European Gas & LNG Markets, Energy Policy, and Geopolitics
October 2016

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Key Themes:

EU LNG Demand

- European import dependency rising due to declining indigenous supplies (UK and Netherlands) causing upward trend in imports, both LNG and pipeline
- Consensus view: European LNG imports set to rise in 2016-2020 because Europe is the market of last resort in a glutted global LNG market; this view is not based on increase in European gas demand, but rather on: 1) Europe being the default market for homeless LNG cargoes; 2) Available infrastructure; 3) Political will to use LNG as a tool to diversify gas mix
- What can go wrong with the consensus view: 1) Gas-on-gas and inter-fuel competition crowd out LNG; 2) Higher demand than anticipated in other markets making Europe less attractive for LNG cargoes; 3) The market rebalances faster than anticipated
- Europe has enough regasification capacity but still need to work on optimization and interconnection
- No need for new LNG infrastructure except for isolated markets: Baltics, Croatia, off-grid islands and enclaves in Europe (Malta and Gibraltar)
- The use of LNG in maritime transportation offers promising demand upsides for LNG in Europe

EU LNG Supply

- Europe has limited supply options to meet its rising import needs. Historical suppliers such as Algeria cannot increase exports
- The choice for Europe is between increasing dependency on Russian gas or on LNG imports
- Gazprom’s strategy volume-over pricing in Europe paying off; US LNG exports have been priced out in the near-term
- Europe defies consensus view it would be primary destination for US LNG, but will become the preferred destination as glut intensifies
- Qatar prioritizes South Asia and the Middle East, Europe is nice to have if nothing else is available

Geopolitics

- Europe will be one of the main beneficiaries of Egypt’s return to gas self-sufficiency by decade-end and revival of LNG exports
- Israel’s gas exports puzzle moves ahead but Europe is not yet a destination
- It will take much more time for Iranian LNG to reach Europe
European Import Dependency Rising
Declining indigenous supplies (UK and Netherlands) causing upward trend in imports, both LNG and Pipeline

- Europe’s gas import dependency increase (both pipeline and LNG); the trend continues in 2016 and beyond
- EU gas import dependency projected to reach 65% in 2020 according to 2014 EU Commission study
- The EU Commission sees LNG as a key component in its energy security, supply diversity, and sustainability improvement strategies
- EU LNG strategy emphasizes regasification infrastructure improvement, reinforcing EU internal market rules, strengthening cooperation with partners and supporting LNG as an alternative transportation fuel
- But investors, utilities, national governments are not yet reassured that EU’s LNG commitment will be a long-term, necessary step to achieve EU’s de-carbonization in a COP21 environment
- Gazprom increased European market share to 31% in 2015, from 30.2% in 2014; Qatari LNG imports into Europe increased 15%, Norwegian gas imports increased 7.8%, Nigerian LNG imports increased 26%, and Libyan gas imports rose by 12%. Imports from Algeria were down 10%

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[Table: 2015 Gazprom Export's to European Gas Markets (bcm)]

<table>
<thead>
<tr>
<th>Rank</th>
<th>Countries</th>
<th>2014</th>
<th>2015</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Germany</td>
<td>38.5</td>
<td>45.3</td>
<td>6.8</td>
</tr>
<tr>
<td>2</td>
<td>Turkey</td>
<td>26.9</td>
<td>27.0</td>
<td>0.1</td>
</tr>
<tr>
<td>3</td>
<td>Italy</td>
<td>21.3</td>
<td>24.4</td>
<td>3.1</td>
</tr>
<tr>
<td>4</td>
<td>Great Britain</td>
<td>10.9</td>
<td>11.1</td>
<td>0.2</td>
</tr>
<tr>
<td>5</td>
<td>France</td>
<td>7.0</td>
<td>9.7</td>
<td>2.7</td>
</tr>
<tr>
<td>6</td>
<td>Poland</td>
<td>8.9</td>
<td>8.9</td>
<td>0.0</td>
</tr>
<tr>
<td>7</td>
<td>Hungary</td>
<td>5.2</td>
<td>5.8</td>
<td>0.6</td>
</tr>
<tr>
<td>8</td>
<td>Austria</td>
<td>3.9</td>
<td>4.4</td>
<td>0.5</td>
</tr>
<tr>
<td>9</td>
<td>Czech Republic</td>
<td>4.7</td>
<td>4.2</td>
<td>-0.5</td>
</tr>
<tr>
<td>10</td>
<td>Slovakia</td>
<td>4.3</td>
<td>3.8</td>
<td>-0.5</td>
</tr>
</tbody>
</table>

Total exports to top 10 European countries: 131.6 bcm in 2014, 144.6 bcm in 2015
Total exports to Europe (Turkey included): 147.0 bcm in 2014, 158.5 bcm in 2015

Source: Gazprom, BP Statistical review 2015, The Rapidan Group
European LNG Imports Set to Rise in 2016-2020
Declining indigenous supply and global LNG oversupply are key drivers

- Consensus view: LNG imports into Europe will increase as unwanted cargoes seek available regasification capacity and well-developed hubs
- This view is not based on increase in European gas demand, but rather on: 1) Europe being the default market for homeless LNG cargoes; 2) Available infrastructure; 3) Political will to use LNG as a tool to diversify gas mix
- What can go wrong with the consensus view?
  - 1) Gas-on-gas and inter-fuel competition crowd out LNG;
  - 2) Higher demand than anticipated in other markets making Europe less attractive for LNG cargoes;
  - 3) The market rebalances faster than anticipated
- Longer term, the EU’s call on LNG will depend on: Russian pipeline politics, EU will to diversify and a more substantial price on carbon to limit coal consumption and push consumers to use more gas
- Use of LNG in European maritime transportation will see some upside
- EU gas demand increased 4% in 2015 to 426.3 bcm, the first rise in four years as gas pricing relative to coal (especially in the UK) became more competitive; Europe consumed 16% more LNG in 2015 (net of re-exports) than in the previous year
No Need for New LNG Infrastructure, Except in EU Isolated Markets
New European niche markets: Malta To Get First Time Access to Gas

<table>
<thead>
<tr>
<th>Country</th>
<th>Project</th>
<th>Investors</th>
<th>Supplier</th>
<th>Targeted Completion</th>
<th>Cost</th>
<th>Power Amount (MW)</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malta</td>
<td>Malta LNG-to-Power</td>
<td>Gas Supply agreement and PPA, Socar (20% equity), Siemens (20% equity), GEM Holdings (30% equity)</td>
<td>SOCAR (100% via trade)</td>
<td>2017</td>
<td>$0.10</td>
<td>400</td>
<td>FSRU is scheduled to be permanently moored by a jetty to feed natural gas to the 400 MW Delimara power station</td>
</tr>
<tr>
<td>Gibraltar</td>
<td>Gibraltar Onshore LNG-to-Power</td>
<td>Gasnor</td>
<td>Shell</td>
<td>2017</td>
<td>UNK</td>
<td>UNK</td>
<td>Shell will supply LNG for gas fired plan, as well as construct regas unit that will receive, store, and regasify LNG for the plant</td>
</tr>
</tbody>
</table>

**European Sub-Total**: $0.10 400

**TOTAL**: $11.20 12,179

- LNG bullish; off grid islands and enclaves in the Mediterranean are to receive access to natural gas for the first time via LNG imports
- British Gibraltar and Malta (one of two remaining EU countries with no gas access) are set to begin importing LNG in 2017
- Some Baltic countries and Croatia are also looking into adding new LNG infrastructure
- LNG imports allows energy diversification, and increased security of supply
European LNG Bunkering: Promising Upsides for LNG Demand

Bunkering facility in Rotterdam paints bullish picture for LNG as a transportation fuel

- Port Rotterdam’s Gate LNG import terminal opened bunkering services, a significant step forward in Europe’s expanded use of LNG as a transportation fuel.

- The EU is strongly supporting LNG refueling points at maritime and inland ports, highlighted in Directive 2014/94/EU and most recently in the EU LNG Strategy released this past winter; these highlight LNG’s saliency as a cleaner alternative propulsion fuel.

- Environmental concerns and new regulatory frameworks will promote marine LNG consumption in the medium and long terms, both for internal waterway transportation and for long-range movements on the high seas.

- The amount of LNG terminals incorporating bunkering for both ships and trucks, both planned and under construction, supports our position of increased demand (please refer to adjacent table).

- This development will strengthen LNG’s position as a more environmentally acceptable fossil fuel in a post-COP21 drive to mitigate GHG emissions.

### European LNG Terminals and Services

<table>
<thead>
<tr>
<th>Service</th>
<th>Operational</th>
<th>Under Construction</th>
<th>Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNG terminals (large + small)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reloading</td>
<td>15</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Transhipment</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Bunkership loading</td>
<td>9</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Truck loading</td>
<td>19</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Rail loading</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Liquefaction plants</td>
<td>22</td>
<td>n.a.</td>
<td>2</td>
</tr>
<tr>
<td>Bunkering facilities for vessels</td>
<td>26</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>Bunker ships</td>
<td>5</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Refuelling stations for trucks</td>
<td>70</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Satellite Storages</td>
<td>&gt;1000</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Source: GIE SSLNG Map, May 2015
Algeria Unable to Maintain Current Export Levels
Likely to reduce spot LNG deliveries and long-term LNG contract commitments once they expire

- While we do not expect the imminent post-Bouteflika transition to disrupt Algeria’s gas sector, other domestic issues (project approval delays, insufficient investment, heavily subsidized domestic consumption, and infrastructure shortfalls) are already curtailing production and exports.

- Start dates for projects totaling 48.7 bcm/yr (South West Gas Project Phases 1 and 2 and four others) that are intended to offset declines have been pushed back toward 2020 (from 2016-2019).

- Algeria’s domestic gas consumption rose to roughly 40 bcm in 2015 (up 4% y-o-y), while production decreased to 82.5 bcm (down 0.4% y-o-y) and exports reached 41.2 bcm (down 4%).

- We expect Algeria will not be able to renew its current 15 mtpa of long-term LNG commitments (with 10 mtpa expiring during 2017-2019 timeframe) and will need to reshuffle pipeline and LNG exports, long-term commitments, and spot deliveries.
Qatari LNG Prioritizes South Asia and Middle East; Europe is the Default

- For Qatar, the European gas market is the market of last resort, given the competition and low prices

- Qatar has adapted well to the new global gas order by offering a flexible approach to secure new markets and new long-term contracts

- Qatar’s strategy of offering flexibility (pricing, shorter contract duration, adaptable delivery terms, more diverse counterparties) to bolster sales volume is paying off

- In 2015-2016, RasGas and Qatargas have already signed 9 mtpa in new contracts, notably with European and South Asian buyers (India, Pakistan), at a time when market diversification is imperative due to demand weakness in the larger Northern Asian markets.

- Qatari exports to India, Egypt, Pakistan, and Kuwait are up from 4.3 Mt (Jan-May 2015) to 7.6 Mt (Jan-May 2016)
Europe Defies Consensus View It Would Be Primary Destination for US LNG
However, transatlantic price differentials and continuous glut will favor US LNG into Europe by end-2016, 2017

- Contrary to consensus expectations, we do not believe US LNG will flow to Europe before the end of the year.
- More than half of the first cargoes exported from Cheniere’s Sabine Pass facility went to South America (Argentina, Chile, Brazil); only 2 cargoes went to Europe.
- Despite the geopolitical appeal of US LNG into Europe (reducing EU gas dependence on Russia), weak prices, intense rivalry between suppliers, and inter-fuel competition have prevented a surge in Europe’s US LNG imports.
- Sabine Pass FOB average price in April, May and June was $3.75/mmbtu while European gas prices converged at $4/mmbtu, putting US LNG out of the money.
- Average EU natural gas import price for July was $4.51/mmbtu, $1 higher than July FOB US LNG price, explaining why so few US cargoes have reached Europe thus far.
- Meanwhile, we expect Gazprom’s European gas prices to remain in the $4/mmbtu range, as the Russian giant will continue its volume over pricing strategy in a move to price out US LNG.
- Russian pipeline politics is full-swing back in Europe; Russia hedges Nord Stream/Turkish Stream against delays/failures in other projects.
Egypt Continues Drive Towards Gas Self-Sufficiency
Zohr’s fast-track and new discoveries help propel Egypt towards gas self-sufficiency

- New discoveries will further boost Egyptian production in the medium-term and signals continued involvement by major oil and gas companies
- Major stakeholders (Eni: $16 bil, BP: $12 bil, Shell: $342 mil) have clearly prioritized Egypt development over other gas/LNG plays in the near-to-medium term
- Their CAPEX input over the next three-to-four years are on track to make Egypt gas self-sufficient by 2020
- Eni’s drilling of 5th Zohr well, with 6th well to be drilled by end-2016, contributes to justified optimism that patterns of declining production could be reversed as early as 2018
- Although Egypt is still at least three years away from gas self-sufficiency, the speed with which Zohr is moving (from discovery to production) supports our view that the next five years will see a ramp-up in production enough to allow a restart of idled Egyptian liquefaction capacity post-2020
- It remains to be seen whether Egypt’s liquefaction plants will also need neighboring gas (Israel and/or Cyprus) to fast-track and sustain restart

Source: Various Egyptian News Sources, The Rapidan Group
Israel’s Gas Export Puzzle Moves Ahead with Immediate Neighbors
Deals to supply electricity companies in Jordan, and Gaza; Europe is only a remote option

- Israeli gas will supply the domestic market and immediate neighbors first
- The 15-year, $10 billion deal for the delivery of 3 bcm/y of gas to Jordan is the first large export contract for the Israeli gas market
- The primary risk to deals with neighbors is the fast evolving geopolitics in the region
- Israel is favoring pipeline over LNG for exports which will makes Europe a more uncertain destination as it will depend on the feasibility of the pipeline to Turkey, and/or connection to the Southern Gas Corridor