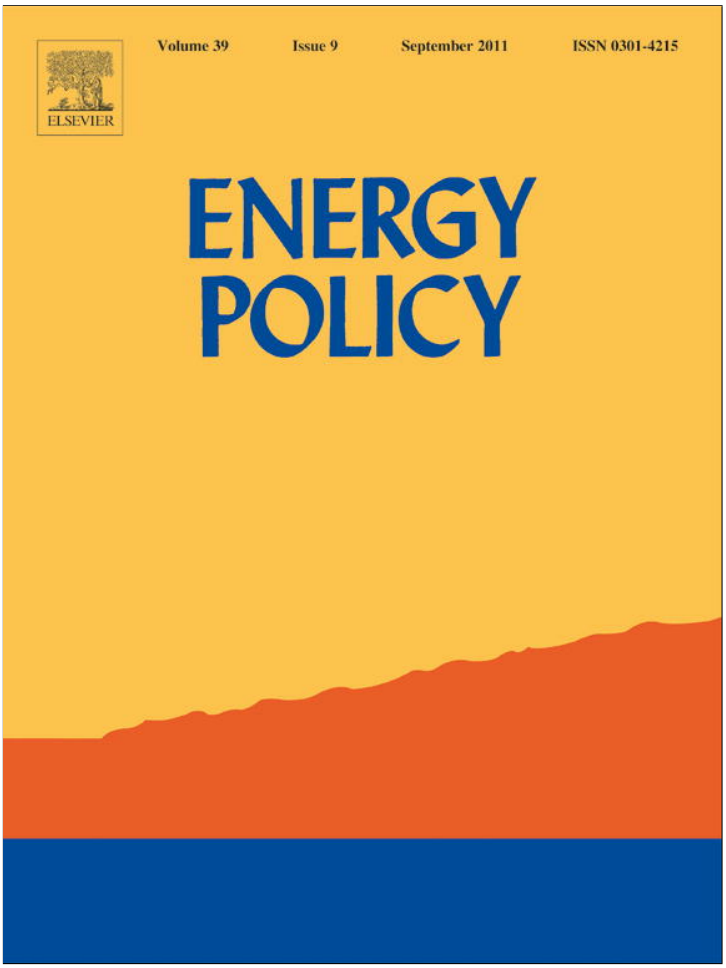

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Israel—New natural gas producer in the Mediterranean

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ABSTRACT

In 2009 and 2010, major offshore natural gas reserves were discovered near the State of Israel. This article examines Israel's newly discovered natural gas reserves and the implications of this discovery for Israel, the Middle East, and the Mediterranean region. The article will discuss Israel's energy security approach; the role of natural gas in Israel's energy consumption patterns; the organization of Israel's natural gas sector; regional political and security implications of the natural gas discoveries; the prospects for export, and the outlook for various natural gas markets. These new discoveries significantly improve Israel's energy security. They may also spur Israel to develop technologies related to utilization of natural gas in a variety of sectors, such as transportation. The discoveries may contribute to the emergence of a number of maritime border delimitation conflicts in the Eastern Mediterranean. At current volumes, the Israeli discoveries will not be a game-changer for gas markets in southern Europe or liquefied natural gas (LNG) markets. However, they will lead to expanded natural gas consumption in the region. In addition, offshore exploration efforts in Israel and in neighboring countries are intensifying. Additional discoveries may turn the Eastern Mediterranean region into a new source of natural gas and oil.

1. Introduction

For most of its history, Israel has been an energy-poor state, relying almost completely on imported fossil fuels to meet its energy needs. Due to the state of war and conflict with most of its neighbors, Israel has also functioned as an "energy island," not linked to energy infrastructure in neighboring states, with the exception of gas supplies from Egypt. Israel has two additional energy security challenges: ensuring energy supplies for the military during times of conflict and ensuring the physical security of its energy infrastructure, which can be targeted during war or by terrorists. Moreover, Israel fears denial of supplies more than most energy importers, due to a history of embargos by Arab oil producers and previous attempts to block Israel's ports in times of conflict.

In 2009, Israel's energy supply options changed dramatically when major offshore natural gas deposits were discovered near Israel's port city of Haifa. When brought to market, this gas will satisfy a large portion of Israel's domestic energy consumption needs for a number of decades. The government and the companies that hold the exploration licenses are also considering exporting some of the gas. Explorations are continuing off Israel's coast, and there are strong indications that additional reserves of natural gas and perhaps of oil will be discovered. Lebanon and Cyprus have also initiated exploration off their coasts, and there may be additional major natural gas and oil discoveries in the Eastern Mediterranean in coming years.

This article will examine Israel's newly discovered natural gas reserves and the implications of this discovery for Israel, the Middle East, and the Mediterranean region. The article will discuss Israel's energy security approach; Israel's new natural gas reserves; the role of natural gas in Israel's energy consumption patterns; the organization of Israel's natural gas sector; regional political and security implications of the natural gas discoveries (including potential conflict with Lebanon); prospects for natural gas export; and the outlook for various natural gas markets. Most of the academic literature published to date on Israel and energy focuses on its predicament as an energy-poor state, centering on its drive to achieve access to energy supplies,[1] its attempts to serve as an energy transit state,[2] or how energy needs have constrained Israel's security and foreign policy.[3] This is one of the first articles to reflect the significant changes that have occurred in light of new natural gas discoveries off the coast of Israel.

2. Israel's energy security approach

Energy security has three components: reliability, affordability, and environmental sustainability (Shaffer, 2009). For most of its

[1] Among the prominent articles on this topic are: Bahgat (2010,2005), Coxon and Greenfield (1982), and Rosen (1982).
[2] Bialer (2007).
[3] Bahgat (2008).

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history, Israel has strongly emphasized reliability of supply in its energy policies, and thus oil and coal played the dominant role. Most Israeli policymakers viewed natural gas, which demands permanent infrastructure and long-term supply contracts, as a risky venture from a supply security perspective. Despite the benefits of natural gas in terms of cost and environmental impact, Israel only began to seriously pursue attaining natural gas imports in the early 1990s. In 1993, Israel signed a Memorandum of Understanding with Qatar on natural gas supplies. This agreement, while not implemented, was made possible by the warming of relations between Israel and its neighbors following the signing of the Declaration of Principles between Israel and the Palestinian Liberation Organization (PLO) in September 1993. Throughout the 1990s and up until the recent discoveries, Israel also pursued natural gas import options from the new states of the former Soviet Union, primarily Russia and Azerbaijan via Turkey. Israel's first discovery of its own modest-sized domestic natural gas reserves in 1999 gave the state the confidence to convert a large part of its power generation sector to natural gas and initiate imports.

Israel's near-obsession with the security of its oil supply has stemmed from Arab producers' dominance in the world oil market. These producers have prevented oil tankers and other energy-related vessels and equipment from entering Israeli ports, some neighboring states have attempted to block oil supplies to Israel during wars, and the Arab producers in OPEC declared a boycott on Israel after the 1973 Yom Kippur War. However, the global oil market has experienced dramatic changes since the 1970s, and the shift of oil trade to mainly between companies on spot markets means that politics rarely disrupts oil supplies to consumers in today's world. Moreover, the relative weakening of OPEC's dominance – non-OPEC producers currently bring 60 percent of the world's oil to market – has vastly improved Israel's oil supply options. However, Israel's continued policy emphasis on a specific approach to energy security does not reflect these dramatic changes in the oil trade since the 1970s and policymakers and the public still view attaining access to oil as a formidable challenge.

Israel treats its energy policies as a national security issue. While formally the Ministry of National Infrastructures is the main ministry leading and coordinating energy policy, the Prime Minister's Office, Ministry of Finance, National Security Council, National Economic Council, and Ministry of Foreign Affairs play leading roles in setting Israel's energy policies. Israel considers much of the data connected to its energy consumption as classified information, and thus officially publishes statistics on energy trends only after a delay of four years. In addition, Israel does not officially reveal data on its strategic reserves. Consequently, despite joining the Organization for Economic Development and Cooperation (OECD) in 2010, Israel has not sought membership in the OECD-affiliated International Energy Agency (IEA), which coordinates emergency supplies among member states and shares data on reserves.

Israel possesses unique energy security needs, since its energy infrastructure and ports are targeted during wartime, precisely when the military needs specific energy supplies. In addition, Israel's energy policies are intertwined with its water supply policies, since the state produces much of its water supply through desalinating of sea water, which demands significant amounts of energy.

Despite its strong emphasis on energy security, Israel's privatization policies have significantly reduced the state's role in the energy sector during the last decade: Israel has taken a relatively strong position in favor of creating conditions for competition and prevention of state involvement in natural gas contracts. It has also ensured that multiple companies have access to gas supply lines, even though there is little chance of developing competition in Israel's small and isolated energy market. Unfortunately, the lack of state involvement in long-term natural gas purchases hampers the state's efforts to launch production from the newly discovered natural gas fields.

3. Israel's natural gas reserves

Within a decade, Israel has gone from a country possessing virtually no domestic natural gas reserves to one that is considering exporting natural gas. Since independence in 1948, Israel has encouraged exploration for oil and natural gas in its territory. Throughout its history, the Government of Israel has offered very attractive commercial conditions to prospective explorers as part of its attempt to improve its energy supply and thus its energy security. However, few major oil and gas companies showed interest in exploring for reserves in Israel. This is especially the case since any international company that explored for energy in Israel could be precluded from lucrative projects in Arab oil-producing states that formally boycott companies, ships and equipment that operate in Israel (Bahgat, 2005). Consequently, Israel only had its first commercially recoverable discovery of fossil fuel in 1999, with natural gas discoveries at the Noa and Mari-B fields in the Mediterranean near Ashkelon (these fields are collectively known as Yam Tethys). A joint venture between Delek Energy[4] and Noble Energy[5] owns the production license at Yam Tethys, which contained 32 billion cubic meters (BCM) of natural gas when it was discovered. Noble Energy is also the operator of the project. The Israel Electric Corporation (IEC) purchased the bulk of the natural gas produced at Yam Tethys, enabling Israel's initial use of natural gas for generation of electricity. Yam Tethys will be depleted in 2013.[6]

Following the Yam Tethys breakthrough, British Gas discovered another field in 2000 off of Israel's southern coast and the Gaza Strip. The Gaza Marine Field contains approximately 35 BCM of natural gas.[7] As of 2011, the Palestinian Authority and British Gas have not made a decision to develop production of the natural gas at Gaza Marine.

Beginning in 2009, there were a series of natural gas discoveries off of Israel's northern coast that have sharply increased Israel's natural gas reserves and will enable the state to dramatically change its energy consumption patterns. In January 2009, the offshore Tamar natural gas field was discovered near the city of Haifa (at a depth of 1650 m). The field reportedly contains approximately 240 BCM of natural gas. The field is being developed within the framework of a lease held by a joint venture of Noble Energy, the Delek Group, Dor Gas Exploration[8] and Isramco Negev.[9] According to the latest company reports, development of Tamar will cost 3 billion dollars (Bar-Eli, 2010). The companies plan to begin construction of production facilities in 2011 and to deliver gas to the Israeli market by early 2013.

[4] Delek Energy Ltd., the oil and gas exploration and production arm of the Delek Group, is a public company whose shares have been listed on the Tel Aviv Stock Exchange since 1982. Delek's subsidiaries that are involved in the oil and gas exploration in Israel include Delek Drilling and Avner Oil Exploration.

[5] Noble Energy is a Houston based independent energy company that is listed on the New York Stock Exchange.

[6] The Israeli government is considering retaining some of the reserves in Yam Tethys as an emergency reserve storage facility.

[7] In 1999 Prime Minister Ehud Barak relinquished control over this offshore area to the Palestinian Authority as part of peace process efforts.

[8] Dor Gas Exploration is a subsidiary of the Dor Alon Company. The Israeli businessman David Wiessman holds 54 percent of the ownership of the company's stock through his private company Bielsol Investments.

[9] Isramco Negev is an energy exploration limited partnership that is a subsidiary of Naphtha Israel Petroleum Corporation. Naphtha was a state-owned Israeli company until 1996. It is traded on the Tel Aviv Stock Exchange.

In April 2009, seismic tests conducted at the offshore Dalit field offshore near the Israeli northern city of Hadera indicated that the field contains approximately 14 BCM of natural gas. Noble Energy is also the chief operator of this project, and owns the production license together with Isramco Negev, Delek Group and Dor Gas Exploration.

The most dramatic natural gas discovery in Israel took place in June 2010 at the Leviathan offshore field, which is also off the coast of Haifa. According to the latest tests conducted by the field operator, Noble Energy, Leviathan contains 460 BCM of natural gas (at 1645 m depth). The Leviathan license is owned by Noble Energy, Delek Group and Ratio Oil Exploration.[10] Leviathan may also contain oil and additional natural gas volumes, and Noble Energy and its partners plans to continue to drill at the site at deeper levels.

There will likely be additional offshore oil and natural gas discoveries in Israel and other Eastern Mediterranean states. The U.S. Geological Survey has estimated that the Levant Basic Province of the Eastern Mediterranean contains 1.7 billion barrels of recoverable oil and 3.45 trillion cubic meters of recoverable natural gas (U.S. Geological Survey, 2010). Offshore exploration for oil and gas is continuing off the coast of Israel in more than ten locations. In addition, there are strong indications that significant natural gas reserves will also be discovered near neighboring Cyprus, where Noble Energy is leading the exploration efforts Fig. 1.

4. Israel's energy consumption trends: the role of natural gas

Israel's energy consumption patterns have changed significantly in the first decade of the 21st century. Until 2004, Israel's primary energy supply consisted of oil and coal and a very limited amount of renewable sources. Natural gas plays a growing but still small role in Israel's total primary energy supply (TPES): in 2008, natural gas was only the source of 10.6 percent of Israel's TPES, significantly below the OECD average of 25 percent.[11] In 2008, Israel's total energy consumption consisted of 22,009 kilo tons of oil equivalent (ktoe).[12]

Fig. 2 Natural gas entered Israel's energy mix for the first time in 2004, when the domestic field of Yam Tethys began to supply the Israeli market. Natural gas consumption expanded in 2008, when the Eastern Mediterranean Gas and Oil (EMG) Company began importing natural gas from Egypt to Israel.[13] Israel Electric Corporation signed a contract with EMG for 25 BCM of natural gas over 15 years. EMG constructed an undersea pipeline from El Arish in Egypt's Sinai to the Israeli port of Ashkelon. The pipeline capacity allows supplies of up to 7 BCM annually. In 2010, EMG supplied 2.5 BCM of natural gas to consumers in Israel. With the combined supplies from Egypt and the domestic Yam Tethys fields, Israel consumed approximately 5.3 BCM of natural gas in 2010.[14] Israel's Natural Gas Authority estimates that in 2011, natural gas consumption in Israel will reach above 6 BCM (Stern interview 2011) Fig. 3.

Israel primarily used natural gas to generate electricity in the last decade. Until 2004, Israel produced all its electricity from coal and oil. In 2007, 19.8 percent of Israel's electricity came from natural gas. In 2009, the amount rose to 32.6 percent. Natural gas has supplanted the use of oil in Israel's power generation, and a few large-scale factories in Israel utilize natural gas for industrial purposes. The Israel Electric Company has formally declared its goal to generate 48.4 percent of Israel's electricity from natural gas by 2013.[15]

In the last two decades, Israel's electricity consumption rate has increased significantly, with a 150 percent increase between 1990 and 2009.[16] Israel's growing economy, its expanding use of desalination for water production, and the arrival of a million new immigrants from the former Soviet Union in the 1990s all contributed to the increased demand for energy. Between 1990 and 2009, Israel's population almost doubled.[17] Despite this growth, Israel's rate of electricity consumption is relatively low in comparison to other OECD member countries.[18]

In addition to its domestic consumption, Israel provides electricity to the Palestinian Authority. In 2010, 9 percent of Israel's total electricity consumption consisted of electricity supplied to the Palestinian Authority. Almost all of the Palestinian Authority's electricity supply comes from Israel, since the authority possesses a single diesel fueled 140-megawatt power station in the Gaza Strip.[19] In future peace arrangements, the sides most likely will decide that the Palestinian Authority or its future successor should produce its own electricity, or at least a major portion of it. This would reduce the growth rate of Israel's electricity consumption. Utilization of the Gaza Marine gas field to produce electricity in the Gaza Strip could also lower pollution in the Gaza Strip and thus improve public health.

Prior to the major natural gas discoveries of 2009 and 2010, the government of Israel took a number of steps to provide additional natural gas and other energy sources to meet increasing electricity needs: authorizing tenders for establishing a LNG import terminal and LNG supply contracts, constructing an additional coal-fired plant, and establishing a solar electricity plant in the Negev Desert.[20] Despite the discovery of significant natural gas volumes in Israel, the government has not yet canceled most of these projects that pre-dated the discoveries. Presumably, changes will take place in 2011 as the government considers new policy options made possible by these gas discoveries. The Ministry of National Infrastructures has authorized the commissioning of a new energy sector master plan for the year 2050, and this plan will need to reflect new policies based on the opportunities created by Israel's natural gas discoveries. The stated primary goal of the master plan reflects Israel's policy focus on ensuring security of supply:

> The purpose is to ensure reliable, high-volume production of energy for all sector consumers during routine and emergency times in the short and long-term while maintaining minimum costs for the sector and in view of the need to reduce

[10] Ratio Oil Exploration is an Israeli energy exploration limited partnership that is traded on the Tel Aviv Stock Exchange.

[11] IEA, http://www.iea.org/stats/graphresults.asp?COUNTRY_CODE=25, accessed February 17, 2011.

[12] IEA statistics, http://www.iea.org/stats/indicators.asp?COUNTRY_CODE=IL, accessed February 17, 2011.

[13] EMG is an Egyptian company. The Israeli businessman Yosef Mehman (through his private company Merhav and the public Ampal-American Company) holds 25 percent of the ownership. EMG was headed (until his departure from Egypt in February 2011) by Hussein Salem, a close associate of Egyptian former president Hosni Mubarak. Salem, Mubarak and members of Mubarak's family are under investigation in 2011 in Egypt for corruption and fraud in connection to EMG's natural gas exports.

[14] Ministry of National Infrastructures, State of Israel, http://www.mni.gov.il/mni/he-il/Gas/NGDemand/ accessed February 17, 2011.

[15] Israel Electric Corporation (2010).

[16] US Energy Information Agency, http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=2&pid=2&aid=2&cid=r5,&syid=1990&eyid=2009&unit=BKWH.

[17] In 1990, the population of Israel was 4,821,000 and in 2009 reached 7,522,000. Central Bureau of Statistics (2010).

[18] See International Energy Agency http://www.iea.org/stats/indicators.asp?COUNTRY_CODE=IL, accessed February 17, 2011.

[19] The only power station in the Palestinian Authority is a 140-megawatt power station in the Gaza Strip. Consumption of electricity has been growing rapidly in the Palestinian Authority in the last decade, at an approximate rate of six percent annually in the West Bank and 10 percent in Gaza from 1999 t0 2007. See, West Bank and Gaza Energy Sector Review (2007).

[20] State of Israel, Government Decisions: 2178, 3260, and 177 (in Hebrew).

Fig. 1. Israel's natural gas fields.

dependency in foreign suppliers and to make use of more diverse energy sources.[21]

5. Organization of Israel's natural gas sector

Israel's Ministry of National Infrastructures is responsible for regulating energy production, and distribution. Two of the main laws governing Israel's oil and gas sector are the Law of Petroleum (1952) and the Natural Gas Industry Law (2002).

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 a supplier.

The companies that discovered Israel's natural gas reserves were granted exploration licenses for three years and then production leases for an initial term of 30 years within the framework of Israel's 1952 Petroleum Law. The law authorizes the Petroleum Commissioner, who is part of the Ministry of National Infrastructures, to allot permits, licenses, and leases. 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 to the State of Israel. The law stipulates that the producing companies must allow the state to purchase all the volumes it desires for local consumption at competitive prices. The Petroleum Authority reviews projects on an annual basis and can cancel licenses based on a variety of criteria, such as lack of progress on production.

To accommodate supply from the Yam Tethys natural gas field, the Government of Israel established the Israel Natural Gas Lines LTD (INGL) state company in 2003 to build high-pressure natural gas pipelines. This natural gas pipeline system allows open access to different potential suppliers to reach consumers Fig. 4.

[21] *Public Tender with additional competitive procedure no. 1/10 re: Provision of Advisory Services in Preparation of Master Plan for the Energy Sector in Israel*, Ministry of National Infrastructures (2010).

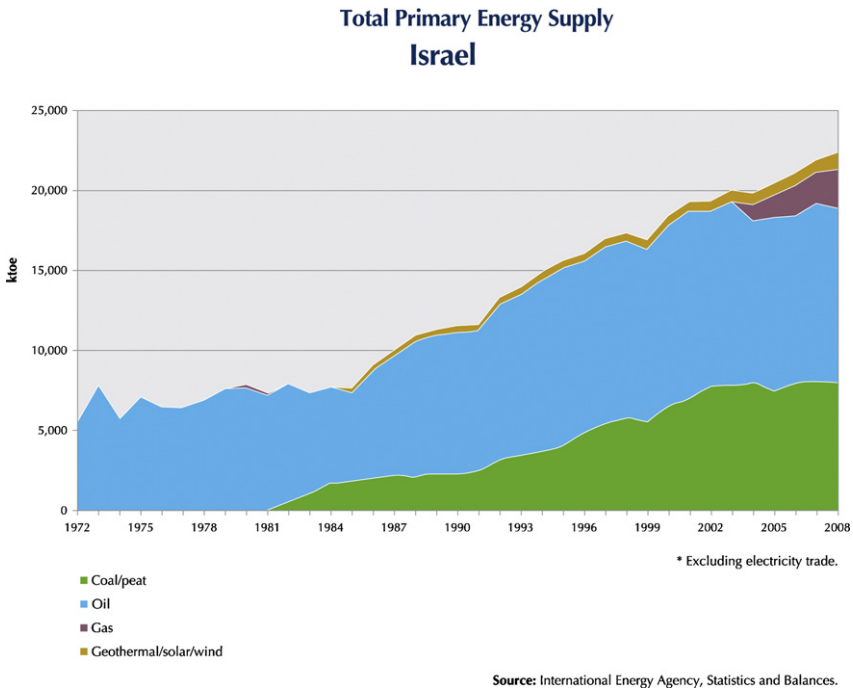

Fig. 2. Total primary energy supply.

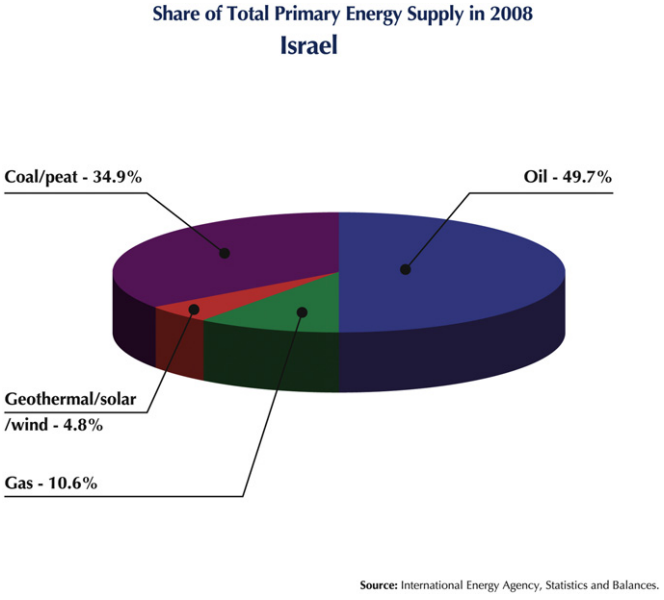

Fig. 3. Share of total primary energy supply in 2008.

For most of Israel's history, the state-owned Israel Electric Corporation (IEC) has been responsible for all electricity generation, transmission, and distribution. In 2003, Israel passed a law to separate electricity generation, transmission and distribution among three separate companies, but this reform of the IEC has not yet been implemented. In 2005, private producers were allowed to enter Israel's electricity generation market, but no significant projects have become operational.

6. Policy dilemmas

Israel's natural gas discoveries have created an opportunity to fundamentally change the country's energy policies. These discoveries have spurred a number of major debates on Israel's future energy policies, focused on three issues:

- How much of Israel's energy and electricity should come from natural gas.
- How to utilize natural gas in sectors beyond electricity production, such as transportation.
- How much natural gas should be used domestically and how much should be exported.

Different policies will produce very different levels of demand for natural gas in Israel and consequently different levels of volumes that would be available for export. An extensive Rand Corporation study on Israel's natural gas policies concluded that Israel's estimated demand for natural gas might be anywhere from 7 to 25 BCM a year, depending on varying policy choices (Popper et al., 2009). Prior to making any decision on natural gas exports, the state must set its policies on domestic consumption. By law, Israel can require producers to sell any portion of domestically produced natural gas in Israel, and to decide over what time period it would like to reserve the gas for the domestic market.[22]

Israel's Natural Gas Authority's current data estimates that in 2020 annual consumption will reach approximately 11 BCM annually with further growth to 16 BCM in 2030 and 20 BCM in 2040 (Stern interview 2011). This data reflects an increase in the portion of electricity produced by natural gas and the transfer of some of Israel's industry to natural gas consumption, but not a dramatic change in the way the country consumes energy.

In considering its future demand for natural gas, Israel also needs to take into consideration the needs of its neighbors, especially the Palestinian Authority and Jordan (Interview with Zemach, 2011). Instability among its neighbors affects Israel's security, and thus Israel tends to plan regionally for water and energy needs. Natural gas is a good source of energy for water

[22] Section 33 Israel Petroleum Law of 1952.

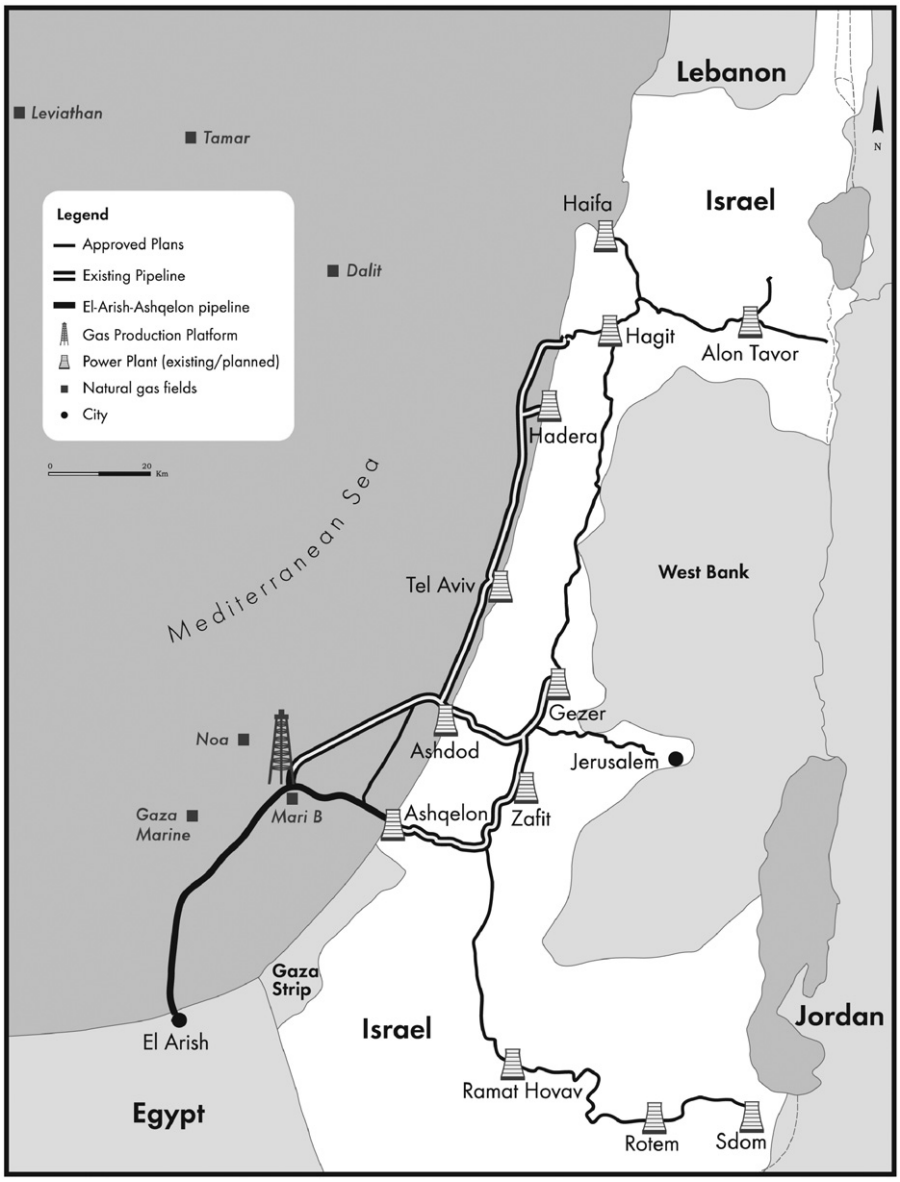

Fig. 4. Israel's natural gas pipeline network and main power plants.

desalination plants and thus figures on future demand for natural gas need to take into consideration demand for water as well.

To date, the Israeli government has not formed any comprehensive policy on the desired mix of sources for Israel's energy consumption. However, there are number of indicators that the government will support policies that will lead to growth in natural gas consumption in light of the country's recent natural gas discoveries. First, the government adopted a policy plan in 2010 to lower climate change emissions by 20 percent by 2020. This goal is in line with the declaration of Israel's President Shimon Peres at the UN Climate Change Conference in Copenhagen in 2009. Using less coal in power generation is a component of this policy.[23] In addition, the government launched a state program in January 2011 to foster technological developments in order to lower domestic and global consumption of oil in the transportation sector. The inter-ministerial committee that formulated the plan is led by Professor Eugene Kandel, chair of the Prime Minister's National Economic Council. The plan promotes the use of natural gas (directly and via consumption by electric vehicles) and development of technologies for natural gas utilization in the transportation sector. In addition, the disruption of natural gas supplies from Egypt in February 2011[24] due to attacks on the supply line during the public uprising against the government has been a strong impetus to rethink the reliability of supply of imported gas from Egypt (Zemach, 2011), a factor that would lead to greater consumption of the domestic volumes. Consequently, Israeli senior officials have begun to express concerns about exports, and support for maintaining significant reserves of natural gas in order to ensure reliability of supply within Israel (Zemach, 2011). The Minister of National Infrastructures, Dr. Uzi Landau, supports Israel retaining a large portion of the volumes as reserves for use by future generations. However, the issue of retaining reserves and the appropriate amount and period to retain is a matter of extensive governmental and public debate.

[23] State of Israel, Government Decision, 2508, http://www.pmo.gov.il/PMO/Secretarial/Decisions/2010/11/des2508.htm.

[24] The February 2011 supply disruption was followed by an additional attack on the gas supply line and a subsequent disruption in April 2011.

Unlike Minister Landau, the Israeli companies that hold licenses for the Tamar and Leviathan natural gas fields are pressuring the government and attempting to win public support for exporting the bulk of the natural gas reserves. The companies are interested in exporting in order to quickly profit from these projects. The companies have been presenting the data in a way that gives the impression that Israel does need the volumes, pointing only at its current consumption rates projected over 20 years.

The government and the Israel Electric Company have not made a clear decision on the desired fuel mix for Israel's power generation. While natural gas has supplanted the use of oil for electricity generation, the government and the Israel Electric Corporation (IEC) have not decided how much to use natural gas to replace coal. Up until 2010, the IEC preferred generation from coal and was an obstacle to expanding natural gas consumption beyond replacing generation from oil. The IEC's stance was that the government's goal of using natural gas to provide more than 50 percent of the state's power generation would be risky since it would rely on a very limited number of pipelines that would be vulnerable to supply disruptions. However, with the rise in the price of coal and the anticipation that the trend will continue wherein it is cheaper to generate electricity from natural gas than coal, the IEC has ended its opposition to expanding the use of natural gas for generating electricity.

Following the natural gas discoveries and continued oil and gas exploration in Israel, an additional public debate has emerged over what to with the revenues from natural gas. The debate is centered on three major issues:

- The appropriate allocation of revenues between the state and companies that develop these discoveries.
- The level of taxation on natural gas revenues.
- The appropriate use of state revenues from natural gas (including the consideration of an off-budget state revenue fund).

In April 2010, Israel's minister of finance appointed a committee headed by Professor Eytan Sheshinski to make recommendations relating to royalties and taxes on natural gas and oil production. In December 2010, the Sheshinski Committee published recommendations for levying special taxes on oil and natural gas revenues that would raise the government share of the profits from the new discoveries (Ministry of Finance, 2010). The Sheshinski Committee recommended leaving the existing rate of royalties to the government (12.5 percent) unchanged, as well as many of the tax benefits that the oil and gas exploration industry receives. At the same time, the committee recommended cancellation of the depletion tax deduction. The committee also recommended the initiation of a special tax levy on oil and natural gas production that would start after profits at twenty percent and gradually rise to sixty percent of the profits. According to this formula, the increase in the state's share in the revenues will come primarily in the later years of production of the natural gas deposit. The Sheshinski Committee recommendations were adopted by the Israeli parliament on March 30, 2011. Even with the change in the tax structure, commercial conditions are still quite attractive for offshore exploration in Israel, since unlike in many other countries the license structure allows an international energy company to possess the reserves, adding significantly to company value.

7. Implications for Israel and the Middle East

The 2009–2010 natural gas discoveries off the coast of Israel and the anticipation of additional natural gas discoveries in the region have a number of implications for Israel and the Middle East and Mediterranean regions. For Israel, the discoveries allow the state to significantly improve its energy security. The domestic natural gas reserves will allow Israel to expand its natural gas consumption and thus to reduce pollution, improve public health, and reduce climate change emissions. The natural gas discoveries will also provide significant benefits to the Israeli economy, with lower costs for power generation and a significant reduction of energy imports. In addition, 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. The government had already begun allocating major funds to foster scientific developments in this field. In addition, the natural gas discoveries will provide added impetus to the development of infrastructure and markets for electric cars, such as the Israeli-based Better Place Initiative.[25] Israel will also need to provide security arrangements for the newly discovered natural gas fields and related infrastructure. Consequently, Israel may advance technology in the sphere of energy infrastructure security that could contribute to global knowledge in this field and create a new technological niche for Israeli companies.

The natural gas discoveries and planned exploration efforts in Cyprus and Lebanon have spurred a number of maritime border delimitation conflicts in the Eastern Mediterranean. The two most acute conflicts to emerge thus far are between Turkey and Cyprus and Israel and Lebanon. In light of the past militarization of these two conflicts, the emerging discrepancies on border delimitation could have negative consequences. In contrast, Israel and Cyprus quickly delimitated their maritime border, realizing the win-win potential for both states to discover more significant volumes.

7.1. Potential conflict between Israel and Lebanon

The natural gas discoveries in 2009 and 2010 off the northern coast of Israel and the strong potential for discoveries off the shores of Lebanon have served as a catalyst for a new source of conflict between the states: demarcation of their maritime border. The dispute over this border is propelled by politicians in both Israel and Lebanon who add fuel to the fire in order to promote unrelated domestic political agendas, and by external forces, such as Iran, that are becoming involved in the conflict. The heated rhetoric of this emerging conflict flies in the face of a number of facts relating to development of oil and natural gas production: foreign investment tends to shy away from locations that are embroiled in conflict and where borders are not demarcated; and Lebanon and Israel are not in competition over being the first to discover significant natural gas riches. In fact, the larger the reserves discovered in the Eastern Mediterranean region, the greater commercial interest will be in developing the energy riches. The larger the potential for exports, the lower the relative cost of export infrastructure. Consequently, both Lebanon and Israel stand to lose by encouraging conflict over sea border demarcation.

In reality, according to common practice of delimitation of maritime borders, there does not seem to be any legal or geographic basis for a dispute between Israel and Lebanon, and the rhetoric seems to be serving domestic political agendas on each side of the border. In August 2010, the Lebanese government has used the threat of "the Israel card" to ram a petroleum law through parliament and to dodge public demands for placing gas revenues into a public revenue fund instead of into the

[25] Better Place is an Israel-based company focusing on building infrastructure and operation systems for electric vehicles. The company has received Israel government support in order to enable Israel to become center technologies for operation systems for electric vehicles. http://www.betterplace.com/, accessed February 16, 2011.

government budget. Member of Parliament Ali Hassan Khalil, who submitted the proposal to parliament for discussion, said that the government should move quickly to establish the extent of its waters in order "to close the door to Israeli attempts to exploit a part of our oil resources."[26] Hezbollah has used the need to defend the country from Israel "stealing" its oil and gas as justification for acquiring more missiles and other weapons. Hezbollah's Executive Council chief Hashem Safieddine claimed that "Lebanon's need for the resistance has doubled today in light of Israeli threats to steal Lebanon's oil wealth."[27] Hezbollah also supported a speedy acceptance of the Petroleum Law according to the government's wishes. Sheikh Nabil Qaouq, a Hezbollah official in south Lebanon, stressed "A delay in approving a law on investing in Lebanon's petroleum serves Israeli goals."[28]

Lebanese politicians' use of the threat from across the border has been mirrored in debate in Israel that took place over how to allocate the natural gas production revenues. Israeli politicians have been using the threat that Lebanon will "beat us to the gas" to call for expedited production and oppose changes in tax laws. In order to make the threat seem more substantial, Israeli representatives have claimed that Iran will develop Lebanon's offshore resources. Israel's minister of national infrastructures has said that "Israel will not hesitate to use force" to defend its gas fields from threats from Lebanon.[29]

At the same time, on both sides of the Israel–Lebanese border, some public officials are airing views that the conflict is being employed to divert attention from substantive domestic issues, such as government royalty levels and public oversight of the revenues. For instance, in connection with the debate on the August 2010 Petroleum Law in Lebanon, Lebanese lawmakers have openly criticized the government for refusing to provide maps that illustrate the so-called dispute between Israel and Lebanon. [30]

8. Prospects for export

Prior to any decisions on natural gas exports, Israel needs to formulate a policy on domestic utilization of natural gas and receive final data on the extent of the country's natural gas reserves. Even with these ambiguities and having no legal sanction, the energy companies involved in these natural gas projects have already announced that they intend to sell the majority of the volumes for export. The heads of Delek Energy – the Israeli company which possesses the largest stake in the Tamar, Dalit, and Leviathan fields – have announced several times that they intend to export Leviathan's riches. They are exploring both LNG and pipeline exports. Gideon Tamar, CEO of Delek Energy, stated: "Israel is set to become an exporter to European and Asian markets for our gas" (Tadmor, 2010). The current Israeli political leadership has also shown support for the company's efforts to export natural gas from these discoveries. In his August 2010 visit to Greece, Prime Minister Benjamin Netanyahu offered Greece the opportunity to serve as a transit state for Israel's natural gas markets in Europe. During his September 2010 visit to Cyprus, Foreign Minister Avigdor Lieberman promoted routing Israel natural gas exports through Cyprus on the way to Greece. Interest in import of the Israeli reserves seemed to grow in markets in southern Europe in early 2011 due to the unrest and instability in North Africa that has cast a shadow over the long-term stability of supply of natural gas from Libya and Algeria.

Despite Delek Energy and other companies' goals, a number of hurdles stand in the way of acquiring export markets. First, Israel has not made a decision to sanction the export of the natural gas. Second, Israel's gas discoveries appeared at a time when there is a glut in European natural gas markets, and many LNG markets. Third, the current state of the European economy will likely preclude many costly new projects to enhance EU-member states' energy security through lowering their portion of natural gas imports from Russia. Member states that are most vulnerable to supply disruptions from Russia, such as Bulgaria, do not possess the means at this stage to fund new import projects. Fourth, many markets in Europe would prefer import arrangements that do not involve transit states. Fifth, neither Greece nor Turkey possesses the appropriate infrastructure to transport additional amounts of natural gas at this stage, and would require additional investments to acquire this capacity. Sixth, Europe's natural gas infrastructure is not interconnected in a way that would allow Israel to reach multiple markets among the Mediterranean European states. However, establishment of new interconnectors that would link markets within Europe is being promoted among states in southern Europe and improving interconnection is a flagship of the EU's current energy policies. Next, Russia possesses tremendously powerful levers of influence to thwart Israel from cutting into natural gas export markets in southern Europe, which is dominated by the Russian state-owned company Gazprom. For instance, Russia and Gazprom are well positioned politically and economically in Italy to foil any significant challenge to their markets. In addition, in Israel itself, Moscow possesses levers for tremendous influence via politicians representing the over one million Russian speaking émigrés in Israel and powerful members of the business community.

The involved companies are also promoting export via LNG. Israel could perhaps export its gas through the existing LNG facility in Egypt or together with Cyprus, if significant natural gas volumes are discovered there. Egypt's LNG facility is particularly attractive on the commercial level, since the infrastructure exists and there is already a gas pipeline between Israel and Egypt. Moreover, the Egyptian facility often does not run at full capacity, due to Egypt's rising domestic natural gas consumption. On average, Egypt consumes two-thirds of its natural gas production domestically.[31] Russia's Gazprom has also displayed interest in acquiring a substantial portion of Israel's natural gas discoveries. The Israeli gas, together with possible additional discoveries anticipated in adjacent Cyprus, might be a relatively inexpensive means for Russia to help it meet its export commitments to European consumers in lieu of very expensive planned natural gas production in Russia itself.

9. Future outlook for markets

At current production levels, Israel will not be able to make a game-changing contribution to southern European natural gas markets or any LNG markets. However, offshore exploration efforts in Israel and neighboring countries are intensifying and there are strong prospects for additional discoveries. With additional discoveries, the Eastern Mediterranean region may serve as a new important source of natural gas and oil.

Israel's newly discovered reserves will most likely lead to expanded natural gas consumption in the region itself. A number of Israel's neighbors, mainly Jordan, Syria and Lebanon, are seeking to increase their natural gas consumption and imports.

[26] Daily Star (Beirut), June 29, 2010.
[27] Daily Star, July 28, 2010.
[28] Al-Manar television (Lebanon), June 25, 2010. http://www.almanar.com.lb/newssite/NewsDetails.aspx?id=143827&language=en.
[29] Bloomberg, June 24, 2010.
[30] *Daily Star*, August 5, 2010.
[31] "Egypt" US Energy Information Administration, http://www.eia.doe.gov/emeu/cabs/Egypt/NaturalGas.html, accessed February 17, 2011.

A number of Israel's neighbors still produce a large portion of their electricity from oil and seek natural gas to supplant oil. In addition, the February and April 2011 disruptions of natural gas supplies from Egypt will likely raise questions about the reliability of Egyptian gas imports—not only in Israel, but in Jordan, Syria, and Lebanon as well. Rising domestic natural gas consumption in Egypt could also further inhibit the country's energy exports. From a purely commercial perspective, Israel's new natural gas could be attractive to neighboring states. But while Jordan maintains diplomatic relations and trade with Israel, Lebanon and Syria do not. One possible scenario is for Jordan to import Israeli gas and then resell it to Syria and Lebanon. If future political relations improved in the region, the Israeli new natural gas volumes could find thirsty markets in neighboring states that would not obligate construction of expensive export infrastructure. Expansion of natural gas consumption in this part of the Middle East could contribute to lowering public expenses for energy and to improved public health and lowered pollution in the region.

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