Levant Basin Geology and Hydrocarbon Potential

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Main Topics:

- Levant Basin Geology
- Highlights of Basin Analysis
- Levant Basin Plays
- The Bid Round Data Package
The Levant Basin – A World-Class Hydrocarbon Province in the SE Mediterranean Sea

More Than 70 TCF of gas discovered in the past 7 years
Gas and oil fields throughout the basin in both shallow and deep water

- Very high rate of success in drilling the gas play (> 60%)
- Sub-commercial (at time of discovery) but important oil fields
- Favorable geologic conditions for generation and accumulation of gas and oil
An integrated Basin Analysis Study was conducted by Beicip-FranLab in 2015

Project goals:

- Define Petroleum Systems and Plays
- Estimate the amount of hydrocarbon resources (Unrisked, Yet-To-Find, Recoverable)
- Identify favorable areas for exploration
- Provide a regional 2D and 3D integrated models
Main Results:

- Good source rock for Biogenic Gas in the Oligocene, Miocene and Pliocene (TOC 0.5-1.5%)  
- Good source rock intervals for Oil and Gas in the Lower and Upper Jurassic and Middle Cretaceous
Main Results:

- The Oligo-Miocene is in the immature zone (Ro < 0.6%)
- The Cretaceous is within the oil to light oil zone (0.6 - 1.4 Ro)
- The Upper Jurassic can reach the dry thermogenic gas zone
Main Results:
- The basin appears to be vertically and latterly compartmentalized
- Salt and shale units form low permeability pressure barriers
Basin Analysis-Maturation and Expulsion of Hydrocarbons

Maturation map of Upper Jurassic (Kimmeridgian) source rock

Present-day

Transformation ratio (%)
Biogenic gas charge

Oil and gas charge

Basin Analysis – Petroleum System Chart

Prospectives resources (most likely)

Biogenic

Thermogenic
### Basin Analysis - Unrisked and YTF Resources

<table>
<thead>
<tr>
<th>Category of Prospective Oil and Gas Resources</th>
<th>OIL</th>
<th>GAS</th>
<th>TOTAL OIL</th>
<th>TOTAL GAS</th>
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<tbody>
<tr>
<td>Jurassic Middle+Upper</td>
<td>Jurassic Middle+Upper</td>
<td>Lower Cretaceous</td>
<td>Lower Cretaceous</td>
<td>Oligo-Miocene (ABCD sands and equivalent)</td>
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<tr>
<td>Unrisked: in place volumes with no exploration risk calculated</td>
<td>Billions bbl</td>
<td>Billions bbl</td>
<td>BCM</td>
<td>BCM</td>
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<tr>
<td></td>
<td>8.0</td>
<td>18.0</td>
<td>991</td>
<td>1133</td>
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<tr>
<td>Yet-to-find: In place volumes after integration of the chance of exploration success</td>
<td>1.2</td>
<td>5.4</td>
<td>149</td>
<td>340</td>
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Main Results:
- Four main Hydrocarbon plays, three of them proven (Pliocene, Oligo-Miocene, Jurassic) and one is speculative (Cretaceous).
- Additional traps are likely found in all plays.
Oligo-Miocene Play (Tamar Sands)

Hypothetical, Oligo-Miocene Submarine Turbidite Sand System
Pliocene Play (Yafo Sands)

The Yafo Fan Complex
Lower Cretaceous Play

Lithofacies map

Mango-1
Yam West-1
Yam-2

Mesozoic oil play in the deep basin

TD=6500m

Mesozoic—Cretaceous
Permian—Triassic
Precambrian

Hydrocarbon Migration

Gas Show
Oil Show

M. Jurassic—M. Cretaceous
Senonian—Eocene
M. Miocene
Oligo-Miocene
Cretaceous
Evaporites
Carbonate Buildup Play

- Zohr
- Mira-1
- Jonah High

ENI (2014)
First Offshore Bid Round
# Bid Round Data Package

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<thead>
<tr>
<th>Data type</th>
<th>Data content</th>
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<td>Well data and reports</td>
<td>19 deep wells</td>
<td>LAS, PDF</td>
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<td>2D seismic surveys</td>
<td>TGS 2001 survey (64 lines and acquisition report)</td>
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<td>Highlights of Basin Analysis-Beicip FranLab (2015)</td>
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<td>Regional geologic report -Gardosh and all (2008)</td>
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Data Package-Wells
Data Package-2D Seismic Lines
Additional Data - 3D Seismic Volumes

Outlines of 3D Seismic Surveys
We Invite you to Participate in our Offshore Success

More information and updates in www.energy-sea.gov.il