**The Global Gas Oversupply and Its Impact on Europe and Asia: Where will the U.S. LNG Exports Go?**

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**Introduction**

- **Global Views by 2015:**
  - most U.S. LNG exports had been assumed to be exported to Asia rather than to Europe as Asia’s gas prices were much higher;
  - spring of 2015: (widely overlooked in Europe) Asia’s gas prices had already decreased 65% since their peak in 2014 (around US$15.6mmBtu/million British thermal unit) to comparative levels to those in Europe;
  - making U.S. LNG exports to Europe more profitable (beyond geopolitical interests of the U.S. to support the EU’s gas import diversification efforts);
  - Overlooking some fundamental changes in the gas markets of China, Japan and South Korea.

- **Global Gas Market Trends:**
  - Worldwide LNG-Revolution;
  - U.S. shale gas revolution;
  - Global natural gas oversupply;
  - Decreasing European demand 2010-2015 and revised forecasts of future European gas demand;
  - new wave of LNG-production entering the global gas market by 2017/18:
    - Australia: might replace Qatar as the world’s largest LNG exporter;
    - rising U.S. LNG exports: game-changer in Europe?
Global Gas Market Developments I

- **Worldwide LNG-Trade:**
  - has increased in volumes and shares versus global gas pipeline transports;
  - more standardized and shipped by an ever increasing pool of market players: rising from 9 importing and 8 exporting countries in 1990 to 34 importing and 19 exporting countries in 2015.
  - New price indices are no longer been tied exclusively to the oil price, but have become more flexible by reflecting more market realities;
  - global pricing formulas have shifted away from oil-indexation from around 76% for contracts signed before 2010 towards more gas-to-gas linkages of around 50% of newer contracts;
  - Fixed destination clauses in LNG contracts declined from 60% in 2014 to 40% in 2015.
  - Technological innovation – i.e. the modularization of liquefaction plant facilities and small-scale *Floating Storage Regasification Units (FSRU)* - have contributed to the LNG revolution;

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     - South Korea
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Global LNG market:
- doubled its size during the last decade;
- Its share of total international gas trade increased from 23.5% in 1990 to 31.2% in 2014.

IEA forecast:
- +30% in LNG export capacity until 2040.
- share of LNG will rise from 42% in 2014 up to >50% by 2040.;
- present overcapacities might last until around mid-2020s;
- If all planned and proposed LNG projects up to 780mt by 2030 would be implemented, it could even widen the worldwide gap between supply and demand.

Global LNG Market Expansion:
- 2000: 100mt/y
- 2010: 217mt/y
- 2014: 231mt/y
- 2020: up to 400mt/y (planned projects)
- 2025: 650mt/y (planned and proposed projects)
- 2030: 780mt/y (planned and proposed projects)

Global LNG Production (2015-2020)

2015-2020: new LNG wave will add around 150mt/y to global gas markets – almost half of it will come from the U.S. and 53mt/y by Australia (one-fifth of global LNG production).
**LNG-Market Oversupply until 2015**

Lots of supply......

105 MMTPA of capacity is currently being built; LNG markets expected to remain oversupplied till 2025.

LNG nominal production capacity and total trade (MMTPA) 2000 – 2035

<table>
<thead>
<tr>
<th>Year</th>
<th>Capacity</th>
<th>Trade</th>
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<tbody>
<tr>
<td>2000</td>
<td>100 MMTPA</td>
<td>50 MMTPA</td>
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<tr>
<td>2015</td>
<td>150 MMTPA</td>
<td>75 MMTPA</td>
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<tr>
<td>2025</td>
<td>200 MMTPA</td>
<td>100 MMTPA</td>
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23% of global production capacity remains uncontracted in the oversupply period.

With 469 MMT of excess global production capacity in the medium term (2016 – 2025), LNG producers face substantial headwinds and buyers have power and choice.

Source: Global LNG markets. Plenty of supply until 2025. Analysis by KPMG 2017

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**U.S., Russia's and Saudi Arabia's Oil and Gas Production (2005-2015)**

Estimated petroleum and natural gas hydrocarbon production in selected countries

<table>
<thead>
<tr>
<th>Year</th>
<th>United States</th>
<th>Russia</th>
<th>Saudi Arabia</th>
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<tbody>
<tr>
<td>2008</td>
<td>30 million Btu</td>
<td>40 million Btu</td>
<td>20 million Btu</td>
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<tr>
<td>2009</td>
<td>40 million Btu</td>
<td>50 million Btu</td>
<td>30 million Btu</td>
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<tr>
<td>2010</td>
<td>50 million Btu</td>
<td>60 million Btu</td>
<td>40 million Btu</td>
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<tr>
<td>2011</td>
<td>60 million Btu</td>
<td>70 million Btu</td>
<td>50 million Btu</td>
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<tr>
<td>2012</td>
<td>70 million Btu</td>
<td>80 million Btu</td>
<td>60 million Btu</td>
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<tr>
<td>2013</td>
<td>80 million Btu</td>
<td>90 million Btu</td>
<td>70 million Btu</td>
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<td>2014</td>
<td>90 million Btu</td>
<td>100 million Btu</td>
<td>80 million Btu</td>
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<tr>
<td>2015</td>
<td>100 million Btu</td>
<td>110 million Btu</td>
<td>90 million Btu</td>
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Source: EIA 2016
Major Changes in Asia’s LNG Markets

- Present oversupply of the global gas markets is not just the result of the rapidly increasing worldwide production, but also:
  - slower economic growth in China and India,
  - increasing energy efficiency,
  - restarts of nuclear reactors in Japan as well as South Korea,
  - and strong position of cheap coal in the region.
- Japan and South Korea consume combined 125Mt/y of global LNG exports = ~70% of all Asian LNG imports.
- Asia is many years behind Europe by shifting away from long-term contracts to a freely floating spot market.
- China’s gas market is still underdeveloped and Singapore’s consumer base and storage capacity to become an Asian LNG hub is too limited in size.
- Plans are also hampered by low LNG prices for continued efforts and investments.
LNG-Imports in North East Asia 2014-2017

LNG imports (bcm)

Source: interfaxenergy.com-NGD 2017

LNG-Demand of Japan, China, South Korea and India (2016-2020)

Source: Bloomberg 2016
2016:
- Only four cargoes were sent to Europe: to Portugal, Spain, Italy, UK (Scotland) as well as two shipments to Turkey;
- demand in South America, the Middle East and India had been stronger than expected.

2018: the U.S. may already become the third largest LNG exporter;

Forecast:
- might increase from 41.1mt/y (~56bcm) in 2016 up to 62mt/y (~85bcm) with its five LNG export terminal projects by 2019;
- may increase further to >120bcm/y by mid-2020, exceeding those of Australia.
U.S. and Australia’s LNG Expansion (2010-2020)

Ramp Up
New projects in the U.S. and Australia will expand global liquified natural gas export capacity.

Liquified natural gas export capacity

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<tr>
<td>U.S.</td>
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<td>150</td>
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<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Australia</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>All other countries</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
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Source: Energy Aspects

U.S. LNG-Exports by 2040

Source: EIA 2017
U.S. Natural Gas Trade (Reference Scenario 1980-2040)

Natural gas trade in the AEO2017 Reference case (1980-2040) trillion cubic feet

Source: EIA 2017

Gazprom: Gas Production and Export Prices 2002-2015

Gazprom's annual gas production

Source: Gazprom, Interfax estimates, EIA 2016

Gazprom's export prices per thousand cubic meters

Source: Gazprom, Interfax estimates, EIA 2016
Gazprom: Decline of Market Value (2006-2016) and Declining Oil and Gas Export Revenues (2013)

Source: FT 2016.

EU-Gas Import Dependence on Russia 2013

Source: Stratfor.com 2015

Source: www.interfaxenergy.com 2015
How Competitive are Russian Gas Exports? – Comparing Apples with Oranges

Source: The Independent 2014

EU: Consumption and Indigenous Gas Production 2010-2015

Source:Reuters 2017

EU-28: Projected Gas Import Dependency
1995-2030 (May 2014)

Source: European Commission 05/2014
**EU LNG Strategy of 2016**

- **LNG Imports:**
  - have decreased from 90bcm to 50bcm in OECD-Europe 2013-2015 mainly due lower European spot market prices compared with those in Asia.
  - utilization rate of its LNG technical import capacities declined from 53 percent in 2010 to just 19 percent in 2014;
  - But will further increase up from 195bcm in 2015 to 211bcm by 2019,
- 2016 European Commission: declaring a new LNG-strategy to strengthen its gas import diversification by enhancing its LNG-imports.

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**European Gas Imports 2014-2017**

![European Gas Imports 2014-2017](chart.png)

- **Russia pipeline imports (net)**
- **Algeria pipeline imports**
- **Ukraine pipeline imports**
- **LNG net imports**

Source: Societe Generale, Eurostat
Source: King & Spalding 2016.

Source: Bloomberg 2016.
the world’s only ‘sink market’ for U.S. LNG exports?

- U.S. LNG exports have not only compete with other LNG suppliers, but also with Gazprom’s pipeline gas and a gas price of probably not more than US$4-6mmBtu.

- **Russia and Gazprom 2015:**
  - almost 90% of its natural gas exports went to Europe.
  - Russia’s ‘Pivot to Asia’ remains uncertain
  - represent a multiple threat to its market share of more than 30% on the European gas market, of its traditional pricing and contract models as well as Russia’s geopolitical influence in Europe.

- **European gas demand:**
  - +27bcm/y in 2016 (+5.4);
  - Coal-to-gas switch (i.e. UK).
Is a Gas Price War between U.S. LNG and Russian Pipeline Gas Forthcoming?

**Europe becoming the „Sunk Market“ for U.S. LNG Exports**

- **Why not Asia?**
  - Declining LNG-Forecasts in Asia (but China remains the „Wild Card“);
  - LNG-price levels not much higher than in Europe;
  - Transport costs to Europe lower;
  - Rising LNG-Imports in Asia covered by Australia, Indonesia and others;
  - **Europe in contrast to Asia has:**
    - physical and virtual gas hubs in contrast to Asia, offering gas auctions and short-term exports;
    - Europe has huge gas storage sites;
    - Geopolitical motivations on both sides of the Atlantic.

**Multiple Threat to Russia:**

- Price levels;
- Market share;
- Geopolitics.

**Reactive Counter Strategies:**

- Restricting flexibility in its contracts with Europe;
- Moving away from oil-indexed prices;
- Dumping significant more gas volumes for European hubs and spot markets by trying to undercut U.S.-LNG

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Statoil: Market Price Signals by 2018

Short-run marginal cost ranges for US 2018 LNG supply to Asia and Europe, and prices

![Image showing marginal cost ranges](Image)
Summary and Strategic Perspectives I

- **2017-2021**: a net total of 161bcm (118mtpa) of committed new supply is still to come online (+46% increase in global supply);
- **Australia’s LNG-Exports**:
  - Outages, delays and commissioning problems dulled impact of new supply;
  - will be sold on the already saturated Asian gas market;
  - leaving only few export options for new U.S. LNG exports;
- **Key Factors to Look**:
  1) Asian gas demand;
  2) New Supply;
  3) U.S. market and hub price development US vs. Europe;
  4) Russia’s gas exports and markets shares
  5) Coal Prices.

Summary and Strategic Perspectives II

- **High Price Scenario**:
  - China remains the biggest wildcard for balancing LNG supply and demand in the region and globally.
  - **Share of natural gas**:
    - World energy mix: around 25% today,
    - China: just 6% (consuming around 205bcm in 2016).
    - China’s gas consumption will grow significantly, but it is unclear how much due to uncertainties of its unconventional gas, coal and RES production.
    - Unconventional gas production 2015-2017: will almost double from 22mt/y up to 40mt/y.
  - **China’s New Gas Consumption Plan**:
    - 2020: 360bcm/y (10% of total energy demand).
    - 2030: 600bcm/y (15% of total energy demand; previous plan: 510bcm/y).
  - China may become the world’s largest LNG importer (<120-150bcm) in 2025-2030 - surpassing Japan, importing 118bcm of LNG in 2015.
Summary and Strategic Perspectives III

- Disappointing expansion of its domestic gas production: will result in a much higher gas import demand, it might lead to higher gas prices in the region compared with those in Europe.
- It would make U.S. LNG exports to East Asia more profitable and decrease those LNG exports to Europe.
- In this case, a price war between U.S. LNG exports and Russia’s gas pipeline supplies will hardly take place in Europe.

**Low-Price Scenario:**

- US LNG exporters struggle to export LNG to Europe at competitive prices without making losses.
- Panama Canal remains a cost factor;
- LNG importers already present to decrease shipping costs of already contracted US LNG exports to Asia by swap deals;
- U.S. may become more dependent on the European gas market than Europe on U.S. LNG imports, given its import alternatives (Russia and other LNG suppliers)

Thank you very much for your attention!