THE LEBANESE OFFSHORE: PROSPECTIVE HYDROCARBON POTENTIAL

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Board Member, Head of geology and geophysics

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OUTLINE

- Lebanon attractiveness factors
- Legal framework and results of the 1\textsuperscript{st} licensing round
- Regional petroleum activities
- Multiclient data library interpretations
- Prospectivity
- Potential Markets
- 2\textsuperscript{nd} Offshore Licensing Round
KEY CONTRIBUTORS TO LEBANON'S OFFSHORE ATTRACTION
ATTRACTIVENESS FACTORS

- Clarity, Predictability and Stability
- Three layers of governance
- Offshore Petroleum Resource Law
- Petroleum Activities Regulations
- Production Sharing Regime

- Published Evaluation Criteria for Prequalification, Bidding and Award
- Extractive Industries Transparency Initiative (EITI)
- Right of Access to Information Law
- Enhancing Transparency Law

- Progressive Fiscal System
- Ease upfront Liabilities and Fair Revenue Sharing
- No Signature / Production Bonus
- Modern Petroleum Tax Law

- Multi client Surveys
- Promising results from the Studies and interpretations
- Structural and stratigraphic traps
- Clastics and carbonates
- Biogenic gas and oil

- Robust domestic market
- Proximity to large markets
  - Regional
  - International
## Legal Setting and 1st Round Timeline

### PQ – Feb-Apr 2017
- PQ companies list
- Apr-2017

### Bidding opened May 2017

### Bid closure 12 Oct 2017

### Bids assessment Nov 2017

### Award Dec 14th, 2017

### Draft Onshore Petroleum Law
- PQ – Feb-Apr 2017

### Oil & Gas transparency Law
- Access to information Law
  - Feb 2017

### Oil & Gas taxation Law
- Tender Protocol, model EPA & Blocks delineation decrees
  - Jan 2017

### Petroleum activities regulations
- Apr 2013

### OPRL – Law 132 (Aug 2010)

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### Bid closure 12 Oct 2017

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### RH Pre-qualification criteria decree (Feb 2013)

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### OPRL – Law 132 (Aug 2010)
1st Licensing Round Closure/Outcome

Council of Ministers approved the award of two exclusive petroleum licenses.

Submission of bids: 12th Oct 2017

Submission of Exploration Plan (3 yrs): 14th Dec 2017

Commencement of Exploration phase upon approval of the Exploration Plan: 27th March 2018

Exploration Activities (Pre-drilling): May 2018

Exploration drilling: H1-H2 2018

Exploration drilling: 2019

The journey has just started...
REGIONAL EXPLORATION ACTIVITIES

- Passive Margin for long geologic time.
- Numerous discoveries in the region.
- Prospects mapped in Lebanon share the same trends.
- Zohr was a paradigm shift in the exploration cycle.
- Calypso discovery announced by ENI in Block 6 offshore Cyprus.
- Two Carbonate reservoirs discoveries in 2.5 years equal in reserves/resources to 17 years of discoveries in turbidites (sand).

Source: IHS Market
AVAILABLE GEOPHYSICAL DATA

- Complete 2D coverage
- 80% of the block area acquired by 3D seismic
- 6000 km² MERG & Hyperspectral
- 70.3 km onshore 2D seismic surveys

40 Companies have Licensed Lebanese Offshore Data
PLAYS OFFSHORE LEBANON

**Pliocene**
Age Range: 5.3 ma – present
Depth Range: 1600 – 2300 meters subsea

**Oligo-Miocene**
Age Range: 33.9 ma – 5.3 ma
Depth Range: 3500– 6500 meters subsea

**Eocene**
Age Range: 56 ma – 33.9 ma
Depth Range: ~2000 – 4500 meters subsea

**Carbonate**
Age Range: 251 ma – 5.3 ma
Depth Range: 2000 – 8500 meters subsea
THE PETROLEUM SYSTEMS OF LEBANON

- 4 petroleum systems identified
- Consist mainly of gas in the deep Basin (based on basin modelling)
- Liquid oil expected onshore, along the margin and possibly in the deep basin
The lower Miocene ranks first given the proven reserves in different parts of the East Med.

Though riskier, recent carbonates discoveries increased the exploration appetite of IOCs due to the potential high undiscovered resources.
AVAILABLE GEOPHYSICAL DATA

- Modern 2D and 3D Seismic data across the EEZ.

- Data viewing at:
  - LPA Offices
  - PGS
  - Spectrum

Data viewing request can be made via email: datacenter@lpa.gov.lb
GEOPHYSICAL CHARACTERIZATION

- Advanced geophysical characterization studies
- Identify sand source and hence reservoir presence
- Reduce uncertainties
- Point to likely drilling targets
SEDIMENTS THICKNESS OFFSHORE LEBANON

Southern to northern Levantine (Source: Spectrum)
SEDIMENTS THICKNESS OFFSHORE LEBANON

Amathusa 1

Very thin interval Cyprus side

Very thin interval Cyprus side

LEBANON Offshore

Thick sand in Lebanon

West to East Levantine (Source: Spectrum)
Widespread occurrence of oil seeps (over 200) suggest that offshore Lebanon is prospective.

HC seeps closely correlate to hydrocarbon indication on seismic such as bright spots and gas chimneys associated with possible migration pathways.
“The Minister may require that the Right Holders sell all or a portion of the Natural Gas produced from a Reservoir to the State or to an Entity that is owned by the State for use in the Lebanese domestic market. In such event, the State shall have the obligation to take the amount of Natural Gas in respect of which the election is made.” (As per EPA, article 14.8)
It is worth noting that sectors other than the power, can benefit from indigenous natural gas supply (i.e. Cement factories, industries, etc.)

Also important is the fact that the natural gas prices **will not be subsidized** and are going to be mainly indexed on the closest natural gas hub market.
REGIONAL MARKETS

- Lebanon holds friendly relations with Syria, Turkey, Cyprus, Egypt, Jordan and the EU.
- Lebanese Natural Gas can easily reach Syria, Jordan and Egypt through the Arab Gas Pipeline.
- Turkey can be reached by an extension of the Arab Gas Pipeline or through a short offshore shallow water pipeline.
- The EU markets can be reached through Turkey.
- Lebanon can tie-in to any regional collaboration passing through Cyprus.
2ND LICENSING ROUND
2ND LICENSING ROUND PROCESS
# TENTATIVE TIMELINE FOR 2\textsuperscript{ND} LICENSING ROUND

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<thead>
<tr>
<th>Event</th>
<th>From</th>
<th>To</th>
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<tbody>
<tr>
<td>Official Launching of Licensing Round and Announcement of Open Blocks</td>
<td>Late 2018</td>
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<tr>
<td>Submission of Prequalification Applications</td>
<td>January 2019</td>
<td>End of April 2019</td>
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<td>Declaration of Prequalification Results</td>
<td>May 2019</td>
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<tr>
<td>Submission of Bids</td>
<td>May 2019</td>
<td>End of October 2019</td>
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<tr>
<td>Evaluation of Bids and CoM approval</td>
<td>November 2019</td>
<td></td>
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<tr>
<td>Signature of EPAs</td>
<td>December 2019</td>
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# MEETING THE LPA

<table>
<thead>
<tr>
<th>Event</th>
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<tbody>
<tr>
<td>AAPG</td>
<td>Capetown – South Africa</td>
<td>4-7 November 2018</td>
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<tr>
<td>Adipec</td>
<td>Abu Dhabi - UAE</td>
<td>12-15 November 2018</td>
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<tr>
<td>Lebanon day- Petex</td>
<td>London - UK</td>
<td>(26)27-29 November 2018</td>
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CONCLUSION

Above ground risks
- De-risk
- Int’l Oil companies (IOCs)
- Markets
- Manage revenues
- Monetize

Below ground risks
- Attract
- National Oil companies (NOCs)
- Prudent production
- Competitive pricing /cost
- Sovereign Wealth fund