

# **Israel Oil & Gas Opportunities**

**THE OIL & GAS INDUSTRY CONFERENCE**

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# Israel Oil & Gas Opportunities

## Introduction

**In 2009-2012 Israel discovered offshore 950 billion cubic meters of natural gas. These are some of the biggest discoveries worldwide.**

**These discoveries allow Israel to use natural gas, instead of coal and oil, as a primary energy source and also to export significant quantities of the surplus.**

**Within the space of a few years, natural gas has become the primary, preferred fuel for electricity generation and for major industries.**

**The new discoveries in the emerging Israeli oil and gas industry offer potentially huge opportunities for UK companies in the supply chain.**

# Israel Oil & Gas Opportunities

## Israel at a glance – December 2013

**Population: 8.1 million**

**Area: 22,145 sq. km.**

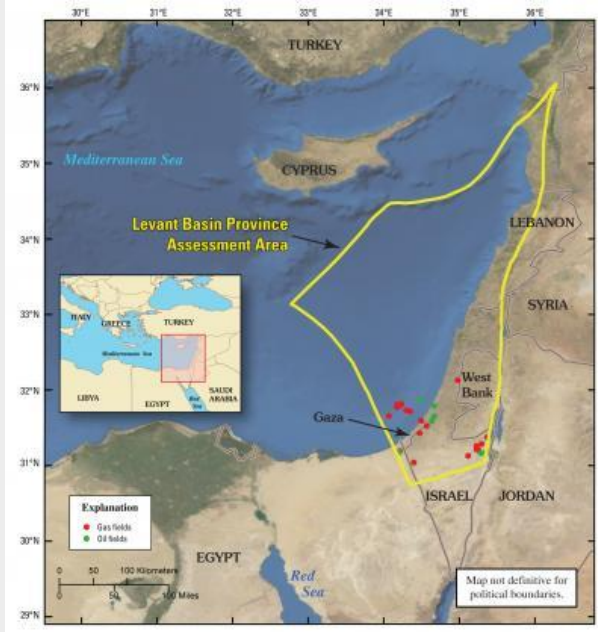
**GDP per capita: \$36,200 (The UK- \$37,300)**

**Growth 2013: 3.3%**

**Inflation 2013: 1.8%**

**Unemployment: 6.2%**

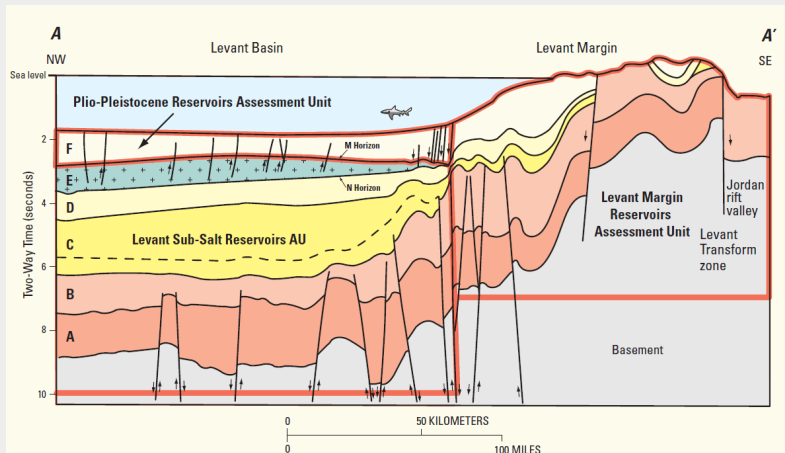
# The Levant Basin



**About 45% of the 83,000 km<sup>2</sup> basin's area fall within Israel's land and economic waters**

**Basin's International players: Noble Energy (NYSE-NBL) with six consecutive discoveries And Edison (Italy)**

**The U.S. Geological Survey (USGS) estimated in March 2010 the undiscovered oil and gas resources of the Levant Basin Province:**



➤ **Undiscovered oil – mean volume of 1,689 MMBO, with a range from 483 MMBO to 3,759 MMBO**

➤ **Gas- mean volume of 122 TCF with a range from 50 TCF to 227 TCF (of which approx. 38 TCF has been discovered)**

# Israel Off Shore Licenses and Discoveries

**2011 Aphrodite**  
5 TCF

**2012 Tanin**  
1.1 TCF

**2013 Karish**  
1.8 TCF

**Cyprus**  
\*Block 12

**2010 Leviathan**  
19 TCF

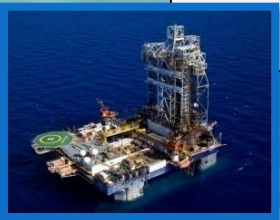
**2009 Dalit**  
0.5 TCF

**2009 Tamar**  
11 TCF

**2000 Mari B**  
1 TCF

**2011 Dolphin**  
0.1 TCF

**2012 Shimshon**  
0.5 TCF



# Yam Tethys Project



**Mari B Gas Discovery in 2000 -1 Tcf**

**WI Partners: Noble Energy 47% -Operator  
Delek Subsidiaries – 53%**

**First Natural Gas project in Israel**

**Worldclass fast development**

**First Gas –February 2004**

**Sole independent source of energy until 2013**

**Sole Natural gas supplier to the Israeli Market until  
2008 and during 2011-2012**

**Mari B is now depleted**

# Tamar Project

## Tamar - World's Largest Deep Water Gas Discovery in 2009



### WI Partners:

**Noble Energy 36%–Operator**

**Delek 31.2%**

**Isramco 28%**

**Dor 4%**

**Natural Gas (2P) Reserves: 11 Tcf**

**Condensate (2P) Reserves: 13 MMBBL**

**First Gas : April 2013-from discovery to full operations- 4 years**

**Development costs: \$3.1 Billion**

**First production-2.5 years from sanction**

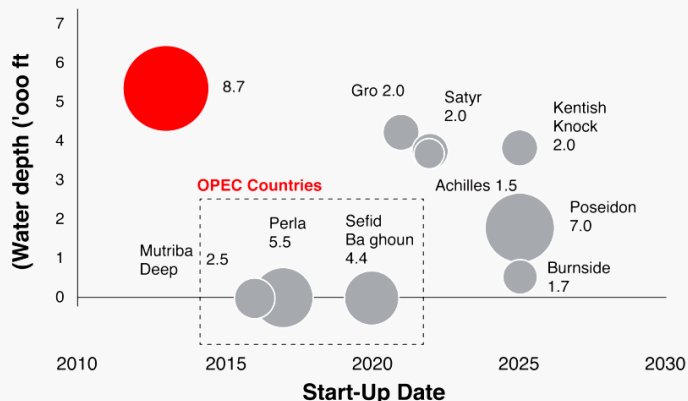
**Main GSPA- Israel Electric**

**2013 Production 5.5 BCM**

**Israel's savings and revenues - \$130 Billion  
(life of the field)**

**CO<sub>2</sub> Emissions reduction – equivalent to all  
Israeli cars emission for 14 years.**

Largest Conventional Gas of 2009



# Tamar Project

**5 subsea wells (200 to 250 mmcfd each), water depth of ~1,700m**



**World's longest subsea tieback- 150 Km, 5,500 ft water depth**

**Gas produced is gathered at the field and delivered via Dual 16" flowlines**

**Tamar platform was constructed adjacent to the existing Mari-B structure**

**Tamar platform is located 25 km from shore, at 237m water depth**

**Tied into the existing 30" pipeline that delivers natural gas to the Ashdod onshore receiving terminal**

**Initial processing capacity up to 1.1 bcf/d**

**Expansion to 1.5 bcf/d targeted for 2015**



# Government Resolution on Gas Export

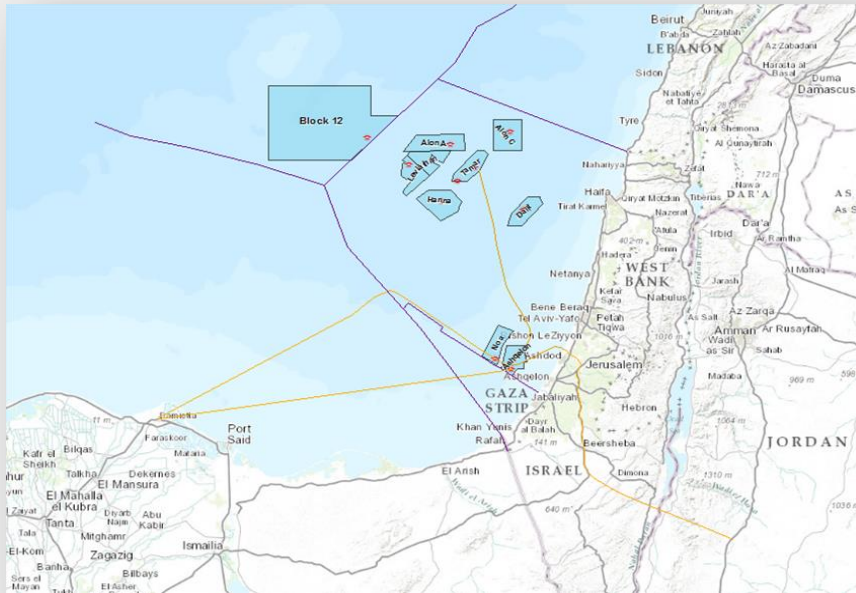
## Allowed quantities for export- by reservoir size:

- ❑ **200 BCM or more– 50%, if the owner committed by contract to sell gas as of today, the committed quantity is reduced from the reservoir's quantity.**
- ❑ **100-200 BCM- 60%**
- ❑ **25-100 BCM 75%**
- ❑ **Less than 25 BCM –TBD**

**Swaps between reservoirs are allowed under certain conditions.**

**In any case the minimum quantity for the Israeli market - 540 BCM.**

# Tamar Project- Regional Export Opportunities



## Export to Egypt, Jordan and Turkey

**Jordan –**  
**Feb 2014-Signed GSPA with two Jordan costumers Arab Potash Company and Jordan Bromine Company**  
**Total sales - up to 1.8 BCM, for 15 years**

**Egypt –**  
**April 2014 Signed LOI with Union Fenosa Gas, to supply 4.5BCM a year to Damietta LNG plant owned by UFG and ENI for 15 years from 2017**

**Negotiations on additional export contracts**

# Leviathan Project

- **The world largest deep water gas discovery in a the last decade**
- **The largest discovery in the history of Noble Energy**



**WI Partners:**  
**Noble Energy 40% -Operator**  
**Delek 45%**  
**Ratio -15%**

**Leviathan Discovery – 2010**

**Total Depth- 5200 meter, water depth-1,600 meter**

**2C Reserves: 19 TCF (a range of 14-24 TCF)**

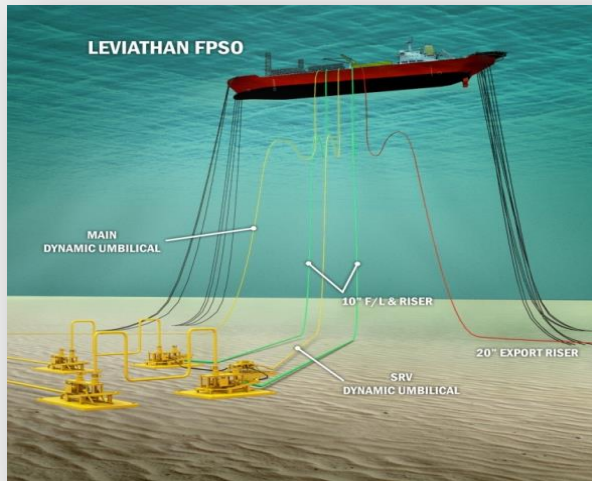
**Condensate (2C) Reserves: 34 MMBBL**

**Leviathan 3 and 4 – appraisal and production wells  
– completed**

**Expected to supply the domestic market in 2017**

**Several export Options target start-up around 2018**

# Leviathan Project - Development Concept



Development will include supply to domestic market and to export

Leviathan development components:

- Deep water subsea facilities
- FPSO, capacity of 1600MMcf/d
- Domestic gas pipeline to a near shore Pressure Reduction Metering Platform (PRMP)
- Tie-in to the INGL gas line onshore to supply the Israeli gas market
- Additional connection can be established to a pipeline to Turkey



# Leviathan Field - FLNG

**Floating LNG Continues to Mature**

**Technical challenges are better understood  
and robust solutions being developed**

**Industry experience with complex FPSOs  
reduces execution risk**

**Robust Economics Exist- Strong LNG markets  
with favorable netback prices**

**Pre-FEED studies confirmed technical and  
commercial viability -Technip**

# Oil Play in Levant Basin

## **A play with step change potential**

- **Gross un-risked basin resource potential at 3 BBO**
- **Oil potential exists in each of discovered gas fields.**
- **High liquid recent Karish gas discovery identified thermogenically sourced hydrocarbon**

# On-Shore Oil - Givot Olam LP

**Givot Olam LP is traded in Tel-Aviv Stock Exchange and in the initial stage of development of Meged Field in Rosh-Ha'ayin lease, central Israel.**

**Givot holds a Lease of 243 km<sup>2</sup> (60,050 acre) and a license of 110 km<sup>2</sup> (27,140 acre). Givot is producing oil from the Meged 5 well located in the Lease and finished drilling the second PUD well - Meged 6 to a total depth of 4,750 meters. Meged 6 is currently waiting on completion.**

**Current daily production from Meged 5 well is 440 BOPD from one zone (production started in June 2011). Due to the high natural pressure in the reservoir, the Meged 5 is a flowing well. Cumulative production for March 2014 is 546MBBL.**

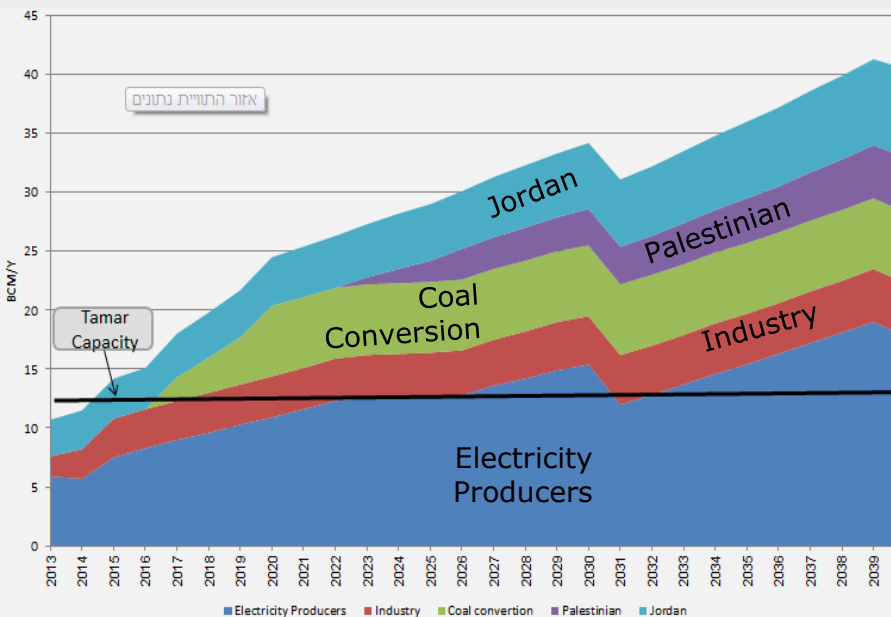
**In order to develop the whole field (estimated 180 km<sup>2</sup>) Givot will need to drill close to 40 wells.**

**Givot is seeking for a strategic partner in order to support operations and finance the development of the field: the completion of the Meged 6 PUD well and subsequently the drilling of additional permitted wells.**

# Israel Natural Gas Demand

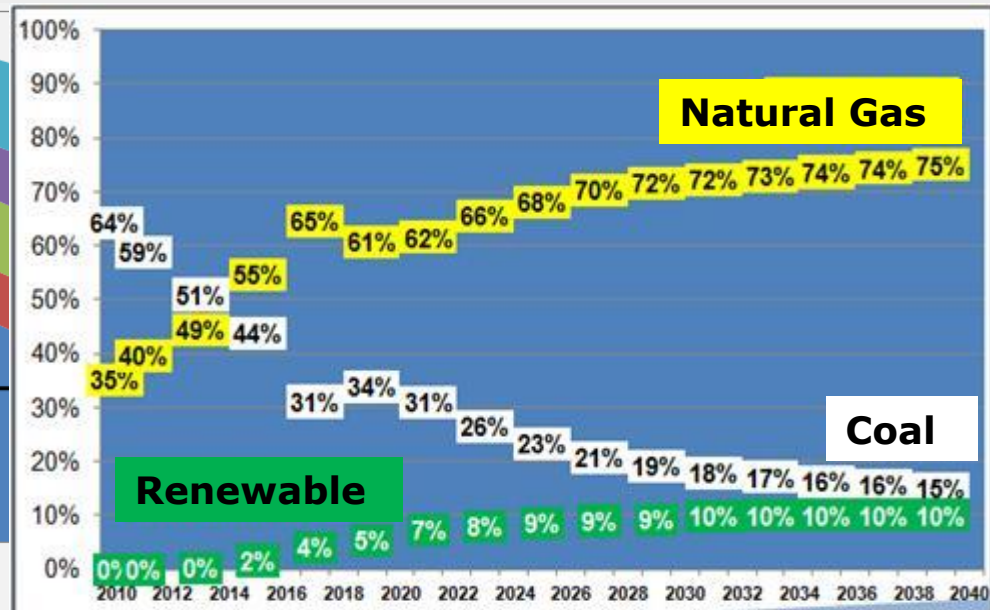
**Gas is the fuel of choice**

- **Shift to base load electricity**
- **Strong electricity and industrial demand**
- **Potential for converting coal-fired electricity generation**
- **2012-2017 15% CAGR**



**Gas Demand 2013-2040**

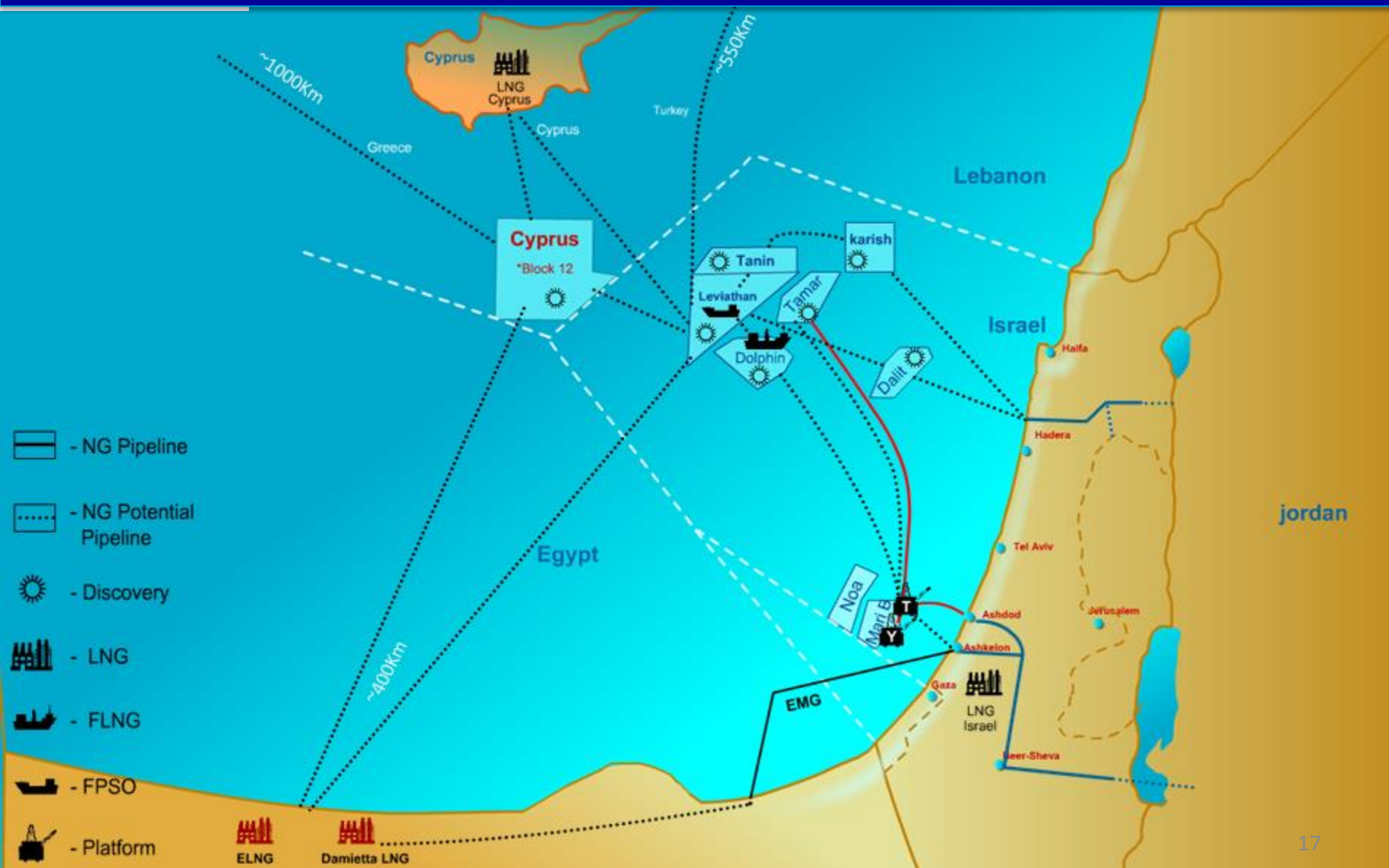
**By sector (Economic Models)**



**Israel Electricity Generation**



# Noble and Delek Discoveries Export Opportunities - Master Plan



# Service Companies Opportunities

- **Main offshore activities are being operated by Noble Energy, headquarters in Houston.**
- **All service providers coming from abroad. There are almost no local companies with the experience, equipment and knowledge to meet the demand for service providers for such an extensive projects.**
- **The initial development of the Leviathan field is estimated to be over \$6 billion (excluding FLNG). Second stage of Tamar development project is hundreds of millions.**
- **If Noble discovers deep oil in the near future it will be a second game changer and will open up new possibilities for oil players and service companies.**
- **The national gas infrastructure is still in its first stages. In order for medium and small consumers to be supplied with natural gas the national infrastructure network needs to be developed further and conversion to gas is required.**

# Karish and Tanin Discoveries are for sale

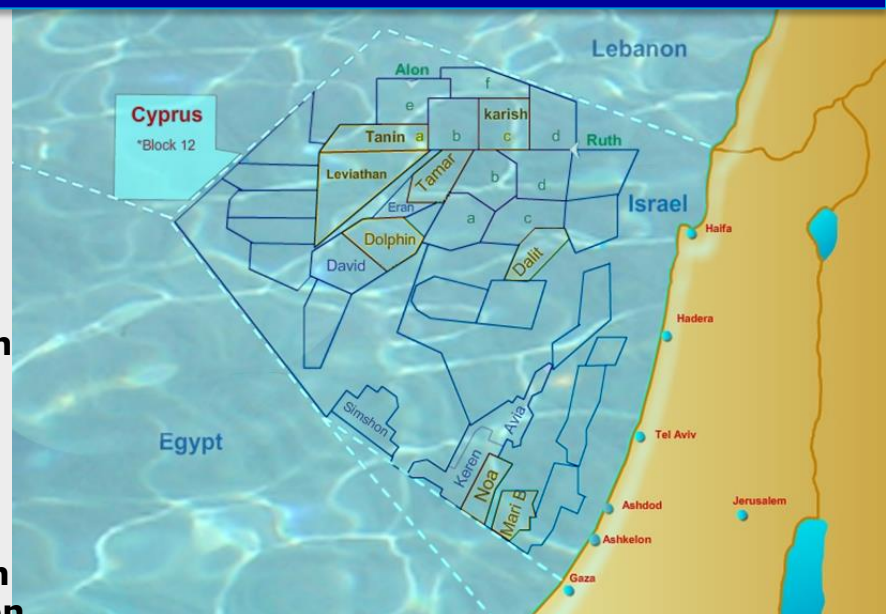
**Noble and Delek agreed with Israeli Anti-Trust authorities to divest the licenses of Karish and Tanin.**

**The buyer or one member of buyers' consortium would need to be a qualified deep water operator.**

**Responsibly for all aspects of the development and production phases. Project would need to rely on its own independent infrastructure**

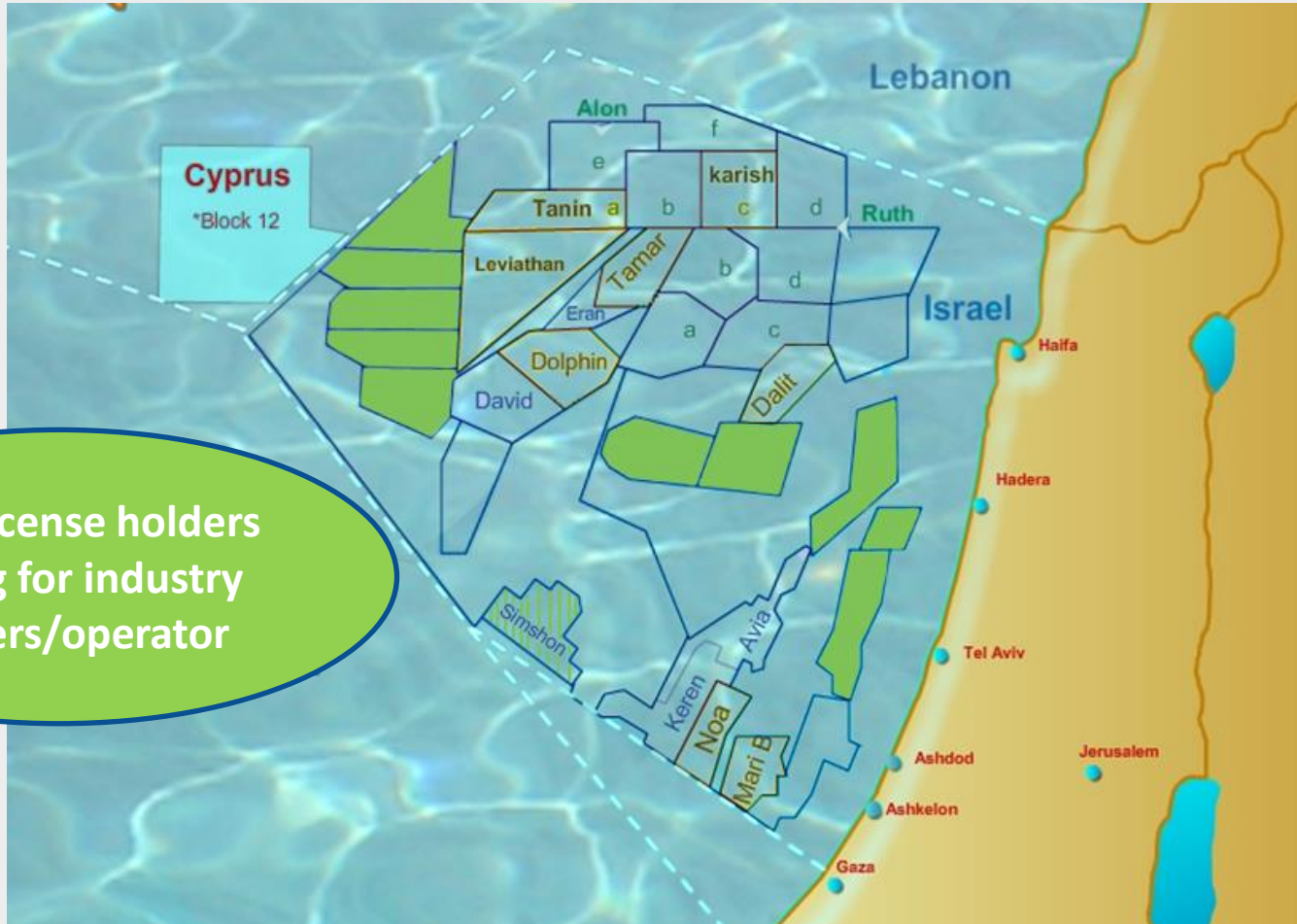
**Domestic market sales – export quota belongs to the sellers.**

**Any condensates or potential deep oil targets production would need a separate mechanism at the sale transaction**



| <b>Karish + Tanin - Reserves in BCM</b> |              |           |                    |                         |
|---|--------------|-----------|--------------------|-------------------------|
| <b>Reserves</b>                         |              | <b>2C</b> | <b>Prospective</b> | <b>2C + Prospective</b> |
| <b>Natural Gas</b>                      | <b>bcm</b>   | 58.7      | 26.7               | <b>85.4</b>             |
| <b>Condensate</b>                       | <b>mmbbl</b> | 14.3      | 4.3                | <b>18.6</b>             |

# Farm-in Opportunities - Exploration



Israeli license holders  
looking for industry  
partners/operator

# Israel – The Cyber Security Capital of the World

## Cyber Threats in the Oil & Gas Industry

- 1. Newest cyber security and cyber-defense software is being coded in Israel.**
- 2. IBM, Cisco, Lockheed Martin, Deutsche Telekom announced plans to set up cyber research centers in Israel.**
- 3. Several Israeli companies are specializing in protecting of infrastructure, including oil and gas facilities.**
- 4. UK oil and gas companies and service companies may benefit from cooperation with Israeli industry.**

# Current Status of Opportunities

|                          | Immediate/<br>Short-Term  | Mid-Term   |
|--------------------------|---|--|
| Upstream                 |   |  |
| E&P Operators / Partners | Offshore -three groups - oil and gas exploration  | Second round of licenses grants                    |
|                          | Offshore-two groups-development & oil and gas exploration   |  |
|                          | Onshore- Oil filed development  |  |
| Service providers        | Tamar operations & Leviathan Development<br>Givot Olam- Onshore, drilling and fracking<br>Cyber Cooperation/Partnership | FLNG   |
| Midstream                | Inland infrastructure for natural gas distribution  | Inland infrastructure for natural gas distribution |
| Downstream               | Consumers conversion process to gas   | Consumers conversion process to gas                |

## **You can win business in the Israeli market**

- **Service companies –Offshore upstream subsea projects**
  - Onshore deep drilling and fracking**
  - Cyber protection cooperation**
- **E&P companies and deep water operators**
- **Midstream and Downstream**

# Israel Oil & Gas Opportunities

## Q&A

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*Pictures and maps courtesy of Noble Energy and Delek*