The Role of LNG in the Euro-Mediterranean Region (EMR)

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Large LNG Infrastructure in the EMR

**LNG Regasification:**

- Existing EU Regulated
- Existing EU Exempted
- Existing non-EU
- Committed/Under construction
- Planned

**FSRU:**

- Existing EU regulated
- Existing EU non-regulated
- Existing non-EU
- FSRU under development
- FSRU Planned

**Liquefaction:**

- Existing
- Planned

(Hash) 80% of the capacity is exempted. 20% is regulated.

Source: GIE data & others
LNG Imports Evolution in the EMR

Source: GIIGNL Industry Reports
LNG Exports from the EMR

LNG Global Exports (right axis) vs. LNG Exports from the EMR (left axis)
Units: bcm

Source: GIIGNL Industry Reports
LNG Trade within the EMR

Geographical destinations for LNG exports from the Euro-Mediterranean Region (bcm)

<table>
<thead>
<tr>
<th>Year</th>
<th>Algeria</th>
<th>Egypt</th>
<th>Libya</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>29.6</td>
<td>24.84</td>
<td>24.22</td>
</tr>
<tr>
<td>2007</td>
<td>24.84</td>
<td>22.16</td>
<td>19.85</td>
</tr>
<tr>
<td>2008</td>
<td>22.16</td>
<td>15.36</td>
<td>12.57</td>
</tr>
<tr>
<td>2009</td>
<td>19.85</td>
<td>13.51</td>
<td>12.76</td>
</tr>
<tr>
<td>2010</td>
<td>15.36</td>
<td>13.73</td>
<td>13.73</td>
</tr>
<tr>
<td>2011</td>
<td>12.57</td>
<td>14.3</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>13.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>12.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>13.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>14.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: GIIGNL Industry Reports

- 48%
+ 83%
Infrastructure in the EMR – LNG Imports

LNG Imports (bcm/y) and LNG Regasification Terminal Utilisation (%)

- 35 LNG receiving terminals → including 9 FSRU
- 24 planned terminals → including 12 FSRU

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Send-out (bcm/y)</th>
<th>Storage (Mm3 LNG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>262</td>
<td>11.4</td>
</tr>
<tr>
<td>Committed/Under Construction</td>
<td>6.3</td>
<td>0.56</td>
</tr>
<tr>
<td>Planned</td>
<td>&gt; 140</td>
<td>&gt; 5</td>
</tr>
</tbody>
</table>

Source: GIIGNL Industry Reports, GIE
Infrastructure – LNG Exports

LNG Exports (bcm/y) and LNG Liquefaction Terminal Utilisation (%)

- Algeria: 4 in operation
- Egypt: 2 in operation, 1 stopped
- Libya: 1 stopped

### Capacity

<table>
<thead>
<tr>
<th></th>
<th>Production (bcm/y)</th>
<th>Storage (Mm3 LNG)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing</strong></td>
<td>42.25</td>
<td>1.35</td>
</tr>
<tr>
<td>(only in operation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Existing</strong></td>
<td>49.53</td>
<td>1.75</td>
</tr>
<tr>
<td>(all, including stopped)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Planned</strong></td>
<td>tba</td>
<td>tba</td>
</tr>
<tr>
<td>(1 facility)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: GIIGNL Industry Reports, GIE
Supply Outlook

Global gas supply by source

LNG imports by region

Source: LNG Supply Outlook – Global level and by region (Source: Shell Energy Outlook 2018)
EU infrastructure relevant for the LNG and storage strategy. Infrastructure to be built/reinforced to improve connections of LNG terminals to the internal market.

Source: European Commission, 2016
In 2017 LNG re-exports from EMR represented 60% of Global re-exports (96% in 2014)

Source: GIIGNL Industry Reports
LNG Truckloading

Truckloading Activity at LNG Regasification Terminals (bcm)

Source: Gas Infrastructure Europe (GIE)
LNG Truckloading

First Large Terminal to Ship bunkering
April 2017
Cartagena, Spain

First Ship-to-ship LNG bunkering
June 2017
Zeebrugge, Belgium

Bunkering (truck to ship, small terminals to ship, etc.)
CNG/LNG as Alternative Fuel

CNG/LNG Fuel Consumption of Different Vehicles - Equivalences

1 Ferry
- uses as much fuel as
  - 65 small boats or
  - 130 fishing boats or
  - 1,300 buses or
  - 10,800 taxis or
  - 80,000 private cars

Marine Transportation offers possibility for big volumes

Source: UN ECE - GEG

Compressed Natural Gas (CNG) vehicles reduce emissions by up to:

- CO: 57%
- CO₂: 25%
- NO₂: 30%
- Non-methane hydrocarbons: 75%

CNG should increasingly be used in urban fleets of buses, utility trucks, and taxis.

Liquefied natural gas (LNG) is the alternative shipping fuel, reducing emissions by up to:

- SO₂: 100%
- NOₓ: 90%
- CO₂: 25%

...and emits few particulates.

Source: GasNaturally

GHG reduction and significant Air Quality Improvements
Pricing Mechanisms in European Gas Imports

- **Oil-indexed contracts**
- **Gas-on-Gas**
- **Other**

Source: IGU

Source: Shell LNG Outlook 2018
Large and small scale infrastructures coexist

Source: Enagas
Conclusions

1. EMR is not following the LNG global trends.
2. EMR could provide an important contribution to EU energy security and diversification.
3. LNG regasification terminals have a regional dimension: free flow of regasified LNG across the borders is required.
4. LNG trade is expected to grow in the following years.
5. Many planned LNG regasification terminals but large uncertainty.
6. Increased popularity of FSRUs
7. Shorter and more flexible LNG contracts are observed: Convenience of harmonisation
8. LNG role in unlocking gas reserves in the East-Med region
9. Small Scale LNG and LNG as Alternative Fuel: Air Quality Improvement and large potential in the region
10. LNG logistic hub: infrastructure is available - enough storage capacity is paramount
Thank You / 谢谢