Status of the Energy Industry in the Middle East & North Africa (MENA) Region

Presented by

Eng. Azmi Al-Said Khreisat
econ@orange.jo

USA (April/2013)
## Oil and Gas Reserves and Production in the MENA Region at End 2011

<table>
<thead>
<tr>
<th></th>
<th>OIL</th>
<th></th>
<th>NATURAL GAS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proved Reserves (MMBBL)</td>
<td>Production (000BBL/D)</td>
<td>Proved Reserves (TCM)</td>
<td>Production (BCM)</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>265</td>
<td>11,161 13%</td>
<td>8 4%</td>
<td>99 3%</td>
</tr>
<tr>
<td>Iraq</td>
<td>143</td>
<td>2,798 3%</td>
<td>4 2%</td>
<td>2 0%</td>
</tr>
<tr>
<td>Kuwait</td>
<td>102</td>
<td>2,865 3%</td>
<td>2 1%</td>
<td>13 0%</td>
</tr>
<tr>
<td>UAE</td>
<td>98</td>
<td>3,322 4%</td>
<td>6 3%</td>
<td>52 2%</td>
</tr>
<tr>
<td>Libya</td>
<td>47</td>
<td>479 1%</td>
<td>2 1%</td>
<td>4 0%</td>
</tr>
<tr>
<td>Qatar</td>
<td>25</td>
<td>1,723 2%</td>
<td>25 12%</td>
<td>147 4%</td>
</tr>
<tr>
<td>Other Arab Prod.</td>
<td>16</td>
<td>1874 2%</td>
<td>8 4%</td>
<td>202 6%</td>
</tr>
<tr>
<td>Total Arab World</td>
<td>714</td>
<td>26,842 32%</td>
<td>55 26%</td>
<td>518 27%</td>
</tr>
<tr>
<td>Iran</td>
<td>151</td>
<td>4,321 5%</td>
<td>33 16%</td>
<td>152 5%</td>
</tr>
<tr>
<td>MENA Region</td>
<td>865</td>
<td>31,163 37%</td>
<td>88 42%</td>
<td>670 20%</td>
</tr>
<tr>
<td><strong>Total World</strong></td>
<td><strong>1,653 100%</strong></td>
<td><strong>83,576 100%</strong></td>
<td><strong>208 100%</strong></td>
<td><strong>3,276 100%</strong></td>
</tr>
</tbody>
</table>

Source: BP Report 2012, Figures are rounded
MENA Members’ Crude Oil Export by Destination in 2011 (1000b/d)

<table>
<thead>
<tr>
<th>Region</th>
<th>Europe</th>
<th>North America</th>
<th>Asia &amp; Pacific</th>
<th>Latin America</th>
<th>Africa</th>
<th>Middle East</th>
<th>Total World</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENA Region</td>
<td>2,698</td>
<td>2,323</td>
<td>11,458</td>
<td>189</td>
<td>420</td>
<td>287</td>
<td>17,653</td>
</tr>
</tbody>
</table>

The Share of Oil and Gas in the Arab Countries economy, 2010

- Share of Oil & Gas in GDP (%): 35.5%
- Share of Oil & Gas Revenues in total Government Revenues (%): 70.6%

Primary energy Consumption in the MENA Region (MTOE) 1980-2011

<table>
<thead>
<tr>
<th>Region</th>
<th>1980</th>
<th>2011</th>
<th>Compound Annual Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENA Region</td>
<td>224</td>
<td>1,056</td>
<td>5.1%</td>
</tr>
<tr>
<td>World</td>
<td>6,631</td>
<td>12,275</td>
<td>2.0%</td>
</tr>
</tbody>
</table>
Regional Deficits Requiring Supply from Global Oil Markets

Iraq Oil is Poised for a Major Expansion

<table>
<thead>
<tr>
<th></th>
<th>Iraq oil production (mb/d)</th>
<th>Iraq oil exports (mb/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>2.9</td>
<td>2.3</td>
</tr>
<tr>
<td>2020</td>
<td>6.1</td>
<td>4.1</td>
</tr>
<tr>
<td>2035</td>
<td>8.3</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Sources: World Energy Outlook 2012, Iraq Special Report
Iraq’s Planned Pipeline through Jordan

Sources: World Energy Outlook 2012, Iraq Special Report
## MENA 2011 Energy Subsidies ($ billion)

<table>
<thead>
<tr>
<th>Country</th>
<th>Oil</th>
<th>Gas</th>
<th>Electricity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iran</td>
<td>42</td>
<td>22</td>
<td>18</td>
<td>82</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>46</td>
<td>n.a.</td>
<td>16</td>
<td>62</td>
</tr>
<tr>
<td>Egypt</td>
<td>15</td>
<td>4</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>Iraq</td>
<td>21</td>
<td>n.a.</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>UAE</td>
<td>4</td>
<td>11</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>Algeria</td>
<td>12</td>
<td>n.a.</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Kuwait</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Qatar</td>
<td>2</td>
<td>1.5</td>
<td>2.5</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>146</strong></td>
<td><strong>40</strong></td>
<td><strong>51</strong></td>
<td><strong>237</strong></td>
</tr>
</tbody>
</table>

Source: World Energy Outlook 2012,
Gasoline & Diesel Prices in some Countries

Examples of Gas Prices in Some Arab Countries

Sources: World Bank 2012


<table>
<thead>
<tr>
<th>Item</th>
<th>Required Investment (US $ Billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil upstream and mid-stream</td>
<td>95</td>
</tr>
<tr>
<td>Gas upstream and mid-stream</td>
<td>160</td>
</tr>
<tr>
<td>Oil and gas downstream (refining, petrochemicals, fertilizers, LNG and GTL)</td>
<td>235</td>
</tr>
<tr>
<td>The power sector</td>
<td>250</td>
</tr>
<tr>
<td>Total</td>
<td>740</td>
</tr>
</tbody>
</table>

MENA’s oil and gas investment is highly influenced by regional as well as global factors, such as

- Arab spring
- Legal and regulatory structure;
- Energy prices
- New developments in the global oil and gas industry
- Strong push for enhanced security of energy supply

Sources: Economic Commentary Vol. 8 Jan. 2013, MEES Vol 55 No.41, Ali Alissauoi, Arab Petroleum Investment Corporation
### MENA Power Sector Investment Outlook for 2013-2017

<table>
<thead>
<tr>
<th>The Power Sector</th>
<th>Required Investment (US $ Billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Generation</td>
</tr>
<tr>
<td>North Africa</td>
<td>17.6</td>
</tr>
<tr>
<td>Iraq, Jordan, Lebanon, Syria</td>
<td>36.8</td>
</tr>
<tr>
<td>GCC</td>
<td>63.1</td>
</tr>
<tr>
<td>Rest of Arab World</td>
<td>2.3</td>
</tr>
<tr>
<td>Iran</td>
<td>27.8</td>
</tr>
<tr>
<td>Total Region</td>
<td>147.6</td>
</tr>
</tbody>
</table>

- Heavily subsidised domestic prices for natural gas and electricity are one of the obstacles to attract investment in non-associated gas field and IPP power generation projects.

Sources: Economic Commentary Vol. 8 Jan.2013, MEES Vol 55 No.41, Ali Alissauoi, Arab Petroleum Investment Corporation
Impact of Arab Spring

- Egypt, Libya, Tunisia, Yemen and Syria still facing difficult political situation which affects their internal stability and the stability of the region.
- Continued risk of similar developments in other Arab countries.
- Turmoil, reconstruction and changes in governance are weakening political, administrative and technical capacities of the new governments.
- Political and social changes underway will handicap ability of these countries to attract foreign or even local capital for their energy projects.
- Frequent interruptions of the Egypt-Jordan Natural Gas Pipeline are a typical example of regional supply problems.
**Project Stages**

**Third Stage**
- Rehab-Damascus
- Damascus-Homs - Turkey
- Homs-Banias/Lebanon · Border

**Second Stage**
- (36°, 393km)
  - Aqaba/Rehab

**First Stage**
- (36°, 265km)
  - Aresh/Taba/Aqaba
US Oil & Gas Production

Middle East Oil Export by Destination

Oil Shale Occurrences in Jordan

- More than 40 billion tons of geological reserves (surface Retorting)
- Deep reserves are many of the above figure

Characteristics of Oil Shale

- Minimal overburden
- Very good stripping ratio
- Absence of significant structural disturbances
- Favorable mining conditions
- Deposits are located in a thinly populated area, but good road connection with asphalted highways
- Low moisture content
Jordan is pursuing both in-situ and surface retorting opportunities.

**In-Situ Utilization**

- High Quality Products
  - Diesel
  - Jet Fuel
  - Naphtha (gasoline)

- Overburden
- Producer Wells
- Heater Holes

**Surface Retorting**

**Direct Power Generation**

Eesti Power Plant - 1615 MWe
Concession Agreement

- **Fixed provisions:**
  - Fiscal terms: taxation, royalties and bonuses
  - The right to sell / export products
- Specific environmental regulation is included within the Concession:
  - Emission limit values for identified controlled substances
- Everything else operates within the existing legal framework
  - Permits and approvals must be obtained in compliance with Jordanian law
- Principle established that the Concession should be enforceable in accordance with its terms
- Relinquishment Requirements, Termination/Compensation, Dispute Resolution
Oil Shale Projects undergoing Concession Agreements
Proposed Timelines & Production Capacities

1. Jordan Oil Shale Co. B. V. (Shell):
   - End of Exploration Phase
     - May 2013
   - End of the Evaluation Phase
     - Aug 2014
   - Experimental Station
     - Aug 2018
   - Designing Phase
     - Aug 2019
   - Production Phase
     - 350,000 barrel/day
     - 2020-2023

2. Jordan Oil Shale Energy (JOSE):
   - Pre-Development Phase (Maximum 4 yrs)
     - July 2014
   - Development Phase I (20,000 barrel/day)
     - Aug 2017
   - Development Phase II (40,000 barrel/day)
     - Aug 2019

3. KIO “JEML”:
   - Pre-Development Phase (Maximum 4 yrs)
     - March 2015
   - Development Phase I (17,000 barrel/day)
     - March 2017
   - Development Phase II (40,000 barrel/day)
     - March 2019
   - Development Phase III (60,000 barrel/day)
     - March 2020
Conclusions

- MENA region is the world’s richest in oil & gas resources with highest production and proven reserves.
- Iraq will be a major MENA oil exporter and the majority of its export will be destined to Asia Pacific.
- Subsidies for energy consumers and energy overuse in most MENA countries are affecting petroleum export potential.
- To face the challenges of energy industry and to improve the economic competition with other regions, a long term comprehensive energy policy is needed and should focus on:
  - Diversification of the fuel base toward the use of renewable energy and development on unconventional oil and gas resources.
  - Comprehensive promotion and enforcement of energy efficiency standards and energy saving targeting industry, commercial, households and other sectors.
  - Gradual reform of domestic energy pricing to include gradual removal of subsidies by adopting alternative measures such as cash transfers to compensate the poor citizens.
  - Regional integration through oil, gas pipelines & power.
The people in the region are looking for a better and more peaceful life - let us co-operate to accomplish that.

Thank you for your attention.

I am ready for any question or comments you may have.