Global Gas Market Dynamics

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So far, no LNG oversupply

The role of Europe as a balancing market was limited (+1 mtpa absorbed), which largely benefited Russia (178 bcm exported to European countries, +20 bcm against 2015)

A moderate increase in global LNG supply (+18 mtpa) was mostly absorbed by Asia (China/India) and new importers (Egypt, Pakistan and Jordan) absorbing 20 mtpa

Source: GIIGNL.
A look back at the supply side – 2014-16

LNG supply change (2016 against 2014) and utilization of LNG plants (2016)

Limited supply increase despite new trains
Almost stopped
Stopped
Ups and downs
Slow restart

Source: KAPSARC, GIIGNL.

Domestic gas shortages
Gorgon underperforming
LNG supply did not follow capacity additions

- Given the large capacity additions over the past 3 years (+65 mtpa), one could reasonably have expected large LNG volumes to hit the markets in 2016
- It did not happen as new liquefaction plants started late/ramped up slowly and existing ones faced issues
- LNG trade only increased by 27 mtpa over 2014-16

Source: KAPSARC, GIIGNL (historical data).
Looking forward…

- Around 100 mtpa of additional LNG supply are expected to hit the markets over 2017-20
- The largest capacity additions will take place in 2018, with around 85 mtpa of additional LNG expected to be supplied over 2017-19
- Significant slow down post 2020 (excluding a potential +12 mtpa from Qatar)

Source: KAPSARC, GIIGNL (historical data).

These forecasts assume no major issue with existing plants and that new LNG plants start as announced.

Qatar is not included.
Looking for new liquefaction projects

- Three LNG plants have taken FID since 2016 (as of early June 2017)
- All of them have only 1 train
  - One brownfield – Tangguh T3 (Indonesia)
  - One existing regas plant – Elba Island (U.S.)
  - One FLNG – Coral FLNG (Mozambique)
- Potential FIDs in 2017
  - Fortuna FLNG (E. Guinea) >> FLNG
  - Corpus Christi T3 (U.S.) >> expansion
  - PNG LNG T3 (PNG) >> expansion
  - Sakhalin II T3 (Russia) >> expansion
  - Pacific NW LNG (Canada) >> large greenfield
Where will new LNG capacity come from?

**Likely winners**
- Brownfield projects
  - Qatar
  - Utilization of existing capacity in Egypt, Trinidad or Oman
- Projects with strategic involvement from buyers
- Projects with specific cost conditions (tax exemptions, cheap gas/energy supply)
- FLNG – notably the Golar-type projects
- Liquid-rich projects

**Potential losers**
- Expensive greenfield projects in remote locations and strong local content requirements
- Uncompetitive fiscal framework, uncertain regulation
- Potentially rapidly growing domestic demand (like Egypt)
- Politically unstable
- Large projects (>10 mtpa)?

**Will we ever again see a 15 mtpa greenfield project taking FID?**
Who will provide LNG supply beyond 2020?

- Domestic supply issues
- High cost projects
- Coral LNG took FID in June 2017
- Watch out for Mamba LNG
- PNG T3
- Fortuna FLNG
- Lifted the moratorium in 2017
- Coral LNG took FID in June 2017
- Watch out for Mamba LNG
- Domestic supply issues
- High cost projects

- Another Arctic project?
- Do large projects have any chance?
- More brownfields to take FID? How will greenfield compete?
Anatomy of future LNG demand

- New buyers are emerging, interested in more “affordable” and more flexible LNG
- But they are no longer the AAA-creditworthy buyers able to commit for a 20-year long-term contracts. They are interested in small quantities, shorter periods and possibly different price indexations
In Africa, projects have two main characteristics

<table>
<thead>
<tr>
<th>FSRUs/FSUs</th>
<th>LNG-to-Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faster to implement than an onshore terminal</td>
<td>Large anchor consumer (if used baseload)</td>
</tr>
<tr>
<td>Cheaper than an onshore LNG terminal, lower environmental impact</td>
<td>Ability to support demand in other sectors (industry, transport) using same infrastructure</td>
</tr>
<tr>
<td>Scalability</td>
<td>Possibility to use existing oil-fuelled power plants to switch to gas</td>
</tr>
<tr>
<td>No need for large upfront investment from local gas company/local government</td>
<td>Environmental and cost benefits of switching from oil products to gas</td>
</tr>
<tr>
<td>Provides a medium-term solution in countries aiming at developing their gas production later</td>
<td>Speed of delivery</td>
</tr>
<tr>
<td>Can sail away if no longer needed/FSRU owner is not paid</td>
<td>Dispatch will have significant implications for LNG procurement</td>
</tr>
</tbody>
</table>
Can the marine sector come to the rescue?

Comparison of gas consumption for different types of vessels and vehicles

<table>
<thead>
<tr>
<th>Vessel/vehicle</th>
<th>Annual LNG/CNG consumption of a single vessel/vehicle</th>
<th>Approximate number of vessels/vehicles with the same consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MWh</td>
<td>m³</td>
</tr>
<tr>
<td>Ferry</td>
<td>395,000</td>
<td>37,335,000</td>
</tr>
<tr>
<td>Port vessel (tug)</td>
<td>5,900</td>
<td>557,700</td>
</tr>
<tr>
<td>Fishing boat</td>
<td>3,000</td>
<td>283,600</td>
</tr>
<tr>
<td>Bus</td>
<td>290</td>
<td>27,400</td>
</tr>
<tr>
<td>Taxi</td>
<td>40</td>
<td>3,800</td>
</tr>
</tbody>
</table>

Source: Christophe Lefevre; OIES/KAPSARC

- Environmental rules are playing in favor of switching away from HSFO, but different options exist (MGO, LSFO, scrubbers)
- But cost matters in an industry which is quite conservative
Meanwhile, the LNG industry is no longer a cosy little club

**LNG traders**  
(Trafigura, Vitol, Gunvor)

**LNG trading platforms**

**FLNG developers**  
(Golar)

**LNG importers moving into trading**  
(Japanese companies)

**New sellers/developers**  
(Perenco, Schlumberger)

**New LNG exporters**  
(U.S., Angola, PNG, Cameroon, Eastern Africa)

**New LNG importing countries**  
(Pakistan, Egypt, Jamaica etc…)

**New entrants in existing LNG importing countries**  
(Many Chinese)
LNG contracts are changing

- Number of contracts by
  - Duration (top right)
  - Quantity (bottom right)
  - Origin (bottom left)

Source: GIIGNL, KAPSARC
Buyers are becoming more demanding and sellers are reacting

*World's top LNG buyers form alliance to push for flexible contracts (Reuters)*

Asia’s LNG “Buyers Club” Is Shaking Up The Market

*Top Indian gas utility pushes Gazprom for LNG price cut (Bloomberg)*

Asia's U.S. LNG fever going cold as buyers seek supply swaps

*Indian-Qatari LNG Pricing Negotiations: Yet Another Sign That LNG Markets Are Shifting (Forbes)*

EXCLUSIVE-Qatar talks tough on project stakes in Japan LNG contract talks

Japan: buyers urge flexible LNG contract terms, indexation (LNG World News)
The inevitable change in the nature of long-term contracts

This is what buyers want

- The end of final destination clauses
- Moving away from oil indexation
- More flexible LNG

This is why it will happen

- The Japan Fair Trade Commission is reviewing the legality of these clauses
- Three Asian countries trying to set up a trading hub
- More uncommitted LNG, flexible U.S. LNG
- More portfolio players long on LNG
- Less willingness/interest in renewing LNG contracts at times of oversupply
- Renegotiation of long-term contracts with smaller volumes or shorter duration

Thank you for your attention