E&P Offshore Acreage in Greece: 2019 Roadmap
What is HHRM SA?

- HHRM SA was established in 2011 (Law 4001/2011)
- The law introduced HHRM as:

  “A Competent Independent Authority, exercising exclusively the Hellenic Republic’s rights on Hydrocarbon resources (managing upstream activities and licensing)”

- HHRM SA is 100% State-owned company but **not an NOC!**
HHRM’s role

- Manages the hydrocarbon rights (including prospecting, exploration & production) on behalf of the State
  - Proceeds to tenders, receives bids, evaluates, negotiates and concludes Lease Agreements with third parties.
  - Lease Agreements are signed by HHRM SA and the Contractor and then submitted to the Minister for approval.
  - Hydrocarbon prospection right is granted by HHRM SA.

- Competent Authority for Offshore Safety in Oil and Gas Operations
  - Since July 2016.
Data room

- Data rooms in Athens and PGS
- Signed CA is necessary
- Technical presentations available online
Bidding

Express of Interest (EOI) submitted to HHRM SA

HHRM SA opinion to Ministry

Ministerial decision (MD)

Government Gazette → European Gazette

90-day (minimum) bidding period

Bidding evaluation & negotiations for improved offer

Preferred bidder

Parliament ratification process
Biddable items

- Work programme
- Signature bonus
- Royalties
- Training fees (different for each exploration phase & exploitation)
- First oil bonus
- Production bonus (cumulative)
- Depreciation
- Relinquishment

- Technical 40%, Financial 60%
Current acreage situation in Greece

- Ionian Block & Block 10: ratification by Parliament pending
- South of Crete & SW of Crete blocks: Court of Audit
Principle tectonic settings

1. Active Fold & Thrust Belt (Hellenides)
2. Kefalonia Fault (KFT)
3. Africa slab subduction (Aegean Island Arc)
4. NAF
Future E&P opportunities

1. Offshore (Western Greece)
   • Central Ionian Sea (N & S part)
   • South of Peloponnese

2. Offshore
   • South of Crete (central & eastern part)

3. Onshore (Central Greece)
   • Mesohellenic Basin
     – Under technical evaluation
Challenges vs Advantages (offshore)

Main challenges

• Frontier areas (sparse seismic 2D grid, to the south)
• Sea-water depths
• Structural elements such as the Kefalonia transform fault and its consequences, South of Crete complexity
• Source Rocks
• Environmentally protected sectors & tourism

Main advantages

• Discoveries in W Greece, oil & gas shows and seeps, Albanian [basin] and Italian analogues [platform]
• Wells to correlate (Ionian Sea, absent in Crete) – with hydrocarbon shows
• Large acreage-potential blocks to explore
• EastMed Pipeline Project in progress (S. of Crete), TAP underwater (N Ionian)
• Fiscal regime
Offshore acreage

Central Ionian Sea

South of Crete
Central Ionian Sea acreage

Northern part
Size: ~9,000 sq.km.

Southern part
Size: ~16,000 sq.km
Central Ionian Sea acreage – bathymetry

Northern part
Bathymetry: 700-3,800 m
Average: 2,000 m

Southern part
Bathymetry: 200-4,350 m
Average: 2,970 m
Central Ionian Sea acreage – seismic coverage

Northern part
Conditioned: 578 km
Reprocessed: 833 km
MC2D (2012-13): 1,535 km (PSTM & PSDM)

Southern part
Conditioned: 388 km
Reprocessed: 421 km
MC2D (2012-13): 1,322 km (PSTM & PSDM)
Central Ionian Sea acreage – tectonic setting
Central Ionian Sea acreage – seismic interpretation
Central Ionian Sea acreage – palaeogeography (Cretaceous)

Cretaceous: Extensive platform development

Isolated build-ups
Central Ionian Sea acreage – Apulian platform seismic character

- Intra Platform Unconformities and
- Truncations on intra-cretaceous unconformity
Central Ionian Sea acreage – source rocks
Central Ionian Sea acreage – play types

<table>
<thead>
<tr>
<th>Type</th>
<th>Karstified Carbonate Platform</th>
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</thead>
<tbody>
<tr>
<td>Water depth</td>
<td>840 m</td>
</tr>
<tr>
<td>Target depth</td>
<td>1,100 m</td>
</tr>
<tr>
<td>Dimensions</td>
<td>6685*160 (m)</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Isolated Carbonate Build-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water depth</td>
<td>2,160 m</td>
</tr>
<tr>
<td>Target depth</td>
<td>3,060 m</td>
</tr>
<tr>
<td>Dimensions</td>
<td>4,260*720 (m)</td>
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<thead>
<tr>
<th>Type</th>
<th>Carbonate mounded feature (mound build up)</th>
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<tbody>
<tr>
<td>Water depth</td>
<td>1400 m</td>
</tr>
<tr>
<td>Target depth</td>
<td>2,160 m</td>
</tr>
<tr>
<td>Dimensions</td>
<td>3,800*630 (m)</td>
</tr>
</tbody>
</table>
South of Crete offshore acreage

Western part
Size ~11,000 sq.km.

Eastern part
Size ~22,000 sq.km.
South of Crete offshore acreage – bathymetry

Western part
Bathymetry: 1,000-3,660 m
Average: 2,100 m

Eastern part
Bathymetry: 150-4,450 m
Average: 2,400 m
South of Crete offshore acreage – seismic coverage

Western part
MC2D (2012-13): 882.7 km (PSTM & PSDM)

Eastern part
Reprocessed: 35.5 km
MC2D (2012-13): 1,396 km (PSTM & PSDM)
South of Crete offshore acreage – seismic interpretation

Legend:
- Seabed
- Top Oligocene
- Top Cretaceous
- Mesozoic Carbonate platform
- Neogene Clastic and Evaporites
- Top Miocene
- Intra Cretaceous
- Basement
- Mid Jurassic
- Faults

TVD (m): 15000 - 3000
South of Crete offshore acreage – carbonate platform extent

Eocene-Cretaceous carbonate platform before tectonism

Similarities with other Mediterranean Isolate Carbonate Platforms

Thin continental crust near Crete (platform). Similar age platforms offshore Libya
South of Crete offshore acreage – play types

<table>
<thead>
<tr>
<th>Type</th>
<th>Carbonate Build up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth</td>
<td>2,500 m</td>
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<tr>
<td>Target Depth</td>
<td>3500 m</td>
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<tr>
<td>Dimensions</td>
<td>H: 400 m, W: 1,500 m</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Type</th>
<th>Anticline/Build up</th>
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<tbody>
<tr>
<td>Water Depth</td>
<td>2,890 m</td>
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<tr>
<td>Target Depth</td>
<td>3,700</td>
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<td>Dimensions</td>
<td>H: 1,500 m, W: 4,000 m</td>
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<thead>
<tr>
<th>Type</th>
<th>Carbonate Build up</th>
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</thead>
<tbody>
<tr>
<td>Water Depth</td>
<td>2,650 m</td>
</tr>
<tr>
<td>Target Depth</td>
<td>4,630 m</td>
</tr>
<tr>
<td>Dimensions</td>
<td>H: 1,000 m, W: 3,000 m</td>
</tr>
</tbody>
</table>
Hydrocarbon prospectivity – summary

- New opportunities offshore western Greece and South of Crete isl.
- Extensive acreage offered for E&P
- Central Ionian Sea and South of Crete areas provide interesting & promising structures

<table>
<thead>
<tr>
<th>Ionian Sea</th>
<th>Offshore South of Crete</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source</strong></td>
<td>Mesozoic/Miocene shales (e.g. Paxi)</td>
</tr>
<tr>
<td><strong>Plays</strong></td>
<td>1. Cretaceous to Palaeogene karstified platform carbonates (intraplatform to slope plays)</td>
</tr>
<tr>
<td></td>
<td>2. Carbonate build-ups</td>
</tr>
<tr>
<td><strong>Structural</strong></td>
<td>Faulted blocks</td>
</tr>
<tr>
<td><strong>Seal</strong></td>
<td>1. Neogene shales</td>
</tr>
<tr>
<td></td>
<td>2. Messinian Evaporites and overlying Pliocene shales (in the southern part)</td>
</tr>
</tbody>
</table>
Hydrocarbon prospectivity – plays map
Visit our Booth #1440, at the International Pavilion

Thank you!