agreement on the basic principles on the use of the Nile River.[47] The agreement signals greater cooperation on the usage of the river.

Coal

Coal is also not a major source of energy in Egypt and makes up only about **2 percent** of its energy consumption.[48] Due to the increasing consumption and falling productivity of the country's oil and gas sector, however, the use of cheap imported coal is projected to increase in Egypt. Coal is approximately 30 percent cheaper than imported natural gas.[49] In April 2014, the Egyptian government approved the use of coal for industrial purposes for the first time, and companies are beginning to use coal for their factories.[50] In September of the same year, Egypt's state-owned power company, EEHC, signed a deal with an Abu Dhabi-based company to build the country's first coal-fired power plant.[51] There are concerns that using coal would lead to serious environmental problems for Egypt which already has a high level of air and water pollution.[52] In particular, Egypt's tourism sector, particularly in the Red Sea area, is concerned that the use of coal might cause significant damages to the industry.[53]

Renewable Energy

Non-hydro renewable energy makes up only **1 percent** of the total energy consumption in Egypt.[54] Since 2014, Cairo has redoubled its efforts to develop and use more renewable energy to address growing energy challenges with the goal of producing 20 percent of the country's energy supply from renewable sources.[55] In January 2015, Egypt declared its objective of producing approximately 4,300 megawatts of energy from solar and wind power within three years.[56] Access Power, a UAE company, is heading a consortium to lead the project.[57]

Solar energy has much potential in Egypt, with has approximately 325 days of sun in a year and approximately 2,400 hours annually for potential solar operations, compared to Spain and Greece, the next sunniest countries, which have 1,900 hours annually.[58] Back in 1913, Egypt was selected to host the world's first solar power station, although the plan was scrapped with the outbreak of World War I.[59] The country's first solar-thermal power plant was connected to the national electricity grid only in June 2011, producing approximately 160 megawatts of solar energy.[60] Cairo currently has a plan to develop solar energy to address the country's growing energy shortages with approximately $1 billion slated for the project in the coming years.[61] A number of Egyptian banks have also expressed interest in developing solar energy.[62] Despite Egypt's potential, however, investors and entrepreneurs face significant regulatory hurdles in pursuing renewable projects in Egypt, particularly with the current political, social, and economic problems that the country is dealing with.[63]

Egypt is also seeking to boost its wind power capacity. Currently, most of the country's wind power comes from the Zafarana and Hurghada wind farms.[64] In January 2015, the Egyptian government announced a plan to bring up the use of wind energy up to 2,000 megawatts within three years.[65] Cairo plans to increase its wind power capacity up to 7.2 gigawatts (7200 megawatts) by 2020.[66]

Nuclear Energy

Egypt's work toward nuclear energy has been an on-and-off process, ever since the country's first president, Gamal Abdel Nasser, signed its first nuclear agreement with the Soviet Union in 1954. The work on the nuclear sector was halted after the war of 1967 and then restarted under Anwar Sadat after 1973. In 1986, Hosni Mubarak halted Egypt's work in the nuclear sector again after the Chernobyl disaster. Cairo began discussing nuclear power again in 2006.[67] Egypt currently has two small research reactors, but no large commercial reactor yet.[68] In February 2015, Egyptian President Abdel Fattah el-Sisi signed an agreement with Russian President Vladimir Putin on building a commercial nuclear reactor.[69]

Energy Development Versus Climate Change

While Egypt seeks to produce more oil and gas and diversify the country's sources of energy, Cairo also has to consider the consequences that such developments might have on the environment and climate change. While Egypt is a large country, most of its population lives near the Nile River Delta and Valley, making the country one of the world's most vulnerable to climate change. Any change in sea levels or the flow of the river would be very detrimental to those relying on the river.[70] According to the Climate Institute, a 0.5 meter rise in sea level could result in the displacement of 2 to 4 million Egyptians. A warmer climate could also mean less fresh water supplies, with harmful effects on the overall economy.[71] Such a change could result in a great amount of political and social instability.

Source: NASA

Conclusion

The problems Egypt faces in its energy sector come at a time of great uncertainty. In order to stabilize the country in the long run, the el-Sisi government will need to combine measures to provide security for ordinary Egyptians while diversifying its sources of energy and liberalizing the economy to bring in more foreign investment. The el-Sisi government will face significant challenges in doing so, however. The upcoming summer season during which energy shortages are expected will be the first hurdle that Cairo will have to overcome. Hence, whether or not the el-Sisi government will be able to achieve all of its objectives remains to be seen.

Find out more on the U.S. -Egypt Strategic Partnership

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The American Security Project (ASP) is a nonpartisan organization created to educate the American public and the world about the changing nature of national security in the 21st Century.

Gone are the days when a nation's security could be measured by bombers and battleships. Security in this new era requires harnessing all of America's strengths: the force of our diplomacy; the might of our military; the vigor and competitiveness of our economy; and the power of our ideals.

We believe that America must lead in the pursuit of our common goals and shared security. We must confront international challenges with our partners and with all the tools at our disposal and address emerging problems before they become security crises. And to do this we must forge a bipartisan consensus here at home.

ASP brings together prominent American business leaders, former members of Congress, retired military flag officers, and prominent former government officials. ASP conducts research on a broad range of issues and engages and empowers the American public by taking its findings directly to them via events, traditional & new media, meetings, and publications.

We live in a time when the threats to our security are as complex and diverse as terrorism, nuclear proliferation, climate change, energy challenges, and our economic wellbeing. Partisan bickering and age old solutions simply won't solve our problems. America – and the world - needs an honest dialogue about security that is as robust as it is realistic.

ASP exists to promote that dialogue, to forge that consensus, and to spur constructive action so that America meets the challenges to its security while seizing the opportunities that abound.

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