Monetization of natural gas of Eastern Mediterranean

Panos Papanastasiou
Professor, Dean of the Engineering School
University of Cyprus
Introduction

• Gas value chain
• Gas monetization option and criteria
• LNG market
• Visegrad group (market) and East Mediterranean (supplier)
Oil & gas value chain

Upstream (Exploration & Production)
- Lease Access
- Exploration
- Development
- Production
  - Gas
  - Oil
  - Gas Processing
  - LNG Liquefaction

Midstream (Transportation & Trading)
- Oil Trading
  - Transportation Ship, Pipeline
- Petrochemicals
  - Specialty Chemicals
  - Commodity Chemicals
  - Gas to Market
  - Motor Fuels (gas/diesel)
  - Jet Fuel Heating Oil
  - Lubricants Asphalt

Downstream (Refining & Marketing)

FOB
- IOC in E. Mediterranean

DES
- Utility companies in Visegrad group

Source: A. Inkpen and M.H. Moffet (2011)
Field development

Floating LNG

Upstream

Pipelines

Treatment, Liquefaction and Export

Distribution

Regasification Terminal

Transportation

LNG

Gas
Gas monetization

• Options
  – Gas export through pipelines
  – Onshore LNG
  – Floating LNG (FLNG)
  – Petrochemicals (ammonia, GTL, etc)

• Criteria
  – Selling price/ net-back margin
  – Cost
  – Bankability/investibility
  – Technical visibility
  – Size/ scalability
  – Time to market
  – Return to local economy
  – Geopolitical risk, security
  – Regulatory obstacles
  – Environmental obstacles
Vasilicos LNG plant

- Cyprus is in the right location. Vasilicos is a proper site with expandable capabilities
  - can accommodate (3 bcf/d or 3X5 MMTPA)
- Project Structure
  - Tolling structure
  - The government will secure competitive participation and access to newcomers gas holders
- Project financing
  - $9-10 billion for 2 trains, 20-30% shareholders finance, 80-70% project financing
  - Sale contracts on strong commercial basis signed before FID
- Timing
  - Upstream (offshore), midstream (LNG, shipping, regasification) projects all aligned

Source: Technip
Competitive prices

- **Upstream development**
  - Exploration cost, development cost, operating cost
  - IOC Company IRR
  - Government’s share through PSC

- **Midstream cost**
  - Liquefaction cost (CAPEX, OPEX)
  - LNG entity
  - Tolling cost, IRR

- **Shipping cost (for DES)**

\[
\text{Net-back price} = \text{Gas price at delivery point} + \text{LNG entity} + \text{Tolling cost, IRR}
\]

\[
\text{Price at FOB} = \text{Net-back price} + \text{Tolling cost, IRR}
\]

\[
\text{LNG landed prices in Europe, Asia} = \text{Price at FOB} + \text{Shipping cost (for DES)}
\]
World LNG Estimated November 2013 Landed Prices


Updated October 7, 2013
Future prices of Natural Gas

• N. America (USA)
  – future prices in the range of $4-5/mmbtu

• Asia
  – contracts $14-15 /mmbtu (14% of oil price $100/bbl)
  – spot prices $15-20 /mmbtu
  – New Contracts $HHB (1+15%)+ Liquefaction + transportation cost= $12/mmbtu

• Europe
  – contracts $10-12 /mmbtu (Visegrad group?)
  – spot prices $9-10 /mmbtu (lower)
East Med is located between main LNG Markets

LNG imports in 2011 (bcm)

<table>
<thead>
<tr>
<th>Country</th>
<th>LNG imports</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Japan</td>
<td>104.42</td>
<td>32.5%</td>
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<tr>
<td>S. Korea</td>
<td>48.78</td>
<td>15.2%</td>
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<tr>
<td>UK</td>
<td>25.06</td>
<td>7.8%</td>
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<tr>
<td>Spain</td>
<td>23.04</td>
<td>7.2%</td>
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<tr>
<td>India</td>
<td>16.39</td>
<td>5.1%</td>
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<tr>
<td>China</td>
<td>10.24</td>
<td>5.1%</td>
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<tr>
<td>Taiwan</td>
<td>15.93</td>
<td>5.0%</td>
</tr>
<tr>
<td>France</td>
<td>14.66</td>
<td>4.6%</td>
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<tr>
<td>Italy</td>
<td>8.55</td>
<td>2.7%</td>
</tr>
<tr>
<td>USA</td>
<td>8.54</td>
<td>2.7%</td>
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<tr>
<td>Others</td>
<td>39.84</td>
<td>12.4%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>321.45</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Sources: Cedigas, Technip
Visegrad group (market) and East Mediterranean (supplier)

- Dependence on Russia gas
  - Poland 70%, Chech Republic 70%, Hungary 80%, Slovakia 100%
  - Gas prices are 20-25% higher than in Western Europe

- Many Eastern European EU member states face energy security challenges
  - To diversify supplies and reduce risk

- Alternative
  - Import LNG from US but requires licenses for export which may take several years for non FTAs
  - LNG from East Mediterranean

- Challenges
  - will require regasification terminals
    - at Krk-Croatia and connecting N-S pipeline
  - Japanese and Korean prices remain 35-50% above average EU prices for LNG

- Opportunity
  - existing prices + short distance to E. Mediterranean gas