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COUNTRY ANALYSIS BRIEFS

Egypt

Last Updated: July 2012

Background

Egypt is the largest non-OPEC oil producer in Africa and the second largest natural gas producer on the continent.

Egypt is the largest oil producer in Africa that is not a member of the Organization of Petroleum Exporting Countries (OPEC), and the second largest natural gas producer on the continent, following Algeria. Egypt also plays a vital role in international energy markets through the operation of the Suez Canal andSuez-Mediterranean (SUMED) Pipeline, important transit points for oil and liquefied natural gas (LNG) shipments from African and Persian Gulf states to Europe and the Mediterranean Basin. Fees collected from operation of these two transit points are significant sources of revenue for the Egyptian government.

Total Primary Energy Consumption

Almost all of Egypt's 3.4 quadrillion British thermal units (Btu) of energy consumption in 2009 was met by oil (47 percent) and natural gas (48 percent). Oil's share of the energy consumption mix is mostly in the transportation sector, but with the development of compressed natural gas (CNG) infrastructure and vehicles, the share of natural gas in the transportation sector is likely to continue to grow.

The government has been pushing to reduce domestic petroleum consumption by attempting to reduce subsidies and promote the use of natural gas. However, subsidy reduction is a politically sensitive issue that has proven difficult to fully implement. For the 2011/12 fiscal year, the subsidy was budgeted at 96 billion Egyptian pounds, according to Global Insight. The increased use of compressed natural gas as a fuel for motor vehicles and the conversion of some thermal power plant feedstock to gas have, to an extent, helped to ease the consumption of petroleum products.

Dry natural gas consumption nearly doubled over the last decade and reached 1.6 Trillion cubic feet (Tcf) in 2010. Total petroleum consumption has risen by about one-third over the same time

period. EIA estimates show that petroleum consumption in 2011 was about 815,000 bbl/d. The rapid growth of oil and gas consumption has been driven by increased industrial output, economic growth, energy-intensive gas and oil extraction projects, population growth, and fast-rising private and commercial vehicle sales.

Similarly, electricity consumption increased by an average of 7 percent over the last decade, climbing from nearly 61 billion kWh in 2000 to 116 billion kWh in 2009. In terms of electricity generation, conventional thermal electricity, which derives from traditional fossil fuels, accounts for nearly 90 percent of Egypt's electricity generation, with the remainder mainly from hydroelectricity. Generation capacity has increased by about 4 percent yearly over the last two decades. EIA estimates show that electricity generation reached 137 billion kilowatthours (kWh) in 2010. Plans are underway to further expand electricity generation capacity by utilizing the country's vast wind and solar resources, expanding the Gulf Cooperation Council (GCC) Power Grid, and also through development of nuclear power.

Oil

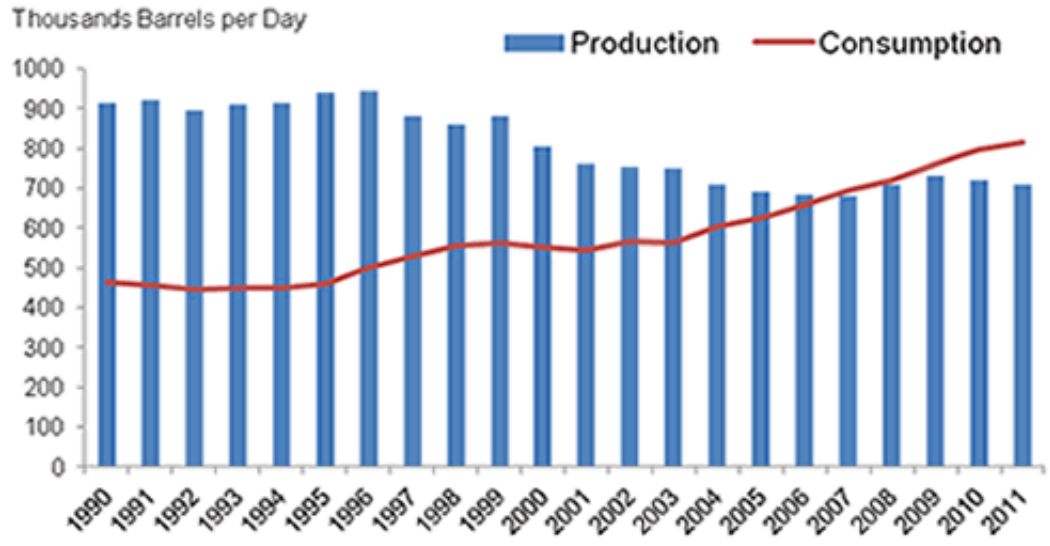
One of Egypt's challenges is to satisfy increasing domestic demand for oil in the midst of falling domestic production. Although in recent years, oil output has experienced moderate increases from new production at smaller fields.

According to the *Oil and Gas Journal's* January 2012 estimate, Egypt's proven oil reserves are 4.4 billion barrels, an increase from 2010 reserve estimates of 3.7 billion barrels. New discoveries have boosted oil reserves in recent years. In 2011, Egypt's total oil production averaged around 710,000 bbl/d, of which approximately 560,000 bbl/d was crude oil including lease condensates and the remainder natural gas liquids (NGLs).

After Egypt's production peak of over 900,000 bbl/d in the 1990s, output began to increasingly decline as oil fields matured. However, ongoing successful exploration has led to new production from smaller fields, and enhanced oil recovery (EOR) techniques in existing fields have eased the decline at aging fields. In addition, output of NGLs and lease condensate have increased as a result of expanding natural gas production and have offset some of the other declines in liquids production.

One of Egypt's challenges is to satisfy increasing domestic demand for oil in the midst of falling domestic production. Domestic oil consumption has grown by over 30 percent over the last decade, from 550,000 bbl/d in 2000 to 815,000 bbl/d in 2011.

Total Oil Production and Consumption in Egypt, 1990-2011



Source: U.S. Energy Information Administration, *International Energy Statistics*

Egypt's oil consumption has outpaced production since 2008. Accordingly, as consumption increased, Egypt's imports of both crude oil and refined petroleum products increased to make up for decreased oil output. Although Egypt has the largest oil refining sector in Africa, a small volume of refined petroleum product imports are used to meet domestic demand (see Refinery

section below). Additionally, since Egypt's refining capacity exceeds current oil production levels, small volumes of crude oil are imported, processed, and re-exported.

Sector Organization

The Egyptian General Petroleum Corporation (EGPC) is the state entity charged with managing upstream activities including infrastructure, licensing, and production and also owns and operates much of the country's refining capacity. International and foreign national oil companies play a significant role in Egypt's upstream sector on a production-sharing basis with EGPC. In addition to the EGPC and the Egyptian Mineral Resource Authority (EMRA), the energy sector is broken up into three holding companies: the Egyptian Natural Gas Holding Company (EGAS), the Egyptian Petrochemicals Holding Company (ECHEM), and Ganoub El Wadi Petroleum Holding Company (GANOPE).

EGPC directly accounts for about 20 percent of oil production, in addition to holding shares in operations through joint ventures (JVs) with foreign companies, according to Business Monitor International Ltd. (BMI). Nonetheless, major foreign companies dominate Egypt's upstream oil sector. The US-based Apache has heavily invested in exploration over the years, especially in the onshore Western Desert. In 2011, the company produced about 104,000 bbl/d of oil. BP is another major multinational in the industry, although the company's output has significantly declined from 130,000 bbl/d in 1999 to 45,000 bbl/d in 2011 as a result of maturing fields. The Italian major Eni is also heavily invested in Egypt's hydrocarbon sector and operates mostly through a JV known as Agiba Petroleum and its subsidiary IEOC. Other foreign investors in Egypt's oil sector include Dana Gas, BG Group, Shell, Hess, Petronas, and LUKoil.

The political unrest in 2011 did not affect foreign investor presence in Egypt and hydrocarbon production was largely unaffected, since populated areas are far from the top producing regions of the Western Desert and the offshore Nile Delta. Additionally, as of yet, there has not been any regulatory changes that would adversely affect foreign company operations.

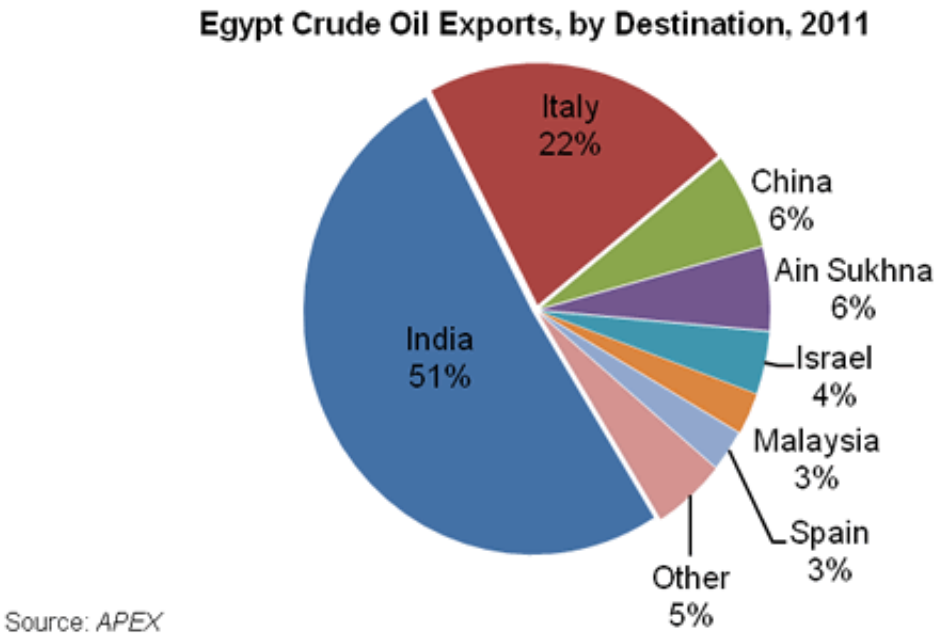
Exploration and Production

Egyptian oil production comes from five main areas: primarily the Gulf of Suez and the Nile Delta, and also the Western Desert, the Eastern Desert, and the Mediterranean Sea. Most Egyptian production is derived from mature, relatively small fields that are connected to larger regional production systems. Overall production is in decline, particularly from the older fields in the Gulf of Suez. However, some declines have been offset by small yet commercially viable discoveries in all producing areas, in addition to EOR techniques used in mature fields.

As a result of extensive exploration, new discoveries, and EOR techniques used to extract more oil from mature fields, Egypt's oil production increased slightly in 2009. New finds in the Mediterranean deepwater offshore and in mature productive areas in the Gulf of Suez and Nile Delta may offer the country sustained oil resources in the future. Additionally, exploration is ongoing in the onshore Western Desert area, where oil discoveries are generally cheaper to exploit. Since 2000, oil output in the Western Desert area has doubled, and it now accounts for around 28 to 30 percent of total oil production, according to IHS Cera.

Exports

Egypt's benchmark oil blend is Suez, which is usually sold at a discount to the Brent contract because of its relatively high sulfur content, according to Global Insight. Crude oil exports increased by just over 15 percent from 95,000 bbl/d to 114,000 bbl/d in 2010 and 2011, respectively. Contrarily, Egypt's exports of refined petroleum products have been declining. The future trends in both crude and product exports mainly depend on the government's ability to curtail domestic demand of oil, along with the potential to increase production through new finds and at existing fields.



In 2011, just over half of Egyptian oil exports were sent to India (60,000 bbl/d), followed by Italy (25,000 bbl/d). India and Italy are traditionally top destinations for Egypt's crude oil exports. The remainder of Egypt's crude exports went to other European and Asian countries in 2011, as with previous years. The U.S. has traditionally imported small volumes of crude oil and petroleum products from Egypt, although according to EIA estimates, volumes were reduced last year. In 2011, the U.S. imported 4,000 bbl/d of crude oil from Egypt, down from the previous year's imports of 7,000 bbl/d. In addition, last year was the first time in over a decade that the U.S. did not import any petroleum products from Egypt. The downward trend represents the overall decrease of U.S. imports of crude oil and petroleum products in recent years.

Refining

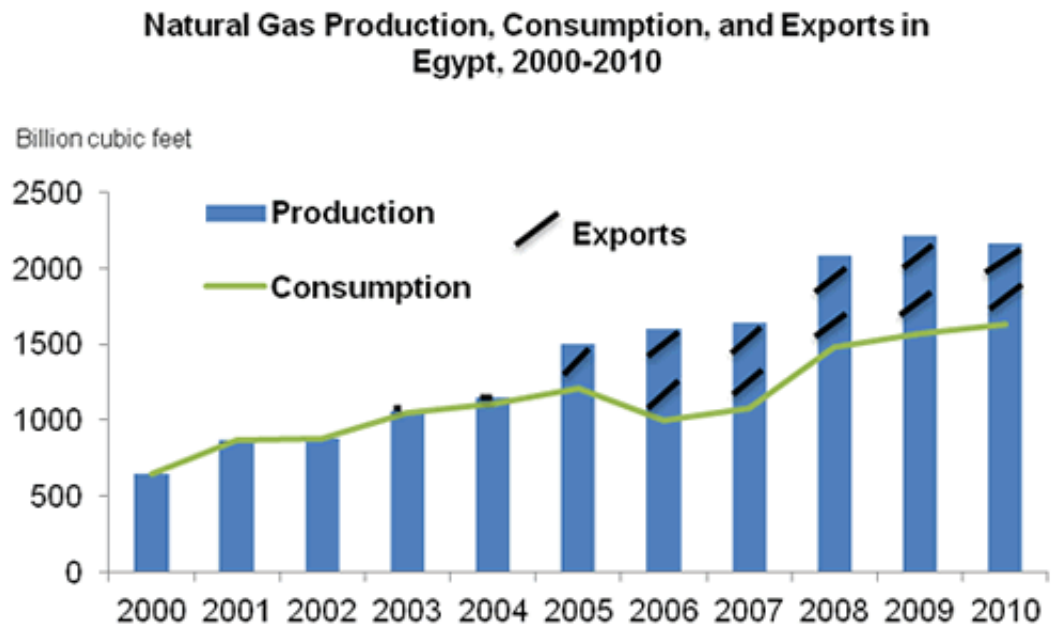
Egypt has the largest refining sector in Africa. The country has nine refineries, operated mostly by state-owned agencies, with a combined crude oil processing capacity of 726,250 bbl/d, according to *OGJ*estimates from January 2012. The largest refinery is the 146,300-bbl/d El-Nasr refinery on the Suez Canal, which is owned by the Egyptian government through the EGPC and operated by its subsidiary, the El Nasr Petroleum Company. The government has plans to increase production of lighter products, petrochemicals, and higher octane gasoline by expanding and upgrading existing facilities and promoting new projects. Current plans call for expanding refining capacity by over 600,000 bbl/d by 2016, and even further expansions into the next decade; which would require large amounts of foreign investment.

Natural Gas

Due to major recent discoveries, natural gas is likely to be the primary growth engine of Egypt's energy sector. However, growing domestic demand, supported by government subsides, has caused the government to regulate the amount of gas exports.

Egypt's natural gas sector has been expanding rapidly, as production has more than tripled from 646 Billion cubic feet (Bcf) in 2000 to 2.2 Tcf in 2010. According to *OGJ*estimates from January 2012, Egypt's proven gas reserves registered at 77 Tcf, an increase from 2010 estimates of 58.5 Tcf and the third highest in Africa, after Nigeria and Algeria. New discoveries offshore the Nile Delta and some finds in the Western Desert have led to the increase in proven reserves. Over 80 percent of Egypt's natural gas reserves and 70 percent of its production is located in the Mediterranean and Nile Delta.

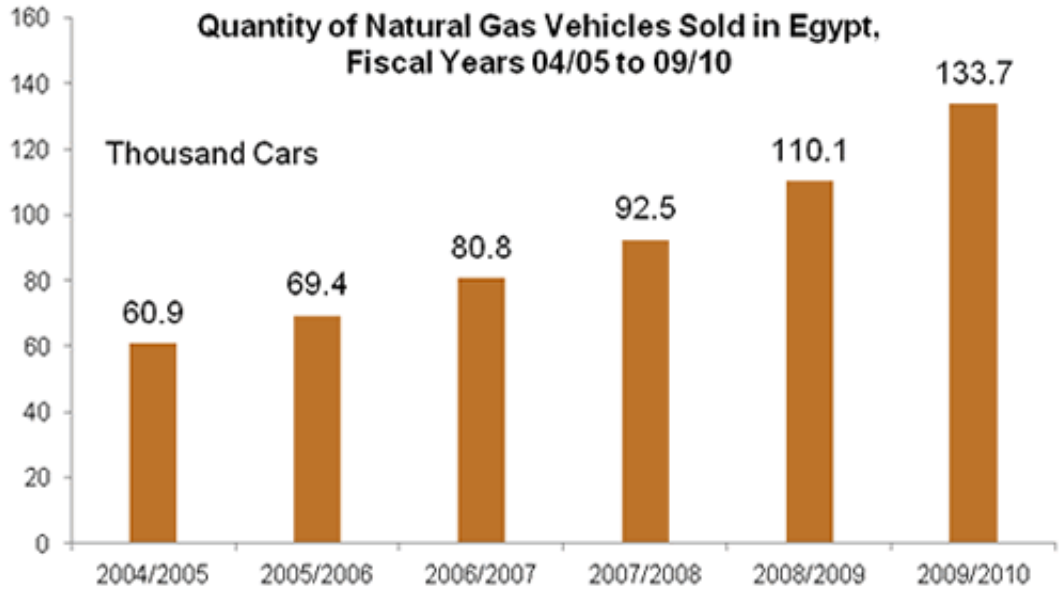
In 2010, Egypt produced roughly 2.2 Tcf and consumed just over 1.6 Tcf of dry natural gas. Gas production is expected to continue to grow to satisfy rising domestic demand, export commitments through the Arab Gas Pipeline, and LNG exports. Thus, Egypt is expected to continue to be an important natural gas supplier to Europe and the Mediterranean region, although exports are competing with rising domestic demand, particularly in Egypt's power generation sector.



Source: US Energy Information Administration, *International Energy Statistics*

In 2009, the electricity sector accounted for the largest share of natural gas consumption (54 percent) followed by the industrial sector (29 percent), according to Cedigaz. The government is also encouraging households, businesses and the industrial sector to consider natural gas as a substitute for petroleum and coal. In January 2008, the World Bank approved loans for the Natural Gas Connections Project, which serves to switch consumption of liquefied petroleum gas (LPG) to natural gas through investment in new connections and to further expand natural gas use in densely populated, low income areas.

The share of natural gas consumed in the transportation sector has also been rising since the development of compressed natural gas (CNG) infrastructure and vehicles. According to the Ministry of Petroleum in Egypt, the quantity of natural gas vehicles sold in Egypt between the fiscal years 2004/2005 and 2009/2010 more than doubled.



Source: *Ministry of Petroleum of Egypt*

Sector Organization

As is the case with the oil sector, the Egyptian General Petroleum Corporation (EGPC) is the state entity charged with managing upstream activities including infrastructure, licensing and production. Egyptian Natural Gas Holding Company (GASCO) is charged with promoting the sector, establishing a development strategy, and distributing tenders. According to a recent government announcement, GASCO will be offering tenders to international companies this year for on- and offshore natural gas blocks near Egypt's maritime border with Israel.

The Egyptian government has an ongoing policy to allocate one-third of proven natural gas reserves for domestic market requirements, one-third for future generations, and the remaining third for exports. Given increasing domestic demand, combined with popular pressures in recent years against LNG and gas export contracts (particularly with Israel), the oil minister declared in mid-2008 that no new gas export contracts would be made. These policies delayed plans to expand the export infrastructure and have also deterred some investment in the more expensive offshore areas.

Foreign companies operating in Egypt's gas sector must direct all or a portion of its current production to the domestic market, while new discoveries are earmarked for domestic market. Major foreign players include Eni, BG Group, BP, and Apache. BG Group produces about 40 percent of Egypt's total gas production, which amounted to 794 Million cubic feet per day (Mcf/d) in 2011 and was mainly derived from the offshore Nile Delta, according to IHS Cera. The vast majority of BG's output is used to supply the domestic market.

BP produced about 444 Mcf/d of gas in 2011, but is planning to increase output through its recent discoveries in the Gulf of Suez and Mediterranean. The company was also the first to secure an agreement with the government for higher gas prices for production from its deepwater areas, according to IHS Cera. Eni is another major player in Egypt's gas industry, and operates fields mainly in the Mediterranean and Nile Delta areas through its JV and subsidiary.

Exploration and Production

Exploration and production activities in the country's natural gas sector continue to grow. While there have been marked decreases in the production of natural gas associated with oil extraction, new finds of non-associated gas fields, combined with growing domestic demand and export capacity, are increasing interest in Egypt's natural gas sector. Exploration has occurred in the offshore Mediterranean, onshore Nile Delta, and in the Western Desert. However, between 2006 and 2010, there was a slowdown in deepwater exploration. To promote foreign participation in the exploration of the more expensive deepwater offshore, the Egyptian government revised pricing policies by agreeing to pay more for natural gas produced in these areas.

Most industry analysts place Egypt's natural gas production on an upward trend in the short- and medium-term, despite the existing limitations to the sector's growth. Current production mostly occurs in the Nile Delta area and surrounding offshore areas, with the Abu Madi, Badreddin and Abu Qir non-associated fields in the Delta accounting for about half of Egypt's total gas production. Most recent finds have been in the deepwater Mediterranean, which are being exploited by industry giants such as Shell, BG, and Eni.

Exports

Dry natural gas exports, which began in 2003, had been rising rapidly, with the completion of the Arab Gas Pipeline (AGP) in 2004 and the startup of the first three LNG trains at Damietta in 2005. However, after 2006 exports began to level off and in 2010, natural gas exports fell to 535 Bcf, an almost 20 percent drop from the prior year. According to the country's petroleum minister, low international prices and growing domestic demand led to the government's decision to enact a two-year moratorium on new gas export deals at the end of 2008 in response to increased electricity consumption at gas fired power plants. Around 70 percent of total natural gas exports are in the form of LNG, and the remaining 30 percent are exported via pipelines.

Pipeline Exports

The Arab Gas Pipeline (AGP) originates in Egypt and provides gas to Jordan, Syria, and Lebanon, with recent additions extending the pipeline to Turkey and European markets. In 2008, the pipeline was extended at its starting point in al-Arish in Egypt to Ashkelon in Israel. However, AGP has been sabotaged on over a dozen occasions between 2011 and 2012 due to political protest, which has resulted in gas supply disruptions to recipient countries.

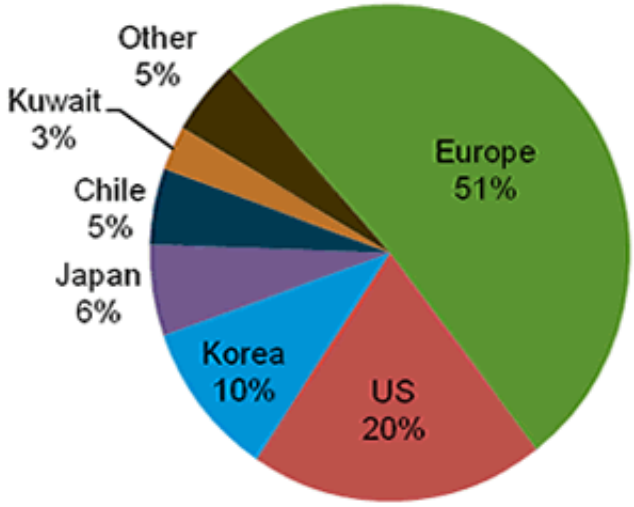
Israel and Jordan have been most affected from supply cut-offs since they are most dependent on Egyptian gas. Prior to the attacks, about 40 percent of Israel's gas consumption and 80 percent of Jordan's power generation derived from Egypt's gas supply, according to IHS Cera. As a result of the pipeline attacks, gas supplied by Egypt to Jordan dropped by 60 percent from 2010 to 2011. In late-April 2012, Egyptian state-owned oil and gas companies announced that they were terminating their agreement to supply gas to Israel under the premise that Israel did not meet payment deadlines in recent months. Although gas supplies to Israel had become a contentious political topic in Egypt over the years.

Liquefied Natural Gas (LNG)

Egypt has three LNG trains: Segas LNG Train 1 in Damietta and Egypt LNG trains 1 and 2 in Idku. The combined LNG export capacity is close to 600 Bcf per year with plans to expand in the near future, pending export policy changes and legislation. In 2010, as domestic demand for natural gas increased, LNG exports fell to about 354 Bcf, which was down by 30 percent from almost 500 Bcf in 2009.

In 2010 half of Egypt's LNG was shipped to Europe, which imported about 180 Bcf, with over half of that destined for Spain (110 Bcf). The US was the second largest recipient of Egyptian LNG in 2010, and imported just over 71 Bcf. Other major destinations included Korea (36 Bcf), Japan (21 Bcf), and Chile (18 Bcf).

Egypt Liquified Natural Gas (LNG) Exports, 2010



Source: *FACTS Global Energy*
Europe: Spain (60%), France, Italy, Turkey, Belgium, UK, and Greece
Other: Taiwan, Mexico, India, and China

Suez Canal/SUMED Pipeline

The Suez Canal and Sumed Pipeline are strategic routes for Persian Gulf oil shipments to Europe. Closure of the Suez Canal and SUMED Pipeline would add an estimated 6,000 miles of transit around the continent of Africa.

Suez Canal

The Suez Canal is located in Egypt, and connects the Red Sea and Gulf of Suez with the Mediterranean Sea, spanning 120 miles. In 2011, petroleum (both crude oil and refined products) and liquefied natural gas (LNG) accounted for 15 and 6 percent of Suez cargoes, measured by cargo tonnage, respectively.

In 2011, 17,799 ships transited the Suez Canal from both directions, of which 20 percent were petroleum tankers and 6 percent were LNG tankers. Only 1,000 feet wide at its narrowest point, the Canal is unable to handle the VLCC (Very Large Crude Carriers) and ULCC (Ultra Large Crude Carriers) class crude oil tankers. The Suez Canal Authority is continuing enhancement and enlargement projects on the canal, and extended the depth to 66 ft in 2010 to allow over 60 percent of all tankers to use the Canal.

Source: U.S. Government (Click here to zoom)

Closure of the Suez Canal, along with the SUMED Pipeline, would divert oil tankers around the southern tip of Africa, the Cape of Good Hope, adding approximately 6,000 miles to transit, increasing both costs and shipping time. According to a report released by the International Energy Agency (IEA), shipping around Africa would add 15 days of transit to Europe and 8-10 days to the United States.

Suez Canal Hydrocarbon Traffic (2008 - November 2010)			
	2008	2009	2010*
NORTHBOUND			
Crude Oil (bbl/d)	940	314	428
Gasoline	429	379	413
Middle Distillate	150	261	250
Fuel Oil	6	19	6
Naptha	45	1	13
LPG	49	14	24
Other	2	7	20
Total Oil (bbl/d)	**1,621**	**994**	**1,153**
LNG (Bcf)	**316**	**803**	**1,320**
Number of ships			
Tankers	2,089	1,867	1,768
LNG	229	283	393
SOUTHBOUND			
Crude Oil (bbl/d)	211	271	307
Gasoline	165	173	108
Middle Distillate	22	50	27
Fuel Oil	291	188	250
Naptha	63	103	78
LPG	27	38	24
Other	39	27	19
Total Oil (bbl/d)	**818**	**850**	**813**
LNG (Bcf)	**281**	**48**	**97**
Number of ships			
Tankers	1,706	1,612	1,451
LNG	200	242	370
TOTAL			
TOTAL OIL (bbl/d)	**2,440**	**1,843**	**1,966**
Crude	**1,151**	**585**	**735**
Product	**1,288**	**1,258**	**1,232**
LNG (Bcf)	**596**	**852**	**1,416**
TOTAL SHIPS			
Tankers	**3,795**	**3,479**	**3,219**
LNG	**429**	**525**	**763**
SUMED flows (bbl/d)	**2,100**	**1,100**	**1,150**

Source: Suez Canal Authority, converted with EIA conversion factors. SUMED pipeline flows are EIA estimates based on APEX (Lloyd's MIU) Tanker Data.

SUMED Pipeline

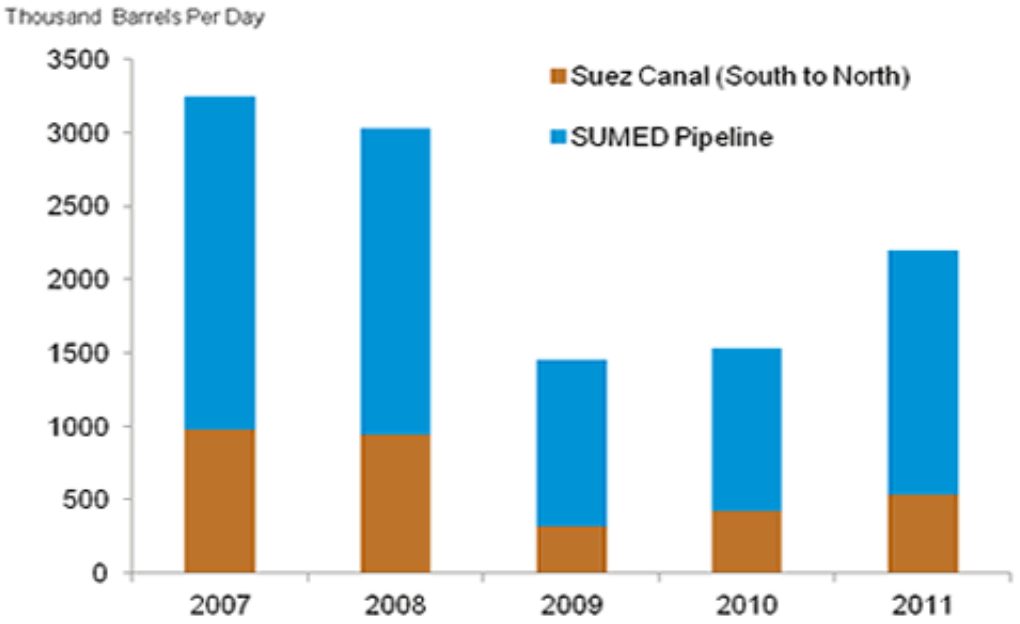
The 200-mile long SUMED Pipeline, or Suez-Mediterranean Pipeline, provides an alternative to the Suez Canal for those cargos too large to transit through the Canal (laden VLCC's and larger). The crude oil flows through two parallel pipelines that are 42-inch in diameter, with a total pipeline capacity of 2.3 million bbl/d. Oil flows north through Egypt, and is carried from the AinSukhna onshore terminal on the Red Sea coast to its end point at the SidiKerir terminal on the Mediterranean. The SUMED is owned by Arab Petroleum Pipeline Co., a joint venture between the Egyptian General Petroleum Corporation (EGPC), Saudi Aramco, Abu Dhabi's National Oil Company (ADNOC), and Kuwaiti companies. In 2011, 1.7 million bbl/d of crude oil flowed through the pipeline, or slightly over three percent of seaborne crude oil traded that year.

Source: Oil Capital Ltd.

Crude Oil

The majority of crude oil transiting the Suez Canal travels northbound, towards markets in the Mediterranean and North America. Northbound canal flows averaged approximately 535,000 bbl/d in 2011. The SUMED pipeline accounted for about 1.7 million bbl/d of crude oil flowsfrom the Red Sea to the Mediterranean over the same period. Combined, these two transit points were responsible for nearly 2.2 million bbl/d of crude oil flows into the Mediterranean. Northbound crude transit has declined by almost one-thirdof its level in 2008 when 943,000 bbl/d of oil transited northbound through the Canal and an additional 2.1 million travelled through the SUMED to the Mediterranean. Crude oil shipments travelling southbound through the Canal toward the Red Sea have declined less dramatically from 280,000 bbl/d in 2008 to 212,000 bbl/d in 2011.

Crude Oil Transported to Europe and the Mediterranean Area via the Suez Canal & SUMED Pipeline, 2007-2011

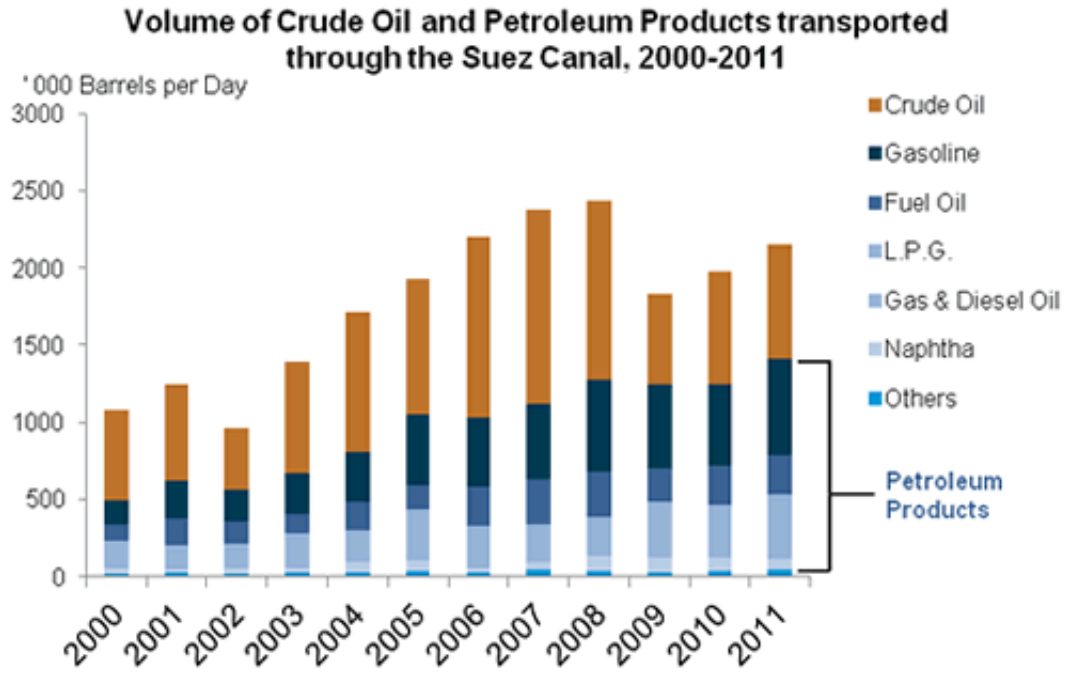


Source: *Suez Canal Authority (with EIA conversion factors) and APEX (Lloyd's MIU) Tanker Data*
*Note: Suez Canal (South to North) only includes petroleum moving in one-direction from the Red Sea toward the Mediterranean. It does not include shipments from the Mediterranean to toward the Red Sea.

Total Oil and Products

Total oil flows from the Suez Canal declined steeply by more than one-third in 2009 to about 1.8 million bbl/d, down from 2008 levels of over 2.4 million bbl/d. Product flows through the SUMED experienced a much steeper drop to1.1 million bbl/d from approximately 2.1 million bbl/d over the

same period. The year-on-year difference reflects the collapse in world oil market demand that began in the fourth quarter of 2008, followed by OPEC production cuts (primarily from the Persian Gulf), which caused a sharp fall in regional oil trade starting in January 2009. Drops in transit also illustrate the changing dynamics of international oil markets where Asian demand is increasing at a higher rate than European and U.S. markets, and West African crude production is meeting a greater share of the latter's demand. At the same time, piracy and security concerns around the Horn of Africa have led some exporters to travel the extra distance around South Africa to reach West African markets. Total oil flows increased to almost 2.2 million bbl/d in 2011, but still remain below previous levels experienced before the global economic downturn.



Source: Suez Canal Authority, *Traffic Statistics*

Liquefied Natural Gas (LNG)

Unlike oil, LNG transit through the Suez Canal has been on the rise since 2008, with the total number of tankers increasing from approximately 430 to over 1,000, and volumes of LNG traveling southbound (laden tankers) increasing more than four-fold. Southbound LNG transit originates in Algeria and Egypt, destined for Asian markets while northbound transit is mostly from Qatar and Oman, destined for European and North American markets. The rapid growth in LNG flows over the period represents the startup of five LNG trains in Qatar in 2009-2010. The only alternate route for LNG tankers would be around Africa as there is no pipeline infrastructure to offset any Suez Canal disruptions. Countries such as the United Kingdom, Belgium, and Italy received over 80 percent their total LNG imports via the Suez Canal in 2010 while Turkey, France, and the United States had about a quarter of their LNG imports transited through the Canal.

Electricity

As a result of Egypt's growing domestic energy demand, the government plans to increase the amount of power generated from renewable sources, particularly wind and solar.

The Egyptian electrification rate in 2009 was approximately 99.6 percent, according to the International Energy Agency (IEA). The rate is among the highest in Africa with a 100 percent urban access to electricity and 99.3 percent in rural areas. Nonetheless, approximately 300,000 people still lack access to electricity.

According to EIA data, Egypt's total net electricity generation was 136.6 billion kWh in 2010: 121.4 billion kWh of which was conventional thermal generation, 14 billion kWh hydroelectric, and 1.2 billion kWh of wind generation. Total electricity consumption and generation have both grown by an average of 7 percent annually from 2000 to 2009. Most of Egypt's power demand growth comes from the growing industrial sector. Ageing infrastructure and rising demand have led to intermittent blackouts. The summer of 2010 highlighted these problems, as the country experienced rolling nationwide blackouts.

Egyptian electricity consumption is increasing much faster than capacity expansions and the government is planning to invest over $100 billion in the power sector over the next decade, while also seeking financing from external sources. The private sector, international organizations, and renewable energy funds such as the World Bank's Clean Technology Fund have all provided investment in the sector. Under existing plans, Egypt hopes to produce 12-20 percent of its electricity from renewable energy by 2020 while also developing a nuclear power industry.

Sector Organization

Egypt's power sector is organized under the Egyptian Electric Holding Company which comprises sixteen affiliated companies (six production, nine distribution, and the Egyptian Electricity Transmission Company). Growing electricity demand in the late 1990s spurred industry restructuring and limited privatization of the sector. However, the country now has several privately-owned power plants that are either independent power projects (IPPs) or financed under Build, Own, Operate and Transfer (BOOT) schemes. BOOT projects allow for the financing and development of the large-scale energy projects without affecting the country's debt profile.

Conventional Thermal

In 2010, conventional thermal energy sources accounted for almost 90 percent of the total electricity generated in Egypt. Nearly all of this was met by domestically produced natural gas. Existing natural gas subsidies combined with plans to expand gas-fired generation capacity indicate that the fuel will continue to play an important role in Egypt's electricity mix.

Hydroelectricity

According to Egypt's New and Renewable Energy Authority (NREA), hydropower is Egypt's third largest energy source after gas and oil. In 2010, Egypt generated around 14 billion kWh from hydroelectric resources, almost all of which came from the Aswan High Dam and the Aswan Reservoir Dams. However, over 85 percent of the Nile's hydropower potential has already been exploited. In turn, NREA, the government entity tasked with leading renewable energy development in Egypt, has actively pursued renewable projects to diversify the country's energy mix.

Other Renewable Sources

Solar

Egypt's first solar-thermal power plant is located in Kuraymat, just over 55 miles south of Cairo and has the capacity to generate 140 megawatt (MW) of solar-thermal energy. The plant was completed and connected with the national grid at the end of June 2011. The plant uses concentrated solar power (CSP) with back up natural gas fired generators. According NREA, solar power accounts for 20 MW of the plant's total generation. The solar-thermal plant is part of a general plan to export North African generated electricity to Europe through the Desertec project. The World Bank and the Japan International Cooperation Agency (JICA) helped to finance the construction of the solar-thermal plant.

According to NREA's 2010/2011 annual report, a project feasibility study is being prepared and expected to be completed this year on the construction of a 100-MW solar-thermal plant in KomOmbo. The project will be financed by the German government-owned development bank known as KfW, the World Bank, and the African Development Bank.

Wind

According to NREA, Some of the world's best wind power resourcesare located in Egypt, especially in the areas of theGulf of Suez, and West & East Nile Valley whereat least 7200 MW could be potentially developedby 2020. Currently, Egypt generates about 550 MW of energy from wind power plants, of which 545 MW are generated from the Zafarana wind farm and the remainder from the Hurghada wind farm.

Egypt's largest renewable project is the Zafarana wind farm located on the Gulf of Suez West Coast, along the Red Sea coastline. The farm houses several wind projects that were developed in several stages and financed in cooperation with development banks from Germany, Denmark, Spain, and Japan.

The government has said that it was planning to expand wind capacity by over 2.6 gigawatts (GW) over the next five years as part of a plan to increase wind's share of electricity generation to 12 percent. There are several wind projects currently under preparation that combined could greatly increase Egypt's installed wind capacity. The projects will be implemented through governmental cooperation agreements with Germany, Japan, Spain, France, and the European Union. Wind projects are being prepared in cooperation with private international companies as well.

Nuclear

Egypt is also working on developing nuclear power as an energy source. It has a 22-MW nuclear research reactor at Inshas in the Nile Delta that began operation in 1997. The Ministry of Electricity and Energy in 2010 approved a 1,200 MW power station at El Dabaa, which is open to international participation and expected to become operational by 2019 as the country's first nuclear power plant. Bidding for the development of this plant was supposed to have started in early 2011; however, controversy over land ownership has stalled construction plans indefinitely.

International Connections

Work has been completed on the interconnection of Egypt's electric transmission grid with other countries in the region. The five-country interconnection of Egypt's system with those of Jordan, Syria, and Turkey was completed by 2002, and Egypt also activated a link to Libya's electric grid in December 1999.

The Gulf Cooperation Council (GCC) Power Grid project plans to link Egypt to the GCC through Saudi Arabia. The link is expected to be complete by 2015 and will allow the sharing of 3,000 MW of electricity between the two countries. This project will indirectly expand each country's electricity capacity by pulling from each other's supplies at different peak hours. Longer-term plans call for broader interconnections that would include North Africa, the Middle East and Europe.

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