Relevance of MENA in energy investment, trade, and innovation for energy sector transformation

Fourth IEF-EU energy day
The green new deal and circular economy: Session I

Dr Ivan Marten
BCG Senior Partner Emeritus. IEF Knowledge Partner

February 18, 2020
MENA is a very diverse region
MENA holds 1/3 of global oil & gas production and resources

**Global Oil & Gas Production**

<table>
<thead>
<tr>
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<th>Mboed</th>
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</thead>
<tbody>
<tr>
<td>Crude oil</td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td></td>
</tr>
<tr>
<td>RoW</td>
<td>77</td>
</tr>
<tr>
<td>MENA</td>
<td>62</td>
</tr>
</tbody>
</table>

**Global Oil & Gas Resources**

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Crude oil</td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td></td>
</tr>
<tr>
<td>RoW</td>
<td>1,097</td>
</tr>
<tr>
<td>MENA</td>
<td>965</td>
</tr>
</tbody>
</table>

Source: Rystad Energy; BCG analysis
>50% of all seabornered traded oil transits through MENA

Oil transit through chokepoints

- **The Suez Canal**
  - Primary route: Suez Canal
  - Alternative route: Additional 9,000 miles

- **The Panama Canal**
  - Primary route: Panama Canal

- **Strait of Bab el-Mandab**
  - Alternative routes: Additional 9,000 miles

- **The Turkish Strait**
  - No alternative route

- **The Strait of Hormuz**
  - Alternative route: 745-mile pipeline

- **Strait of Malacca**

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**MENA region**

<table>
<thead>
<tr>
<th>Mbbl/d</th>
<th>Strait of Hormuz</th>
<th>Suez Canal</th>
<th>Strait of Bab el-Mandab</th>
<th>Turkish Strait</th>
<th>Strait of Malacca</th>
<th>Panama Canal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16.5</td>
<td>4.5</td>
<td>3.3</td>
<td>2.4</td>
<td>15.0</td>
<td>0.5</td>
<td>42.2</td>
</tr>
</tbody>
</table>

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Growing interconnections with Europe

Power interconnections' capacity, GW

Existing Natural Gas infrastructure & outline for Hydrogen backbone

Sources: Entsoe, press research
Investing heavily in Refining and Petrochemicals

Expected global crude distillation capacity Δ 2015 - 2021

Δ Million barrels per day

-0.1 0.2 0.6 0.8 0.8 0.9 2.2 2.3
Europe FSU LATAM NAM Africa Other Asia China Middle East

Petrochemical plants capacity additions, 2017-2025

MTPA

35 71 36 142
Extensions¹ Planned Announced Total

1. New petchem capacity for plants already in place
2. Not probability weighted
Source: GlobalData; BCG analysis
MENA oil is on average cleaner than global oil

Average crude oil upstream GHG intensity

Note: Selected countries considered
MENA oil is the most resilient to price crashes

Cash costs without royalties

Note: Analysis based on 2017 data
Source: Rystad Energy
Power sector in MENA is becoming greener

- Ambitious renewable targets
- Competitive renewable tenders
- Energy price reforms
- Distributed generation policies
- Energy efficiency initiatives
MENA has embarked on ~67GW of clean energy projects

Source: MEED; IRENA, REN 21
EU determined to be at the forefront on Circular Economy

<table>
<thead>
<tr>
<th>Year</th>
<th>Municipal Waste</th>
<th>All packaging</th>
<th>Plastics</th>
<th>Wood</th>
<th>Ferrous Metals</th>
<th>Aluminium</th>
<th>Glass</th>
<th>Paper and cardboard</th>
<th>Landfills</th>
<th>Hazardous &amp; textiles</th>
<th>Biowaste</th>
</tr>
</thead>
<tbody>
<tr>
<td>2025</td>
<td>55%</td>
<td>65%</td>
<td>50%</td>
<td>25%</td>
<td>70%</td>
<td>50%</td>
<td>70%</td>
<td>75%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td>60%</td>
<td>70%</td>
<td>55%</td>
<td>30%</td>
<td>80%</td>
<td>60%</td>
<td>75%</td>
<td>80%</td>
<td></td>
<td></td>
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</tr>
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</tbody>
</table>

1. Amount of MW landfilled
2. Source: European Council of the European Union (after Dec 2017 revision)

2023: Either collected separately or recycled at source (compost)

All waste suitable for recycling/recovery won't be admitted

10%¹
Summary

A very diverse region...

... that plays a key role in the global security of supply...

... requiring high investments in energy and industry in pursuit of economic development and stability...

... and rightfully addressing the challenge of energy sustainability energy efficiency and circular economy
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