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## «Israel and the state of the gas market – the right time to open the doors for exports?»

Résumé of Ms. Cohen's conference at the Brussels Energy Club on 6 December 2018.

**I**n January 2009, the Tamar field (318 billion cubic metres or bcm) was discovered, followed in 2010 by Leviathan (604 bcm), Tanin-Karish (67 bcm), bringing great promise to the country, to develop a local gas market and export surplus volumes of gas.

### The local market

Looking from the starting base of 20 years ago, when the first gas field was discovered (Mari-B/Noa), the country has made impressive strides in various issues: several gas fields have been discovered, two were developed and are supplying gas to the market (Mari-B now depleted & Tamar), two others are under development (Leviathan & Karish), regulations and laws have been enacted, the national transmission system - including 650 km of high pressure lines - has been constructed and is operating, 70% of industrial consumption has converted to using gas (although only tens of mainly very large consumers use gas at present), six private distribution companies have been selected by public tenders (and have started to build the low pressure networks and connect consumers), natural gas is the power sector's main primary energy source (65% - with the rest still being coal and only 3% renewable) and the electricity sector has been opened up to competition thanks to the penetration of gas.

Natural gas demand forecast (in bcm) - Table 1

Year	2018	2020	2025	2030	2035	2040	2042	2042-2018
Electricity	8.8	8.4	11	13.5	14.7	16	16.5	321
Heavy Industry Distribution	2	2.5	2.7	3	3.2	3.4	3.5	73.1
Transport	0	0.1	0.3	1.3	3	4.7	5.1	47
Petrochemical Industrial			0.3	0.5	0.7	0.7	0.7	11.2
local demand Total	10.9	11	14	18	22	25	26	452

Much of these accomplishments, however, constitute the low hanging fruit, since selling Israeli gas to the main state-owned electricity utility is much easier than some of the other goals we have set for ourselves, especially attracting international oil companies to carry out further exploration and exports of gas

### Exploration

Paradoxically, Israel has succeeded beyond expectations in the exploration side and companies have discovered ~1,000 bcm of gas, in a market that currently consumes 11 bcm/year and is expected to consume ~20 bcm a year over the next decade, meaning that the main challenge for developing the reservoirs is finding markets.

Indeed, despite the Ministry of Energy presenting data that another 2,000 bcm of potential gas is to be discovered offshore Israel, the country first offshore exploration tender that closed in

November 2017 for 24 blocks failed to attract even one new international oil and gas exploration company. In November 2018, the Ministry issued its second international bidding process, this time for 19 larger blocks offshore in the hope that more lenient regulations enacted for new fields and progress on some of the export channels will entice new players to invest and explore in Israel.

### New field export regulations

On 6 January 2019, the government approved regulations regarding future gas discoveries, so that contrary to the past, not all new fields (if exploration takes place following the current licensing tender process due to close in July 2019) have to connect and supply gas to the local market, but have greater flexibility to find markets outside of Israel. Thus, the new policy states that fields of less than 50 bcm would not have to be connected to and/or supply gas to the local market, whilst every other field has more or less stringent requirements (see table #2 below), whilst a lot of leeway has been given to the Petroleum Commissioner to enable new medium size fields (50-200 bcm) to not have to connect to the shore until a later date.

### Exports

Exports of natural gas will contribute strategically, economically and geopolitically to the Israeli market and would most importantly provide a big enough market to encourage further investment in exploration and development of additional gas fields that will enhance the contribution gas can make to Israel.

The benefits include: The strategic benefits – improved security of energy supply for Israel as, paradoxically, exports will contribute to enhance the security of energy supply to Israel. The reason for this is that it would increase the resource base for both the export market but also the local market, because the pipelines that will be constructed will be bidirectional lines connecting Israel to the international markets and enabling both export and import when needed. On the geopolitical front, although gas is not the panacea to solve all conflicts in the Middle East, it provides a tool for the governments and the peoples to have

interactions and relationships, to carry out other forms of bilateral trading and it creates opportunities that should not be missed.

Exports of gas will always be complicated. The lower energy density of gas, compared to oil or coal, means that transportation takes a relatively high share of the delivered cost with investment needed to be made prior to income from sales, making geographical proximity to resource-rich areas an important determining factor for affordability. Gas transportation infrastructure is capital intensive (and transportation entails losing volumes along the way such as for boil-off in the case of LNG, etc.).

The cost of transporting gas over long distances is, for the same energy content, between 7-10 times more expensive than oil or coal, which is why proximity between a field and the market is a most fundamental factor in calculating the feasibility of a project.

Although Israel is favorably located vis-a-vis Europe (and certainly to India) compared to the US, East Mediterranean wellhead gas is currently an average of \$5.5/million Btu which constitutes a challenge when competing with other sources of gas to Europe (Russian, Azeri, US LNG).

### Export options

**Jordan** – Israel is already exporting tiny volumes of gas to Jordan, with volumes due to increase to 3-3.5 bcm a year once the Leviathan field comes on line at the end of this year. This is a relatively easy project since all that is required from the infrastructure point of view is an onshore pipeline of a few dozen km linking the two countries (in construction, to be completed in May this year) and because Jordan has no indigenous gas resources yet of it is own.

**Turkey** – Until political relations between the two countries deteriorated culminating in the recall of both countries' ambassadors in May 2018, Israel had been in negotiations to sell about 10 bcm a year of gas to Turkey. The project seemed most feasible at the time, because Turkey, like Jordan has no local supplies and is thus 100% dependent on imports of gas, all of which comes from countries with either strings attached (Russia) or supply problems (Iran, Azerbaijan) or higher prices (LNG). Hopefully, in the future, when emotions will have calmed down, such negotiations can be rekindled to the benefit of both countries. In addition, since Turkey is already connected to Greece and Bulgaria, this offers further opportunities to sell gas onwards to Eastern and Southern Europe.

**Egypt** – An agreement has been signed to sell 7 bcm of Israeli gas to Egypt again starting mostly once supplies ramp-up sufficiently, upon the development of Leviathan. Egypt, is also, on the face of it an ideal market, with its population just shy of 100 million and its growing energy needs (in every sector, from power consumption to CNG (compressed natural gas) cars, to the residential sector), as well as the existence of low cost LNG facilities greatly underuti-

lized and with the Suez Canal that offers one of the easiest, if not the cheapest, trade routes for oil and gas to markets. There are two issues that may dampen potential full-scale progress on this front. The first is the current lack of capacity in the national pipelines within Israel itself to pipe more than half this volume towards Egypt (it will take 2-3 years to increase the capacity). The second is the ever hovering possibility that Egypt, which is blessed with a strong exploration program, could at any time find sufficient volumes of gas to meet its own needs and to fill its export facilities.

**FLNG** – Israel could do it alone and build a world scale FLNG (floating liquefied natural gas) facility offshore Israel, which might be able to attract other gas fields from the region, such as from Cyprus. This is a good option, as the technology has by now been tried and tested, the Eastern Mediterranean has ideal weather and sea conditions for such a facility, it provides Israel a high degree of long-term sustainable independence in all matters regarding gas exports, and very importantly it can help to avoid many of the regional geopolitics and provides optimal flexibility, without causing a hindrance (NIMBY or not in my back yard) to the Israeli market. However, certain LNG markets are closed to Israeli gas (e.g. Muslim countries such as Kuwait, Dubai, Abu Dhabi, Malaysia or Pakistan).

**East Med Pipeline project from Israel to Europe** – This project, is to run 2,100 km from Israel to Italy, via Cyprus, Crete and mainland Greece to transmit 10 bcm a year. The project has been awarded €35 million grant through the Connecting Europe Facility (CEF) to carry out a technical feasibility study, and so some considerable progress has been made on this front as well.

There are some positive elements and drawbacks to the project:

- Positive: EU indigenous production is falling and so countries are keen to diversify away from the shackles of Russian gas, supplies of which are increasing. Israel is located relatively close to Europe compared to many other exporters, but still at the wrong end of a long pipeline.
- Negative: The technological complexities of the subsea conditions: long, deep (more than 3 km water depth), and complex bathymetric (the study of underwater depth of lake or ocean floors) conditions, the huge costs that such a project could amount to and the complexity in today's world of finding entities to underpin the construction of such a line in Europe.

As one can see, there are a host of options for Israeli gas exports, each with its inherent advantages and difficulties. At the end of the day, the future for East Med gas exports may be through integrated projects to minimise costs, and even then, it will be challenging. If players fail to cooperate, countries with too little gas will continue to use coal, import distant LNG whilst countries with too much gas will find it hard/expensive/time-consuming to export.

Export projects will very much depend on economic imperative vs. political will. The economic need for diverse energy supplies by certain countries may eventually require them to reconcile their political sentiments vis-à-vis some of the conflicts taking place in the Middle East.

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#### Requirement to connect to the local market:

<50 BCM	Not required to connect to local market
50-200 BCM	Fields that commence commercial production by 1.1.2028 must connect to local market by 31.12.2032 (as determined by Petroleum Commissioner), fields that commence commercial production after 2028 must connect upon development before commercial supply
>200 BCM	Must connect immediately upon development

#### Requirement to supply to the local market:

<50 BCM	Not required to supply to the local market
1 BCM above 50 and up to 200	Can export 50%; must reserve 50% for local market
1 BCM above 200	Can export 45%; must reserve 55% for local market