

Policy Brief

Mediterranean Policy Program

Eastern Mediterranean Energy Project

June 2012

Summary: This paper analyzes the regulatory frameworks that govern oil and gas offshore exploration in each of the countries in the basin. It briefly considers the potential future exploration activities of Lebanon and Syria. The paper then presents the state of the electricity sector in each country and how the new gas finds will affect electricity trends in the region. It analyzes that data in light of regional and global natural gas trends and assesses the prospects for commercial development of the resources and their expected influence in various natural gas markets. It concludes with an assessment of likely future developments in the eastern Mediterranean region in light of the energy sector.

Energy Resources and Markets in the Eastern Mediterranean Region

by Brenda Shaffer

Introduction

The eastern Mediterranean basin has recently emerged as a natural gas producing region. Spurred by discoveries and production offshore of Egypt and Israel, exploration activity has recently intensified in the basin, and additional natural gas and oil discoveries are likely during the current decade. This paper will present an assessment of the proved, estimated, and potential reserves offshore in the eastern Mediterranean basin in areas where exploration has taken place.

This paper makes six main points.

1. Significant oil and natural gas exploration activity is taking place in the eastern Mediterranean region, following recent discoveries offshore of Israel and Cyprus. This activity should lead to additional discoveries and the launching of exploration offshore of other countries in the area, notably Lebanon.
2. Utilization of the natural gas volumes could provide a remedy for the region's ailing electricity sectors. Most of the countries in the region (and neighboring Middle East states) have unreliable electricity supply, produced at high costs and high pollution rates, and

the new natural gas volumes could provide a solution to this regional quandary.

3. There is considerable commercial interest in oil and gas exploration offshore of Cyprus, as reflected in the recent bidding round for licenses, despite the risk of conflict between the two communities on the island.
4. The new eastern Mediterranean discoveries are taking place in a period not only of heightened global demand for natural gas but also of increased supplies. In the past two decades, global natural gas supply has grown at a faster rate than demand. At the same time, there is growing demand for natural gas consumption in the region itself and, to some extent, in some neighboring markets in southern Europe. Europe's financial crises will lead to a downturn in the short term in energy demand and may also put a damper on financing for energy supply diversification projects, such as new interconnectors that could help eastern Mediterranean gas reach additional markets. Thus, the new eastern Mediterranean volumes in Israel and Cyprus will not be a major game-changer for gas markets in southern Europe

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or liquefied natural gas (LNG) markets in general at this stage. However, they will lead to expanded natural gas consumption in the eastern Mediterranean region itself. Moreover, additional volumes may well be discovered and, if significant, could have a greater impact on markets for eastern Mediterranean gas. Since exploration activity has recently accelerated, the extent of the volumes is most likely to grow and so commercial viability should be reassessed.

5. One of Egypt's existing LNG facilities provides an especially interesting commercial opportunity for export of gas from the region. Egypt does not produce enough gas to use its facilities at full capacity and could benefit from additional supplies. This would allow the region's producers to export LNG without huge infrastructure investments.
6. The governments in the region seem to overestimate the geopolitical benefit of the gas finds. This may contribute to higher risk-taking in the security realm and raise the propensity for conflict in this already turbulent region. At the same time, the natural gas finds can make a positive contribution to lowering conflict over access to fresh water in the greater eastern Mediterranean region, since the gas can be a source of cheap and clean energy for desalination plants.

In recent decades, offshore exploration of oil and gas has turned maritime borders into an issue of contention in different locations around the globe. Most maritime borders were not delimitated before the search for oil and gas offshore, since there was no concrete question for disagreement, except for fishing rights and passage of military vessels. Conflict over maritime border delimitation in the eastern Mediterranean region is especially acute because several countries concerned are in a state of war (e.g. Israel and Lebanon) or are engaged in long-standing disputes (Turkey, Greece, and Cyprus).¹ Rivalry over resources has become more intense because of existing political conflicts.

Overview

The eastern Mediterranean basin is considered to contain approximately 77 trillion cubic feet (Tcf) proved and estimated reserves of natural gas (May 2012). Impelled by recent discoveries in Israel and Cyprus, exploration activity

has been accelerated in the area, and additional volumes of natural gas and possibly oil will probably be discovered in coming years.

In 2010, the U.S. Geological Survey (USGS) released a report that estimates that the greater Levant Basin contains 122 Tcf of recoverable gas and 1.7 billion barrels of recoverable oil.² However, in the oil and gas industry, the USGS reports are considered merely indicative and are not taken as a reliable indicator of expected volumes. The results of further exploration efforts are needed before the extent of oil and gas volumes in the region can be estimated with greater accuracy.

While Egypt has produced gas onshore since 1970, offshore oil and gas discoveries in the eastern Mediterranean began in 1997. The Egyptian discovery was followed by small discoveries offshore Israel in 1999.³ In 2000, another small gas field was uncovered offshore the Gaza Strip.⁴ These discoveries motivated modest exploration activity in the region during the first decade of the 21st century. Exploration activity was accelerated following major natural gas discoveries offshore of Israel in 2009 (Tamar and Dalit fields), in 2010 (Leviathan field), and in 2011 offshore of Cyprus (Aphrodite field, 'block 12').

Both Greece and Turkey have encouraged foreign energy companies to conduct exploration activity in their territorial waters in the last few decades, without any noteworthy discoveries. A new round of licensing has been initiated in Cyprus, and Lebanon plans to conduct a licensing round in 2012.

Egypt

Egypt's proved natural gas reserves in 2010 were estimated at 78 Tcf.⁵ Over 80 percent of Egypt's natural gas reserves and 70 percent of its gas production is in the Mediterranean Sea and Nile Delta. Production and domestic consumption of natural gas increased dramatically following significant natural gas discoveries offshore

² See United States Geological Survey, *Assessment of Undiscovered Oil and Gas Resources of the Levant Basin Province, Eastern Mediterranean*, Fact Sheet 010-3014 (March 2010) <http://pubs.usgs.gov/fs/2010/3014/pdf/FS10-3014.pdf>.

³ The Yam Tethys fields (Mari-B and Noa fields) contained approximately 36 BCM and began production in 2004.

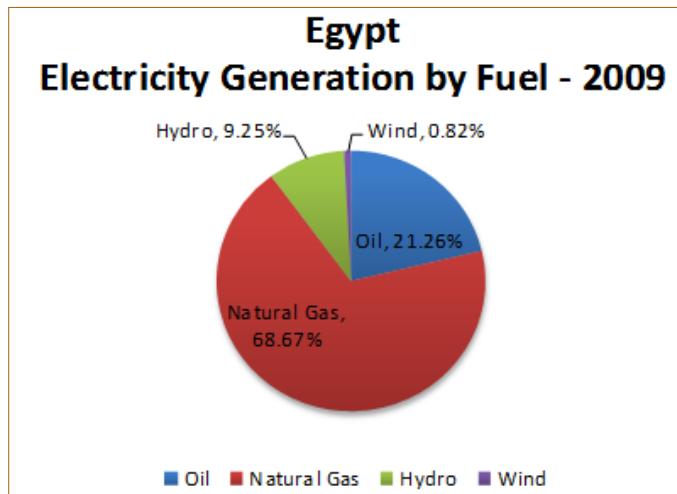
⁴ The exploration was carried out by British Gas within an Israeli legal and regulatory framework. In subsequent bilateral negotiations between Israel and Palestinian representatives, the gas field was designated as within the Gaza Strip's territorial waters.

⁵ BP Statistical Review of World Energy 2011. This represents a significant increase from previous estimates of reserves of 58.5 Tcf and thus may be overestimated.

¹ The legal approach to maritime border delimitation in the region is analyzed in the adjoining paper in this project by Professor Tullio Scovazzi.

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Figure 1



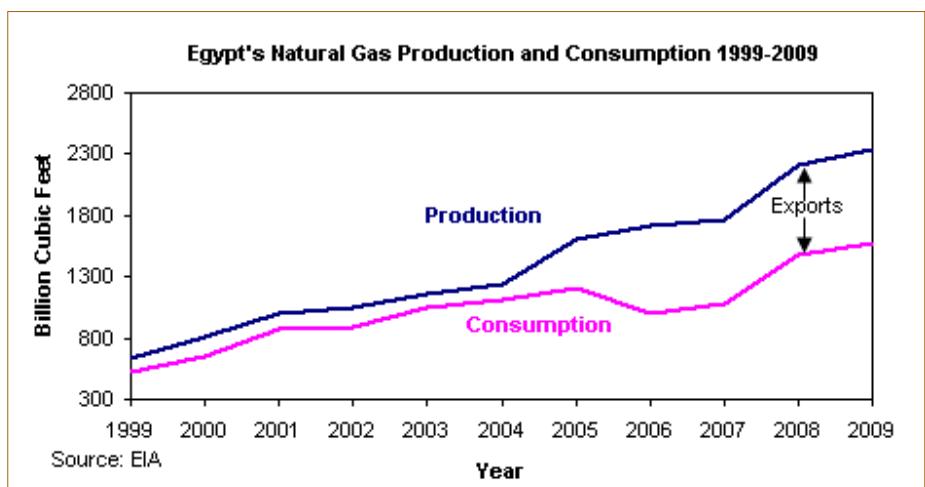
of Egypt in the Mediterranean and in the West Delta in 1997. Among the leading foreign companies that engaged in natural gas exploration and production (E&P) offshore of Egypt are British Gas, BP, GDF Suez, Edison, ENI, and Petronas.

The prospects for additional major foreign direct investment (FDI) in Egypt in the energy sector are mixed. Since 2008, a moratorium has been in place in Egypt on new gas export agreements in light of growing domestic consumption. Moreover, the current period of political instability in Egypt and the potential public backlash against natural gas export, as well as higher public scrutiny of the terms of energy deals, may discourage FDI in Egypt's energy sector. The Muslim Brotherhood's Freedom and Justice Party (the largest party in the newly elected Egyptian parliament) has called for revision of the terms of existing energy export contracts. At the same time, during the Mubarak reign, Egypt offered incentives to increase FDI in natural gas exploration in the Mediterranean through granting a higher price to the producing companies. In the current period of political transformation in Egypt, the government's policies on the regulatory framework for exploration and energy exports is uncertain.

Natural gas plays a particularly important role in Egypt's domestic energy consumption. It accounts for 49 percent of Egypt's total energy consumption and almost 70 percent of Egypt's electricity production (Figure 1).

The significant role that natural gas plays in Egypt's domestic energy consumption is a result of deliberate government policy. Successive Egyptian governments have viewed growth in natural gas utilization as a tool for economic growth in Egypt. Throughout the 1990s and early 2000s, the Egyptian government implemented policies that led to a dramatic increase in the domestic demand for natural gas. As part of this policy, in the period between 1998 and 2004, Cairo implemented a major shift to utilize gas in most of its power plants; major industrial consumers of electricity (e.g. cement and fertilizer factories) went over to natural gas.⁶ Natural gas supply infrastructure was established for the residential sector and almost 20 percent of Egypt's homes are now connected to natural gas supply. In addition, a significant portion of Egypt's vehicles use compressed natural gas (CNG). Domestic natural gas prices are set by Egypt's Ministry of Petroleum and the Cabinet, with little input from market forces. In the last decade, the price was \$1 per 1,000 cubic feet.⁷ Low domestic gas and electricity prices result from a major government subsidy. This subsidy involves significant

Figure 2



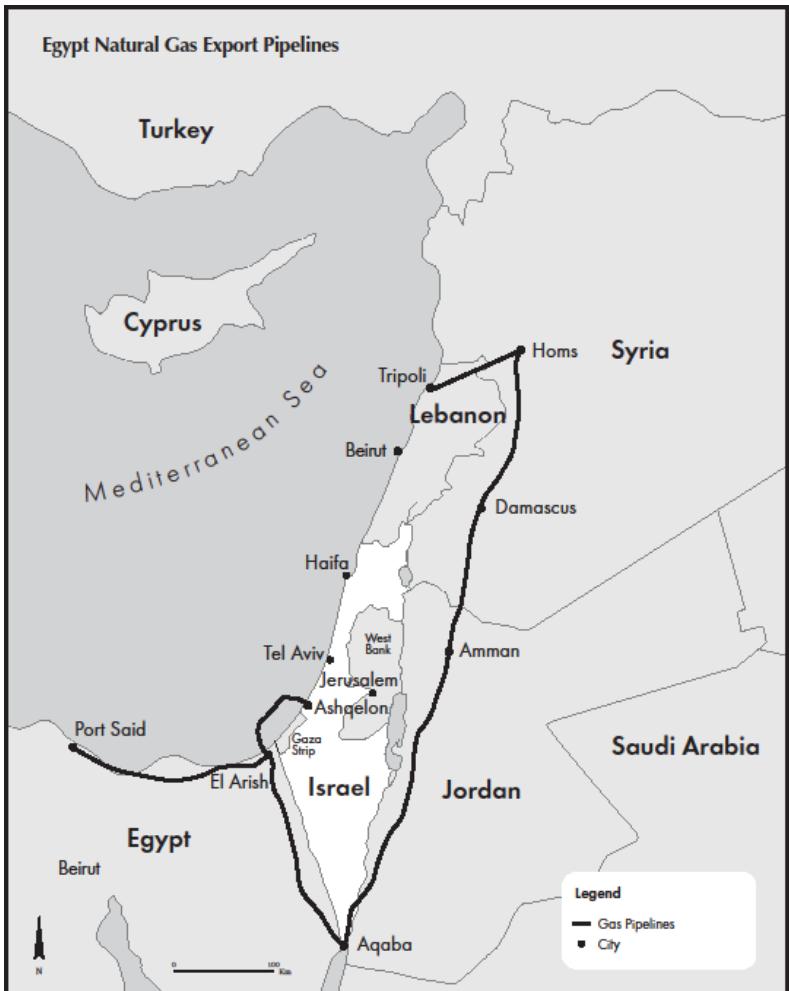
⁶ Al Ahram Center for Oil and Energy studies study published in *Al Ahram* (Cairo), February 2, 2008, available in English on the website of the Arab Republic of Egypt Ministry of Petroleum website <http://www.petroleum.gov.eg/en/MediaCenter/Studies/Pages/EgyptGasExport.aspx>.

⁷ Randa Alami, *Egypt's Domestic Natural Gas Industry* (Oxford Institute for Energy Studies NG, April 12, 2006), p. 23.

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Figure 3



government expenditure, but would be politically very difficult to eliminate.

Egypt initiated natural gas export in 2005 with the opening of two LNG plants.⁸ Exports increased when sales to Jordan began in 2007 and to Israel in 2008. The Arab Gas pipeline from Jordan to Syria was extended in 2008. Natural gas supply to Lebanon (through Syria) began in 2009. In 2009, Egypt exported close to 650 billion cubic feet (Bcf) of natural gas, around 70 percent of which was exported in the form of LNG and the remaining 30 percent via pipelines (Figure 3).⁹ Egypt's main LNG export destinations have been the United States, Spain, and France.

Egypt consumes approximately two-thirds of its natural gas production domestically. In 2009, Egypt produced 2.21 Tcf and consumed 1.57 Tcf. Egypt has had difficulty in supplying the domestic market and meeting its full export commitments simultaneously, so its gas exports have declined significantly between 2009 and 2011.¹⁰

In this period, supplies to Israel, Jordan, Syria, and Lebanon have regularly been below contractual commitments and subject to frequent disruption. The Egyptian LNG facilities also operate below their capacity. In 2010 and 2011, there were frequent disruptions in electricity provision to the domestic market, including summer blackouts in Cairo, which contributed to the public indignation against the regime.

The gap between Egypt's natural gas production and its consumption is narrowing (Figure 2). Thus, Egypt will need new gas finds or significant improvements in domestic energy efficiency to continue to export natural gas in significant quantities.

Regulatory Framework

Egypt grants exploration licenses to companies through Production Sharing Agreements (PSAs), and development leases are granted for 20 years following a discovery. Egypt has two national companies that are involved in oil and natural gas E&P and export: the Egyptian Natural Gas Holding Company (EGAS) and the Egyptian General Petroleum Corporation (EGPC). EGPC is the state entity charged with managing upstream activities including infrastructure, licensing and production. Promotion of the sector and the development strategy are managed by EGAS, which is also a partner in a number of the exploration projects.

Israel

Israel's energy consumption and production patterns have changed radically in the last decade. Until the first discovery of two small natural gas fields (collectively known as "Yam Tethys) offshore of Israel's southern coast

⁸ In 2012, in these two facilities Egypt had three LNG trains: Segas LNG Train 1 in Damietta and Egypt LNG trains 1 and 2 in Idku.

⁹ EIA "Egypt—Country Analysis," <http://205.254.135.7/countries/cab.cfm?fips=EG>

¹⁰ In 2009, Egypt's natural gas exports were 18.3 BCM (646.25 BCF), while in 2011 they stood at 16.1 BCM (568.55 BCF).

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in 1998, Israel had no domestic fossil fuel reserves.¹¹ Production at Yam Tethys began in 2004¹² and enabled Israel to start using natural gas. Until then, Israel's electricity had been produced almost entirely from coal and other fuel oils. In 2009, the Tamar field was discovered off Haifa, with 9 Tcf proved reserves¹³ at a depth of 1,650 meters. Leviathan, a very large gas field, was discovered in 2010, with estimated resources of 17 Tcf at a depth of 1,645 meters.¹⁴ In addition, a number of small fields were discovered in this period. Exploration for oil and gas is continuing off the coast of Israel in more than ten locations, and additional discoveries are expected.

Israel has imported natural gas from Egypt since 2008. From the commencement of supply, Egyptian gas supplies to Israel were erratic and of low quality. Nevertheless, Israel continued with these imports, as they were considered an important element in nurturing the peace agreement with Egypt.¹⁵ Following the overthrow of the Mubarak regime, the Egyptian gas supply to Israel (and Jordan) was disrupted on a regular basis, and in May 2012, EGAS announced the cancellation of the supply agreement to Israel. In lieu of the Egyptian gas supplies, the Israel Electric Corporation (IEC) has been obliged to produce a portion of the country's electricity from fuel oil, heavy oil, and diesel. This has led to a dramatic increase in production and consumer prices for electricity and to significantly higher pollution rates. Gas supplies to Israel's domestic market from Tamar will commence in 2013, and this will greatly enhance Israel's reliability of supply. In parallel, the IEC has commissioned the building of an offshore LNG receiving terminal in order to acquire additional gas supplies until the Tamar production becomes available as well as for future backup supplies. However, it is not likely that this stopgap measure will enable significant supplies to arrive before Tamar comes on stream.

¹¹ For more on Israel's natural gas reserves and energy policies, see Brenda Shaffer, "Israel—new natural gas producer in the Mediterranean," *Energy Policy* 39 (2011), pp. 5379-5387.

¹² The license is held by a joint venture between the Israeli Company Delek Energy and the U.S. Noble Energy.

¹³ The field is being developed within the framework of a license held by a joint venture of Noble Energy, the Delek Group, Dor Gas Exploration, and Isramco Negev.

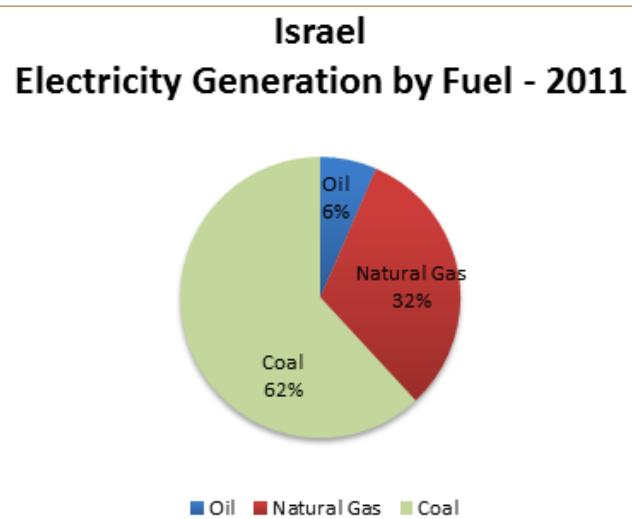
¹⁴ The Leviathan license is owned by Noble Energy, Delek Group, and Ratio Oil Exploration.

¹⁵ Israel's former minister of national infrastructures, who played a leading role in negotiating the deal stated regarding the gas supply agreement, said: "I saw in that agreement the most important added value for the State of Israel, because what is the significance of the peace treaty by itself? Nothing. It has no meaning, it is merely a non-belligerence agreement... In my eyes the gas pipeline is as important as the peace agreement." Benjamin Ben-Eliezer, quoted in *Haaretz*, April 30, 2012.

In light of the discovery of significant gas volumes, Prime Minister Benjamin Netanyahu established an inter-ministerial committee in February 2012 headed by the director general of the Ministry of Energy and Water, Shaul Zemach, to examine Israel's natural gas policies. The mandate of the committee was to evaluate the likely demand for consumption of natural gas and to propose policies for encouraging the emerging natural gas E&P sector, to establish a competitive market that ensures energy security taking into consideration Israel's unique geopolitical situation, and to recommend a policy on natural gas exports from Israel. The committee submitted its interim report in April 2012. After conducting public hearings on the initial report, the committee will submit its final recommendation in June 2012. The interim report recommends that Israel keep as reserves a minimum of 25 year supply of natural gas. Given current volumes and expected demand trends, this would leave about 10.5 Tcf (300 BCM) available for export. The committee also recommended that any export infrastructure would have to be established in Israel, dismissing the preference of the companies for locating the export infrastructure in Cyprus. Following the submission of the final report, the proposed policy will be examined by the various ministers and the public, and the prime minister's cabinet or the full government will need to approve a final policy.

The final policy that is approved may differ somewhat from the report produced by the ministry. The Israeli companies

Figure 4



Source: IEA data

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involved are pressuring the government to allow greater export; this would significantly reduce supplies available to the domestic market. Delek and Noble are also seeking the government's approval to export gas from Leviathan via an LNG facility in Cyprus. The political struggle over Israel's energy policies is complicated by the fact that none of the Israeli commercial entities that are engaged in the exploration is an oil and gas E&P company. Unlike most E&P companies that seek to market gas through long-term contracts to the domestic market, the Israeli companies seek quick monetization of the gas and thus prefer large-scale export.

For Israel, the discoveries allow the state to significantly improve its energy security. The domestic natural gas reserves will enable Israel to expand its natural gas consumption and thus to reduce pollution and climate change emissions, and improve public health. According to current power plant planning, by 2020, Israel will produce over 70 percent of its electricity from natural gas.

The natural gas reserves will spur Israel to engage in technological development related to utilization of natural gas in a variety of sectors, such as transportation and agriculture. The government has begun allocating major funds to foster scientific developments in this field. Israel will also need to provide security arrangements for the newly discovered natural gas fields and related infrastructure. Israel is likely to strengthen its capacity in maritime security and other advanced technology related to energy infrastructure. This could contribute to global knowledge in this field and create a new technological niche for Israeli companies.

Regulatory Framework

Exploration for oil and gas is carried out in Israel and its EEZ in the framework of exploration licenses granted by the Ministry of Energy and Water (formerly the Ministry of National Infrastructures) and governed by Israel's 1952 Petroleum Law. The law authorizes the petroleum commissioner, who is part of the Ministry of Energy and Water, to allot permits, licenses, and leases. Initial exploration licenses are granted for three years. According to the law, a company receives a 30-year lease upon discovery of a commercially viable reserve, with the option for an additional 20-year lease. In return for the lease, the producing companies must pay 12.5 percent royalties on the oil and natural gas produced. The law stipulates that the producing

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companies must allow the state to purchase all the volumes it desires for local consumption at competitive prices.

Israel does not have a oil company or any state companies that are involved in the E&P process. The ministry's Natural Gas Authority was established in accordance with the Natural Gas Industry Law, and is responsible for planning, licensing, and regulating the domestic natural gas market. Israel does not have a central government authority that purchases natural gas and distributes it to consumers. Instead, each consumer contracts gas directly from the producing companies.

Palestinian Authority/Gaza Strip

In 2000, a small gas field was discovered by British Gas in an area that straddles the coasts of the Gaza Strip and southern Israel. The Gaza Marine Field contains approximately 1.2 Tcf (35 BCM) of natural gas. During the Middle East peace summit at Camp David in 2000, former Israeli Prime Minister Ehud Barak relinquished control of this area to the Palestinian Authority. But as of 2011, the Palestinian Authority and British Gas have not made a decision to develop production of Gaza Marine. The government of Israel has opposed development of this field and its utilization by the Hamas government in the Gaza Strip. Today, the Gaza Strip and the West Bank receive almost all of their electricity from Israel. The exception is the city of Jericho, which is supplied by Jordan, and there is a small diesel-based power plant in operation in the Gaza

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Strip. Currently, the Palestinian Authority and the Hamas government in the Gaza Strip have not established a regulatory framework to encourage exploration offshore of Gaza. Without a change in prevailing political relations in the region, further exploration activity offshore of Gaza is unlikely.

Development of the Gaza Marine field could be a win-win for Israel and the Palestinians. Utilization of the field to produce electricity for the Gaza Strip and West Bank could reduce the burden of production for the IEC to provide electricity to the Palestinians. About 9 percent of Israeli electricity output is supplied to the West Bank and Gaza Strip and the payment regime is extremely poor, often adding extra financial burden to the already cash-strapped organization. The Palestinians could benefit from having an independent source of electricity supply, and from improved public health resulting from lower pollution. This could also provide jobs for residents of Gaza and the West Bank.

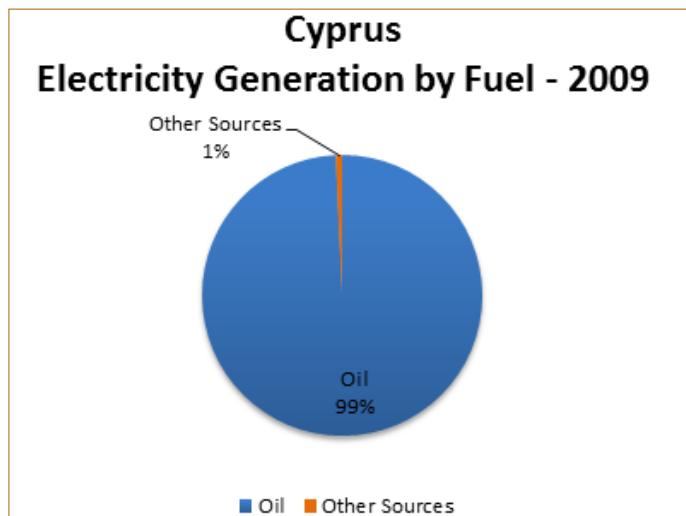
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Cyprus

Cyprus is currently undergoing a fundamental change in its energy policies, which will significantly affect its economy, environment, and foreign policy. The trigger to this change is the discovery of gas in Cyprus's EEZ and in adjoining parts of Israel's EEZ, as well as the explosion that destroyed its newest power plant, Vassilikou, in July 2011.¹⁶ Cyprus has been an EU member state since 2004, although the EU's laws and rules are not implemented in the northern part of the island.

Since Cyprus is a member state, the EU has an interest in efforts to find a comprehensive settlement of the Cyprus problem and in foreign policy and energy-related issues affecting the island. The EU also has an interest in limiting conflicts arising from exploration for gas and oil in Cyprus's EEZ and in fostering Cyprus's potential for natural

Figure 5



Source: IEA data

gas exports to other markets in Europe. The EU hopes its rotating presidency will run smoothly when Cyprus takes it over in July 2012, despite challenges from Turkey and Cyprus's vulnerability to the sovereign debt crisis.

In December 2011, Cyprus made its first natural gas discovery in the Aphrodite ('Block 12') field, which contains an estimated 5-7 Tcf of natural gas. Noble Energy led the exploration at Aphrodite, which is located 34 kilometers west of Israel's Leviathan field.

In May 2012, Cyprus conducted a tender for a second round of exploration licenses and received substantial international commercial interest, including from Petronas, Edison, Enel, Total, Novatek, Woodside, Vitol, KOGAS, and ENI. The involvement of companies of this caliber testifies to the higher profile of the eastern Mediterranean following discoveries in 2009-2011. In response to the start of exploratory drilling in the Aphrodite field, Turkey announced that drilling would begin off the shore of northern Cyprus. On-shore drilling in northern Cyprus, which the Turkish energy minister described as largely symbolic, began in April 2012.

Cyprus has been promoting the idea of the construction of an electricity link with Israel and Greece, and the three states are studying the costs and implications of such a link.

¹⁶ Vassilikou had a capacity of 770 mw. The combined capacity of the two other stations in Cyprus, at Moni and Dhekelia, is 680 mw.

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Regulatory Framework

Nicosia's energy policies are formulated and energy sector supervised by the Ministry of Commerce, Industry, and Tourism. The main legislation governing energy exploration is The Hydrocarbons (Prospection, Exploration and Exploitation) Law of 2007 and The Hydrocarbons (Prospection, Exploration and Exploitation) Regulations 2007 and 2009. In the last year, a number of officials and members of the business community in Cyprus have encouraged the government to establish a separate ministry dedicated to the energy sector in light of the emerging E&P activity.

Potential Future Exploration in the Region

Lebanon

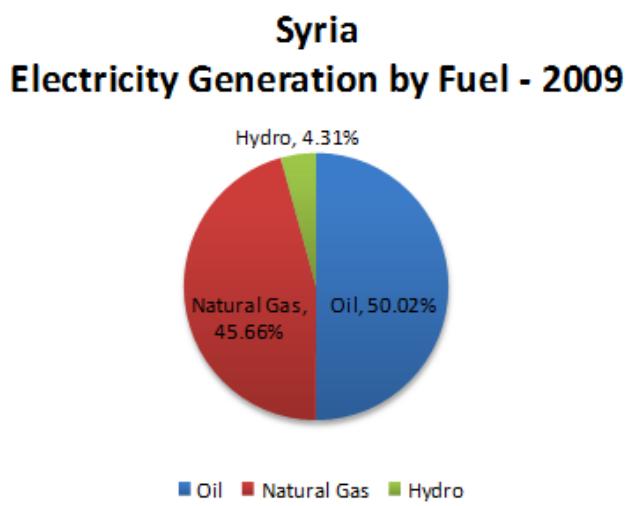
Lebanon has not had any offshore discoveries of oil and natural gas until now and has no domestic fossil fuel sources. Lebanon imports small amounts of Egyptian gas via Syria, and most of its oil imports come from Syria. In August 2010, the Lebanese Parliament approved a Petroleum Law, following strong disagreements between opposing political factions. The Ministry of Energy and Water has commissioned surveys of Lebanon's offshore waters. The ministry is also preparing Lebanon's first licensing round.¹⁷ While Lebanon prepares to launch offshore exploration, it has continued with efforts to import LNG, recently calling for commercial expressions

of interest in construction and operation of a floating LNG supply facility. According to the tender announcement, Beirut plans to decide on the award of the contract in 2013 and supply should commence in 2015.¹⁸

Syria

Syria produces approximately 400,000 barrels a day of oil and small quantities of natural gas from onshore fields. The country has not had any offshore discoveries of oil and natural gas. Its proven natural gas reserves are estimated at 8.5 Tcf (240 BCM).¹⁹ In 2009, Syria produced an estimated 219 billion cubic feet per year (6.2 BCM) of natural gas and consumed 251 Bcf (7.1 BCM). The remaining gas needed for domestic consumption was imported from Egypt (via Jordan). Despite instability in Syria, production of natural gas increased by approximately 10 percent in 2011, due to production in two new onshore sites. Approximately one-fourth of the natural gas consumed in Syria is used by the oil production sector for reinjection and the rest is for power generation. The Syrian Ministry of Petroleum and Mineral Resources and Syria's General Petroleum Corporation (GPC) established three offshore blocks for bids in March 2011. With the current turmoil in Syria and international sanctions, exploration activity is on hold.

Figure7

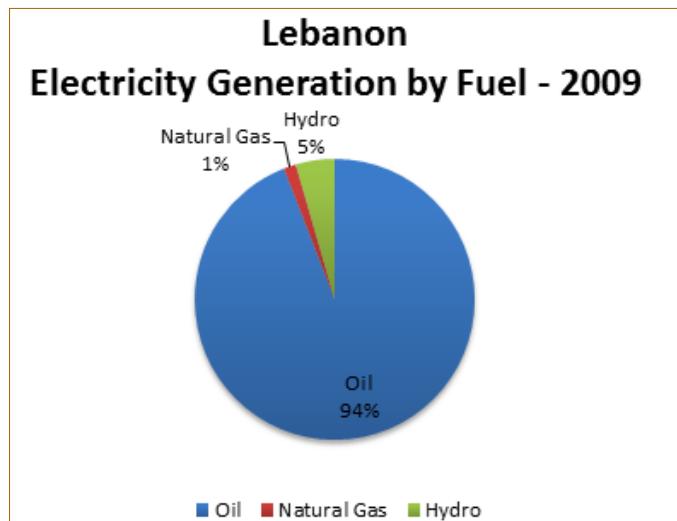


Source: IEA data

¹⁸ <http://www.lngworldnews.com/lebanon-to-join-Ing-importers-club/>

¹⁹ "Syria—Country Analysis Brief," EIA, Department of Energy, US Government, <http://205.254.135.7/countries/cab.cfm?fips=SY>.

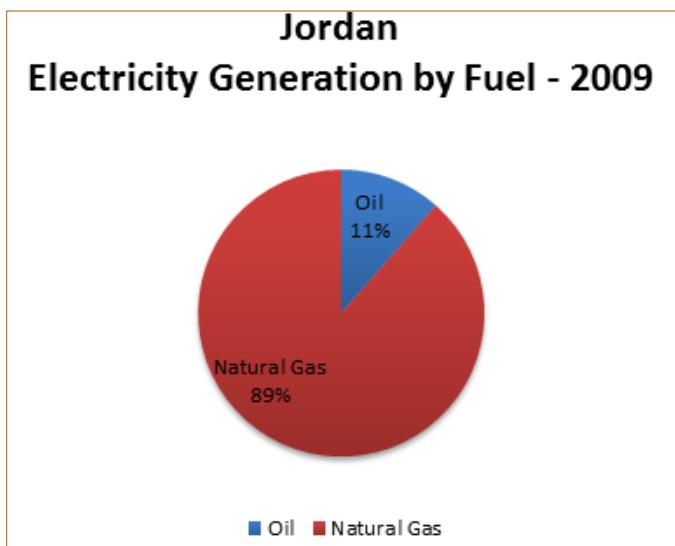
Figure 6



Source: IEA data

¹⁷ http://www.lebanon-exploration.com/Leb_1st_Licensing_Rnd.htm.

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Figure 8

Electricity Production

Most of the states in the eastern Mediterranean and adjacent Middle East region have major problems with electricity production, which leads to unstable supply, high production costs, and high rates of pollution. Syria, Lebanon, and Cyprus experience regular power shortages. Lebanon's power shortages average from 3-10 hours a day. Egypt experienced regular power shortages in the last year of the Mubarak regime. Israel may need to ration power supply in summer 2012 due to inability to meet demand without the Egyptian gas supplies. Cyprus also rations its supplies, with frequent power cuts.

The states in the eastern Mediterranean region produce electricity from different fuel mixes. Oil is a major component of these fuel mixes, leading to high costs and high pollution rates. Better access to stable natural gas supplies could contribute greatly to solving their electricity supply problems. Over 80 percent of Jordan's electricity is produced from natural gas, depending on the arrival of supplies from Egypt. The shift to natural gas in Jordan has greatly reduced production and consumer costs and pollution. It is expected that Israel will produce over 70 percent of its electricity from natural gas within a decade. However, both states experience major security of supply challenges. The lack of stable gas supplies from Egypt since 2011 has led both Israel and Jordan to increase their use of fuel oil, gas oil, and diesel for electricity production.

Syria and Lebanon rely mainly on different fuel oils for a large part of their electricity production and this creates high costs of production and high pollution rates. Access to natural gas could lower both. Since the explosion of its major power plant, Vassilikou, in July 2011, Cyprus has engaged in a major overhaul of its electric system and is weighing the benefits of different fuel mixes.

Many of the countries in the region provide electricity at subsidized rates to their population, leading to inefficiency and high public expenditures on energy. This problem is particularly acute in Egypt. Utilization of more natural gas in the region could lower production costs and thus decrease the burden on the public budget of electricity subsidies.

Global Gas Trends and Commercial Prospects

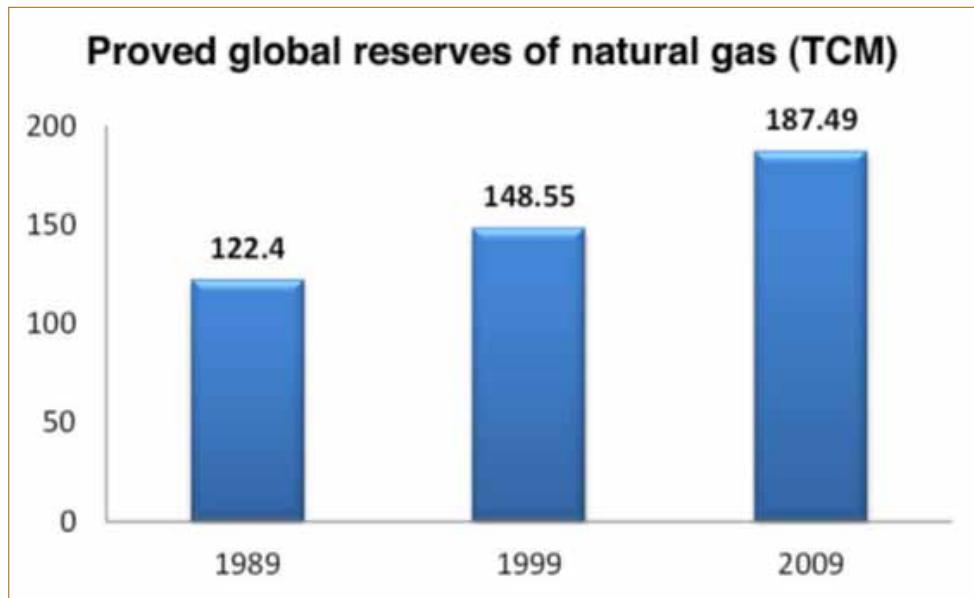
The new eastern Mediterranean discoveries and continued exploration are taking place in a period of both heightened global demand for natural gas and increased supplies. In the past two decades, global natural gas supply has grown at a faster rate than demand, despite a large rise in demand (see Figure 9).

However, gas supplies target a specific market and not a global market. There is major demand for new gas supplies in the eastern Mediterranean region itself, neighboring states in the Middle East, and some markets in southern Europe. Moreover, the participation of a number of important E&P companies in the bids for exploration licenses offshore of Cyprus indicates that there is strong international commercial interest in the eastern Mediterranean volumes.

The eastern Mediterranean gas volumes have been discovered at a time of conflicting trends in LNG markets. The future dynamics of LNG trade that are emerging are not clear: is the LNG market set to become global or not? The extent of inter-regional LNG trade and spot trade is growing, indicating the development of LNG trade in the direction of a global market, or at least markets that have a significant influence on each other. However, major new discoveries of natural gas in recent years in several countries, including the United States, have led to an even larger price differentiation than in the past between various markets. In addition, discoveries of gas in new geographic locations have eliminated demand for LNG imports there. This pattern may continue in the coming years. Large-scale

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Figure 9



discoveries in new areas (e.g. shale and offshore in China) may create opportunities for pipeline supplies in China and neighboring states in Asia, and thus reduce demand for LNG imports.

Natural gas production from the eastern Mediterranean will face stiff competition in Asia from new production in East Africa and Russia as well as expanded production in Australia and Qatar. There are prospects for major discoveries in China that would completely change the dynamics of Asian LNG markets. The gas supplies from the eastern Mediterranean have few comparative advantages to potential consumers in Asia. However, political interests may motivate Chinese companies to bid for ownership and/or imports in the future.

According to existing production and consumption trends, a gas supply gap late in the decade will open markets in Europe that would be a strong commercial opportunity for supplies from the eastern Mediterranean. However, the increase in demand in Europe is dependent on economic growth, which is by no means assured, especially in southern Europe. A number of additional constraints may limit exports to markets in Europe. The EU is committed to the diversification of energy sources, both in terms of origin and of types of energy, but the construction of the necessary infrastructure to achieve this goal, such as new interconnectors, may be put on hold because of the debt crisis. It is unlikely to be financed by private investment.

The planned extension of gas supply infrastructure that could allow the eastern Mediterranean volumes to reach multiple markets in Europe will probably be subject to funding constraints. Europe requires considerable additional investment to expand the transmission capacity through Turkey or Greece. Russia is well positioned to thwart eastern Mediterranean producers from cutting into natural gas export markets in southern Europe, which are dominated by the Russian state-owned company, Gazprom. If the gas produced in the eastern Mediterranean were to be marketed by Russian companies, diversification of supply and increased competitiveness on European markets would be undermined.

From a commercial perspective, the comparative advantage of the new natural gas volumes in the eastern Mediterranean is their proximity to markets that are seeking increased supplies of natural gas from new sources. The involvement of an EU member state, Cyprus, should, in principle, favor European markets.

However, eastern Mediterranean production will be relatively expensive; it is new, small (at this stage), and in deep water. The companies involved in the exploration have given a positive public presentation of the fact that the recent discoveries are in deep-water sites ("Leviathan is the largest deep water discovery in the past decade"). However this is in reality a disadvantage because deep water natural gas production is intrinsically more expensive than production in shallow water or onshore.

The increase in demand in Europe is dependent on economic growth, which is by no means assured, especially in southern Europe.

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The eastern Mediterranean finds could make a modest contribution to the diversification of energy sources in some markets in Europe. However, further large discoveries will be needed to have a significant impact on European markets. In any event, gas production by Cyprus, Israel, and, in the future, other states will lead to expanded natural gas consumption in the region itself. The natural gas volumes will change the way electricity is produced in most countries in the region and provide capacity to produce cleaner and cheaper electricity in a reliable manner.

In terms of export facilities, one of the most commercially attractive options is to use Egypt's existing LNG facilities, since there is already a gas pipeline between Israel and Egypt. Moreover, the Egyptian facility often does not run at full capacity. However this otherwise attractive option is fraught with political uncertainties.

Implications

The eastern Mediterranean basin is at the beginning of the process of becoming an energy-producing region. At current volumes, the new discoveries in Israel and Cyprus will not be a game changer for markets in Europe and Asia. However, if additional volumes are discovered and authorization is given for export, EU and third-country markets will also benefit. In any event, the new discoveries are significant for the region itself and will change the way it uses energy and produces electricity.

At the same time, before even one cubic meter has been produced from the new volumes, conflict has reigned in the region over maritime delimitation between Israel and Lebanon and between Cyprus and Turkey. The governments in the region seem to overestimate the geopolitical benefits of existing gas finds, and this could contribute to higher risk tasking and raise the propensity for conflict in this already turbulent region.

The natural gas finds can make a positive contribution to lowering conflict over water supplies in the greater Mediterranean region and adjacent Middle East countries, since the gas can be used to produce cheap and clean energy for desalination plants. A move to more widespread production of energy from gas can also lead to considerable reductions in pollution. There does need to be stronger regulatory oversight in particular to reduce the risk of spills and other accidents. The Mediterranean region is antici-

pated to be one of those hardest hit by climate change. The gas reserves can help the region adapt to climate change by providing a cheap and clean source of energy that will help meet rising electricity demands and increased water production.

About the Author

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