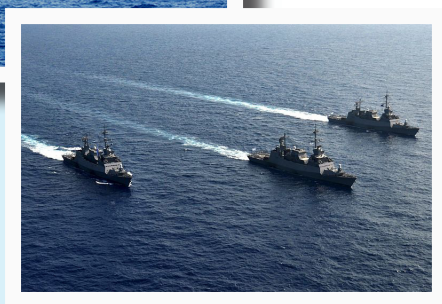
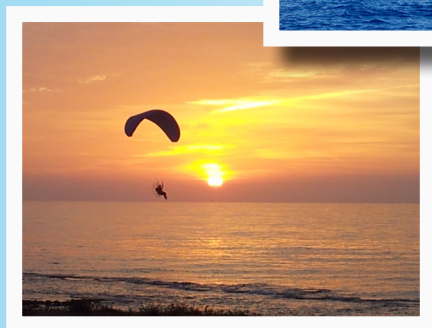
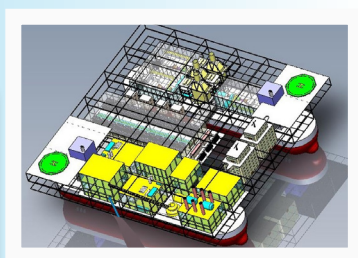


MARITIME STRATEGIC EVALUATION FOR ISRAEL 2016

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Chapter 11: The Status of Offshore Gas Field Developments, the "Framework" and Other Alternatives

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Summary

The year 2016 was characterized by further development of the natural gas sector with the approval of the "Framework for Increasing the Quantity of Natural Gas Produced from the Tamar Natural Gas Field and the Fast-Track Development of Leviathan, Karish, Tanin and other Gas Fields" (herein: **the Framework**). The Framework was the result of negotiations and agreements between the State of Israel and the oil and gas companies, based on the mutual recognition that in order to preserve the status of Israel as an attractive destination for investment requires balancing between various interests. In 2016, some uncertainty remained until the Framework was finally scrutinized by the judicial system (with changes to the section on regulatory stability). Thus, a connection between foreign relations and security on the one hand and the natural gas sector on the other was established and ratified. Moreover, in 2016 mutual steps were taken by the State and the oil and gas companies in preparation for the final investment decision on developing the Leviathan reservoir (herein: **Leviathan**) and other fields. In 2016, the State also took steps to increase local demand for natural gas by encouraging the conversion of industry to natural gas, the use of natural gas in private and public transportation and expansion of the onshore transmission and distribution infrastructure according to a structured work plan. A goal of the aforementioned actions was amongst other things, to encourage the development of the gas fields in a timely manner. In addition, technological alternatives and plans for developing the gas fields were examined.

Background and Current Status

The State of Israel currently consumes natural gas from a single source (over 50 percent of its energy consumption comes from the Tamar reservoir) with supplementary imports of Liquefied Natural Gas (herein: **LNG**) via a subsea buoy connected to a Floating, Storage & Regasification Unit (herein: **FSRU**) for LNG import. Israel is effected by a lack of competition in the natural gas sector (which influences price) and suffers from a lack of regulatory coordination. Therefore, the

key effort of the Ministry of National Infrastructures, Energy and Water (herein: **the Ministry of Energy**) in 2016 was to resolve these issues.

When and How Will Leviathan Be Developed?

Leviathan was discovered in 2010 and is the largest reservoir for which a lease has been granted to date in Israel. Its development has been delayed repeatedly for various reasons. In order to accelerate its development, the Framework was approved in *Government Decision 476* (August 16, 2015) and was passed by the Knesset (September 7, 2015). The Prime Minister, in his additional function as Minister of Economy and Industry invoked section 52 of the Antitrust Law – 1988 granting the oil and gas companies an exemption from certain antitrust issues following discussions in the Economic Affairs Committee in the Knesset and a public hearing widely covered by the media (December 17, 2015).

Following legal proceedings, the High Court of Justice rejected section 10 of the Framework which offered far reaching regulatory stability commitments (March 27, 2016). Mutual efforts by the government and the gas companies produced agreement on different wording and formulation which was re-approved by the government (May 22, 2016).

The Framework focuses on: Resolving the matter of over-reaching holdings of proven reservoirs within a predetermined time period (Tamar, Leviathan, Karish and Tanin), the fast track development of Leviathan and other reservoirs; consumer protection and the option of reducing purchase agreements from the Tamar reservoir in favor of new reservoirs. One of the major achievements for the State in the Framework was the agreement regarding local content purchases in the amount of NIS 500 million over eight years.

Prior to the Framework was the adoption of the *Recommendations of the Committee to Examine Government Policy Regarding the Natural Gas Sector in Israel* (herein: **the Tsemach Committee**) in *Government Decision 442* (September 13, 2012). This decision sets the gas export quotas while ensuring domestic gas supply to the local market for as long as the quantity available to the domestic economy is no less than 540 BCM.

Thus, it was decided that a reservoir that contains 200 BCM or more will supply 50 percent of its gas to the local economy; a reservoir that contains between 100–200 BCM will supply 40 percent; a reservoir that contains 25–100 BCM will supply

25 percent and a reservoir that contains 25 BCM or less will supply a minimal quantity to be determined.

With regard to export permits, the leases for Leviathan North (I/14) and Leviathan South (I/15) (granted on March 27, 2014) impose obligations that must be met prior to the grant of an export permit (such as an obligation to connect each reservoir to Israel).

From a statutory perspective, the *National Outline Plan for Gas Treatment Facilities from the Offshore Discoveries* (herein: **Tama 37h**) was approved by the National Council for Planning and Building (October 22, 2014). The National Council for Planning and Building thereafter approved the offshore segments, including the intended location for offshore treatment facilities (April 5, 2016).

From a commercial perspective, the primary markets for natural gas produced from Leviathan are the local market (Israel) and international markets (the Palestinian Authority, Jordan, Egypt, Turkey, Greece, Cyprus, Europe and Asia).

In the local market, agreements that have already been signed and publicly announced are between the Leviathan partnership and Edeltech for the sale of 6 BCM over a period of 18 years to its power plants; the IPM company for the sale of 13 BCM over a period of 18 years for power plants under construction; and the Paz company for the supply of gas to the refineries in Ashdod over a period of 15 years.

There are a number of agreements in the making that perhaps will be signed in the future.

As of January 2017, the **Base Price**, as defined in Chapter D of the Framework and published by the Gas Authority, was \$5.17 per MMBtu and the simple average for private electricity producers was \$4.70 per MMBtu.¹ The Framework specified a mechanism for choosing between alternative methods of calculating the price during the negotiation of the sale contract without absolute price control by the State, but while maintaining a rigid and transparent system.

One of the challenges currently facing the local industry is the conversion to natural gas and connecting consumers to local distribution networks. The challenge is due to low investment assessment related to conversion costs and the price of natural gas relative to other low cost alternatives for energy production.

¹ The unit of measurement for natural gas is MMBtu: Million British Thermal Units, which is also used in gas sale contracts.

In order to encourage industry to shift to natural gas consumption, government ministries increased the grants to consumers in 2016 which may improve the investment assessment for consuming natural gas (April 20, 2016).

In addition, it was recently decided to phase out some of the coal-burning power plants ("Orot Rabin") over time. Furthermore, a plan was formulated to increase the use of natural gas in transportation. These steps were intended to increase local demand for natural gas and to encourage the development of the fields, among other things.

In the international market, the first export deal for gas from Leviathan was signed between the Leviathan partnership and NEPCO, the Jordanian electricity company, for the sale of 45 BCM of gas over a period of 15 years, with an estimated value of \$10 billion (September 26, 2016). The supply of gas to NEPCO will be through the northern entry point on the Dor coast according to Tama 37h and to the point of delivery. There is political opposition in Jordan to purchasing gas from Israel and to the gas price (according to unofficial reports, the assumed price for the deal is \$6.2 per MMBtu). (The price was not officially announced and it is unclear if this price includes the price of overland transmission to the border and other costs.)

The Leviathan and Tamar partnerships have reported additional non-binding understandings (term sheets) for the sale of natural gas to customers in neighboring countries from the Leviathan and Tamar reservoirs.

The delay in the development of Leviathan in 2016 occurred in parallel to international events that reduced the investment assessment for development and increased its risks. Thus for example "the discovery of a large offshore gas field in Egyptian territory and falling global energy prices. The lower prices have made alternatives to Israel's offshore gas more attractive. The gas producers' financial strength has diminished... Access to project financing for energy projects has been substantially reduced and has become more costly as a result of the significant deterioration of the energy lending markets" ²

In summary, preparations have been made to advance the development of Leviathan. The focus now is on raising the necessary capital. It is believed that there is a need for gas sale agreements in the amount of at least 4–6 BCM per year from the reservoir in order to raise the capital needed for development. Noble Energy reported that a final investment decision (**FID**) will be made "as early as

2 Report of the Commission on the Eastern Mediterranean sponsored by University of Haifa and the Hudson Institute, September 2016, p. 34.

the end of 2016".³ **Note:** Since this article was published, the Leviathan partnership announced that they have made the highly anticipated final investment decision (FID) on February 23, 2017.

What is the Current Development Plan for Leviathan?

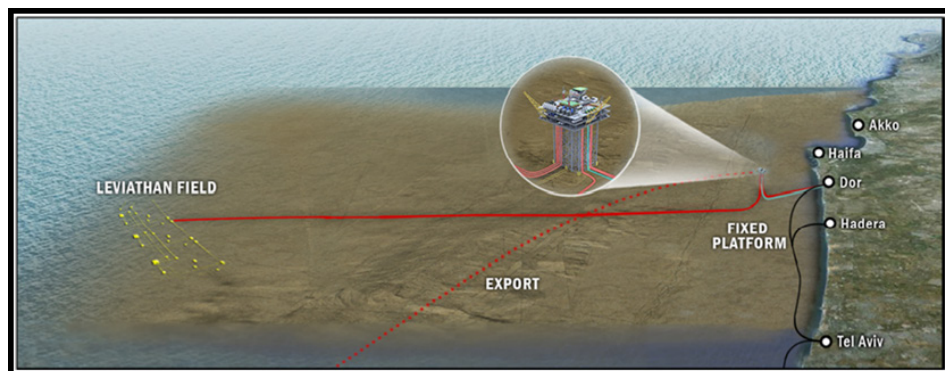


Figure 11.1 Development plan for the Leviathan reservoir⁴

The Leviathan partnership submitted a new development plan on February 25, 2016. It is based on Tama 37h and includes a process platform in shallow water (approximately 80m-100m). The change implicit in the new development plan is that the Leviathan partnership has for now sidelined the vision of using a floating facility above the field within Israel's EEZ for Leviathan using a Floating Production Storage Offloading (**FPSO**) unit. This is a more difficult plan to implement for various reasons, including security, environmental protection and engineering, technological, operational and logistical challenges. These difficulties provide a clear advantage to the new development plan for a process facility in shallow territorial waters in accordance with Tama 37h.

The Commissioner for Petroleum Affairs in the Ministry of Energy (herein: **the Commissioner**) approved the new plan in principle (June 2, 2016) and wrote as follows: "The approval of the development plan relates to the underwater system in the reservoir, the pipeline to the handling platform, the platform for handling and production, the export pipeline from the handling and production platform,

3 Noble Energy executes Leviathan gas sales contract with the National Electric Power Company of Jordan. <http://investors.nobleenergyinc.com/releasedetail.cfm?ReleaseID=990815>

4 The Ministry of Energy and the Leviathan partnership.

the pipeline from the platform to the Israeli coast and the onshore facilities, all according to Tama 37h⁵

The Ministry of Energy has revised the estimated quantity of natural gas that will be produced from Leviathan to 17.6 TCF (about 500 BCM). There were recent reports on a disagreement between the Ministry of Energy and the Leviathan partnership regarding estimates of the quantity of gas in the Leviathan reservoir. The issue will not be decided until there are future drillings that will enable a more exact assessment. Additional drilling is expected during 2017 as part of the development of the reservoir.

The new development plan includes the possibility of exporting gas from the Leviathan platform by means of an onshore pipeline, by way of the northern entrance to the Dor coast, which will be built according to Tama 37h, and the national transmission system (**NTS**).

Once delivered to the NTS, the gas will reach its onshore export destinations in Jordan, Egypt and the Palestinian Authority and/or alternatively, by way of an underwater pipeline to countries and/or liquefaction facilities abroad. It should be noted that oil may exist in the geological formations of Leviathan as well.

The components of the handling, process and transmission system of Leviathan up to the point of entry to the NTS will be built and owned by the Leviathan partnership and used for the benefit of Leviathan at first. As such, the Leviathan partnership will have the exclusive right to use their facilities as they see fit, although the Commissioner has the option, according to Chapter 9 of the Leviathan lease⁶ "to instruct the leaseholder to provide handling, pressure reduction and transmission services for remuneration to another leaseholder, without discrimination and subject to considerations of safety and the necessary approvals according to law ... this is under the assumption that there is excess capacity to provide service that is not reasonably required by the lease owner" (The implementation of a mechanism of this type for cooperation between suppliers in the use of gas handling facilities is very complex and must be examined thoroughly from various angles).

The approval of the development plan is conditional on a detailed engineering plan, the submission of the required engineering and environmental documents

5 <http://energy.gov.il/AboutTheOffice/SpeakerMessages/Pages/GxmsMniSpokesmanOSJune16.aspx>

6 Lease deed for Leviathan South and North I/14 and I/15.

and the specific approvals of the relevant authorities.⁷ The Leviathan partnership submitted a request to receive building permits during the third quarter of 2016, most of which were approved.

To a great extent, development of Leviathan is dependent on export deals, which are influenced by the geopolitical situation. Export deals are likely to affect the timeliness of the reservoir's development and the choice of the preferred technology, which will determine the costs of development.

It will take up to 48 months from the grant of exemption under section 52 of the Antitrust Law as agreed in the Framework (starting from December 17, 2015) for first gas to start flow to the local market from Leviathan and subject to the necessary investments, the signing of sales contracts, the granting of approvals, the preparation of the work plan and resolving potential technical problems. This date may again be delayed due to legal proceedings that were held immediately after the grant of the exemption. **Note:** Since this article was first published, the Leviathan partnership has made their FID decision and anticipate first gas from the Leviathan field by December 2019.

Will the government be involved in constructing offshore transmission infrastructure in order to encourage the development of small and medium-size reservoirs and what are the existing technological alternatives?

Several technological options for government involvement in the construction of the offshore transmission system were examined in 2016, with the goal of preserving essential long-term interests and assisting the gas producers in the development of small and medium-size fields.

According to one of the proposals, the national infrastructure may include a platform (HUB) and offshore pipeline that will be an integral part of the NTS, which will be expanded to sea for about 8–10 kilometers. This infrastructure will be used for gathering processed gas from suppliers and will transmit the gas to shore but will not process it (Gas process is the responsibility of the suppliers according to their Lease). This approach is supported by the Technion's Maritime Plan for Israel.

⁷ The Ministry of National Infrastructures, Energy and Water, the approval of the development plan for the leaseholdings Leviathan South I/14 and Leviathan North I/15 for the Leviathan partnerships. <http://energy.gov.il/AboutTheOffice/SpeakerMessages/Pages/GxmsMniSpokesmanOSJune16.aspx>

One of the weaker points of the current supply of gas in Israel is the fact that there is only one source (the Tamar reservoir) and one intake facility into the transmission system. In order to provide a solution to this problem, Israel Natural Gas Lines Ltd (herein: **Natgaz**), a government company, constructed a subsea pipeline and buoy that connects to an FSRU for the reception of LNG import shipments.



Figure 11.2 FSRU

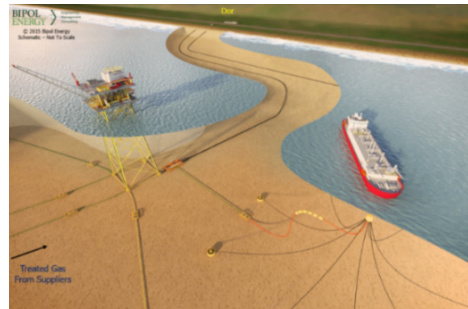


Figure 11.3 National infrastructure for the channeling and monitoring of processed gas (HUB) that includes an FSRU

While the development of Leviathan was delayed and some uncertainty in the implementation of the Framework exists, a proposal was examined to duplicate the FSRU system by means of adding another FSRU system and subsea buoy, with the goal of increasing the import of LNG when needed and/or to provide a solution for interruptions of the supply of gas from the Tamar reservoir. Also examined was a proposal to integrate a FSRU system of this type as part of the planned northern entry at the Dor coast, according to Tama 37h.

In 2013, the Israel Electric Company (herein: **IEC**) began purchasing LNG from the international energy markets. Recently IEC have increased their purchase agreements. In 2016, it was reported that IEC purchased LNG at a lower price than that of the gas supplied from the Tamar reservoir. It should be mentioned that these were one-time deals that cannot be relied on in the future.

In September 2016, the FSRU was refilled at sea for the first time in Israel. An LNG tanker connected to the side of the FSRU and conducted ship-to-ship transfer of LNG. This method enables the FSRU to permanently anchor in Israel's waters on a continuous basis and provide redundancy to the transmission system. The implementation was precisely planned and approved by the entities authorized by Natgaz and IEC. This involved the management of safety, environmental and

security risks that accompany a project of this type in the open sea, in view of the weather and ocean conditions.

National Plan to Encourage Development of Small and Medium-Sized Reservoirs (not yet published)

The government ministries are currently preparing a new national plan to encourage the development of small and medium-sized reservoirs. The plan was not included in the Framework and only parts of it have been presented to the public as part of the current roadshow.

According to reports and models that have been published, it can be assumed that the plan will include a group of specific incentives, which have not yet been defined, for the development of small and medium-sized reservoirs. The incentives will be in the fiscal domain (perhaps discounts and exemptions in royalties) and in the domain of offshore and commercial infrastructure. They may also include the expansion of the national transmission system to sea by the State and/or its institutions or applying a single buyer model (though with a low likelihood).

Government Decisions 442 and 476 encourage government involvement in the planning and construction of the gas infrastructures.

Is the Framework Being Implemented and is there Momentum in the Development of Israeli Gas Fields?

Transfer of rights in Karish and Tanin

The Framework requires the transfer of the rights to the Karish and Tanin reservoirs to a third party. The final transfer of the rights was approved by the Ministry of Energy on December 13, 2016 following an evaluation by the authorized entities, including the Commissioner of Petroleum Affairs in the Ministry of Energy and also the Director of the Antitrust Authority.

Immediately upon the approval of the Framework, leases on the Karish and Tanin reservoirs were granted to Noble Energy, Delek and Avner (it is thought that Delek and Avner will merge in the near future) so they can transfer them, in accordance with the Framework, to a third party.

As of today, the rights to the Karish and Tanin reservoirs have been transferred to Energean Oil & Gas (August 17, 2016). According to reports, the sale includes payment of about \$40 million and royalties in the amount of 9 percent, subject

to the Framework. Energean is an international operator of small to medium size, which is based in Greece. Its main activity is along the western shores of Greece, where it is the only operator of a number of drilling rigs and platforms. Energean's fields are connected to a complex of platforms in shallow water, from which output, primarily oil, is transmitted to Greece. Energean is not in the category of the supermajors, such as Chevron, Exxon, etc.

The question now is when these reservoirs will be developed and in what manner and who will purchase the gas (which is intended only for the Israeli market according to the Framework)?

According to the Framework, once the transfer of the rights in Karish and Tanin has been approved by the Commissioner, the Leviathan partnership will be able to use the export quota of Karish and Tanin for its relative share of the Leviathan reservoir, subject to the approval of a swap transaction. This is a transaction between two leaseholders, in which one exchanges his export quota for the other's supply obligation to the local economy. The Framework permits swap transactions of this type between the Leviathan partnership and the Karish and Tanin partnership and restricts the sale of gas from Karish and Tanin to the local economy only. **Note:** Since this article was first published, the transfer of rights to Energean has been completed and Energean have published their initial field development concept which includes an FPSO positioned over the field and a pipeline to shore.

Dilution of Holdings in Tamar

Harel Insurance and the Israel Infrastructure Fund announced the purchase of 3–4 percent of Noble Energy's rights in the Tamar partnership (July 4, 2016), as part of the Framework's implementation, which requires the dilution of Noble Energy's holding in Tamar and the sale of all the holdings of Delek and Avner in Tamar. The possibility has also been reported of a public issuing of Delek and Avner rights (which are expected to merge in the near future) as part of the sale process.

Renewal of Exploration in Israel's Economic Waters

The Framework is intended, among other things, to restart the exploration in Israel's economic waters.

- **Lease of Tamar and Leviathan.** In 2016, the Tamar partnership announced that it intends to further expand the number of wells in the Tamar reservoir by the end of the year. In addition, additional drilling is expected in Leviathan as part of the reservoir's development. According to reports, there are negotiations with an operator of offshore drilling for this purpose. **Note:** Since this article

was published, new wells have been drilled in Tamar and are activities are soon to commence on Leviathan.

- **Roey license.** The Roey license is located in the western part of Israel's territorial waters, on the maritime border with Egypt. The exploration license was granted to Ratio, Israeli Opportunity and to Edison, which is an operator. As of now, the Roey partnership has announced its intention to carry out exploratory drilling by December 2016, in accordance with the work plan approved by the Commissioner. According to reports, there are negotiations with offshore operators. **Note:** Since this article was published, these activities have been postponed.
- **Ishai license.** The Ishai license is located in the western part of Israel's territorial waters, opposite Cyprus. Israel and Cyprus have signed an agreement delineating the maritime border between them and there is professional collaboration between the two countries, including the sharing of seismic information. According to reports, the Ishai discovery is located on both sides of the maritime border. On the Cypriot side, the Aphrodite field has been discovered in Block 12 by Noble Energy, Delek and Avner (today, Shell holds a percentage after acquiring the BG Company). On the Israeli side, the Ishai license was granted to Nammax, Israel Opportunity, Frenum and AGR. The plan for the development of the deepwater reservoir is technologically complex due the distance from the shore and because its development requires coordination and large-scale regional cooperation.
- **Daniel East and Daniel West licenses.** These licenses are located on the maritime boundary between Israel and Egypt. The licenses were granted to Isramco, Modiin and others. According to the new work plan, the partnership must carry out exploratory drilling by August and October 2017, respectively.

Mediation proceedings between the State and a number of gas companies began in 2016 regarding licenses that were returned to the State for various reasons.

Decision of the Petroleum Council to "Open the Sea" to Exploration

On August 10th, 2016, the Petroleum Council decided to begin granting new licenses for offshore oil and gas exploration. On November 18th, 2016, the documents were published describing the application process, including the minimal requirements for applicants and timetables for participation. The process will be competitive and applications will be discussed by the Petroleum Council according to criteria that have yet to be published. The standards will have to do with the capital and experience of the candidates in the development of deepwater reservoirs.

In September 2016, the Minister of Energy and his staff went on a roadshow in several countries (UK, Singapore and the US) in an attempt to interest companies and international investors. To this end, a strategic environmental survey for the exploration and production of offshore oil and natural gas was published for public comments (July 3, 2016) and a draft of the regulations for offshore exploration activities was approved by the Petroleum Council (September 8, 2016).

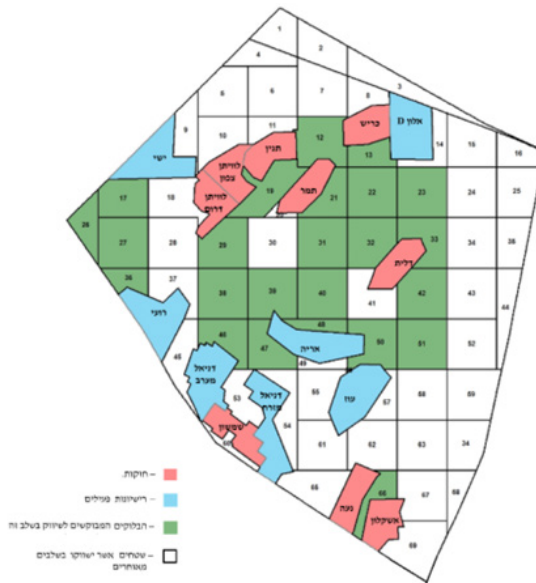


Figure 11.4 Map of the exploration licenses Source: Ministry of Energy

Note: Since this article was published, the information package has been published and updated and is available in at www.energy-sea.gov.il. Also, the dates for submitting proposals have been modified.

Conclusion and Assessment

- A framework for dialog and regional collaboration on resource development should be created.
- The potential for exporting gas to the region and even beyond (to Asia for example) should be investigated and assistance should be provided to the companies in order to reach these markets, by means of, among other things, the construction of national infrastructures for this purpose.

- Foreign investors and international operators should be encouraged to enter the Israeli market. To this end, attractive conditions for investment in the Israeli energy sectors should be created.
- Models and technology should be developed for regional cooperation. An assessment should be made of the geopolitical and technological implications of developing the fields and the export facilities (such as an underwater pipeline, floating liquefaction facilities, joint processing facilities and ports). To this end, shipping lanes and the approach corridors to Israel's ports should be kept open and safe.
- The use of natural gas reduces the costs of production in Israel for energy-intensive industries. Therefore, wise use of natural gas as a source of energy for the local economy should be encouraged and appropriate onshore transmission and distribution infrastructure should be created. In addition, natural gas is creating a new industry in Israel and conditions should be encouraged for integrating local industry and Israeli manpower within the energy sector, including the provision of ongoing logistic services to the platforms and drilling rigs from Israel's ports.
- Best practices in democratic regimes should be studied and laws, regulations and models should be adopted that will improve the development of natural resources. This should include the implementation of legal, strategic and holistic (multidisciplinary) thinking in the domain of resource development. Skills and abilities should be developed in the areas of maritime justice and supportive legal framework should be created. In addition, a national and civilian contingency plan is needed to prepare for malfunctions and leaks in the gas facilities and offshore fields.