Hydrogen Would Prefer Russian Pipeline Gas

Sergei Komlev
Head of Contract Structuring and Price Formation Directorate
Gazprom Export*

26th meeting of the EU-Russia Gas Advisory Council’s Work Stream on Internal Market Issues
33st round of Informal Russia-EU Consultations on EU Regulatory Topics
10 July 2017 – St. Petersburg, Russia

*Views expressed in this presentation are the author’s sole responsibility and do not necessarily represent that of Gazprom Export
“The EU should reduce its energy dependency on Russia, but the EU should not back out of the mutual partnership”.

Günther Oettinger, European Commissioner designate for energy policy, January 14, 2010

“Time and time again, the clear feeling from Russia is that they are irreplaceable and can do what they want” …”We can get away from you; We can live without gas from Russia; It will be costly, difficult; it will take 10 years. But we can do it”.

Vaclav Bartuska, Ambassador -at- large for Energy Security in the Czech foreign ministry, May 26, 2009
Does Gazprom’s Growing Market Share Mean Failure of EU Diversification Policy? No, Simply Russia Has Passed a Market Test

In Europe Gazprom’s share in consumption was 34.2% in 2017 versus 27.3% in 2011 or up by 7 percentage points.

Gazprom met two-thirds of the incremental demand growth in 2017 and proved its ability to fill in any additional supply/demand gap.

Despite having modestly increased in 2017, LNG supplies to Europe still remain significantly below the 2011 record level.
Role of Russian Gas Needs to be Reconsidered on the Integrated European Market. It is not a Problem Anymore but Part to the Solution (1)

German Border Prices Estimates

Source: ICIS Heren, BAFA
Role of Russian Gas Needs to be Reconsidered on the Integrated European Market. It is not a Problem Anymore but Part to the Solution (2)
Success of Diversification Should be Measured by Optionally in Supply Sources and not by Share of the Major Supplier

Residual Supply Index in 2016, %

Source: ACER
LNG Deliveries to the European Market in Q1 2018 were Down

<table>
<thead>
<tr>
<th>Country</th>
<th>Q1 2017</th>
<th>Q1 2018</th>
<th>change (bcm)</th>
<th>change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qatar</td>
<td>5.1</td>
<td>4.9</td>
<td>-0.2</td>
<td>-3.9%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>3.5</td>
<td>3.7</td>
<td>0.2</td>
<td>5.7%</td>
</tr>
<tr>
<td>Algeria</td>
<td>4.0</td>
<td>3.7</td>
<td>-0.3</td>
<td>-7.5%</td>
</tr>
<tr>
<td>Russia (Novatek)</td>
<td>0.0</td>
<td>0.8</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td>1.3</td>
<td>0.8</td>
<td>-0.5</td>
<td>-38.5%</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>0.2</td>
<td>0.7</td>
<td>0.5</td>
<td>250.0%</td>
</tr>
<tr>
<td>Peru</td>
<td>1.0</td>
<td>0.4</td>
<td>-0.6</td>
<td>-60.0%</td>
</tr>
<tr>
<td>USA</td>
<td>0.8</td>
<td>0.4</td>
<td>-0.4</td>
<td>-50.0%</td>
</tr>
<tr>
<td>Angola</td>
<td>0.3</td>
<td>0.1</td>
<td>-0.2</td>
<td>-66.7%</td>
</tr>
<tr>
<td>Equatorial Guinea</td>
<td>0.2</td>
<td>0.1</td>
<td>-0.1</td>
<td>-50.0%</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>0.1</td>
<td>0.0</td>
<td>-0.1</td>
<td>-100.0%</td>
</tr>
<tr>
<td>Lithuania (re-export)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>-100.0%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>16.4</strong></td>
<td><strong>15.7</strong></td>
<td><strong>-0.7</strong></td>
<td><strong>-4.3%</strong></td>
</tr>
</tbody>
</table>

Despite growing gas demand in 1Q 2018 (+0.9 bcm or +0.5%) LNG deliveries to the European market fell in 1Q 2018, being attracted by other markets with higher margins.

Source: IEA, ENTSOG
LNG Ignored Demand Hikes in Europe in January-April 2018 Despite Associated Price Hikes

**LNG Deliveries to Europe, bcm**

- **January:** 5.1 bcm, +15% 5.8 bcm
- **February:** 5.6 bcm, -19% 4.6 bcm
- **March:** 5.7 bcm, -7% 5.3 bcm
- **April:** 5.2 bcm, -17% 4.3 bcm

**Gazprom Export Deliveries to Europe, bcm**

- **January:** 19.1 bcm, -9% 17.3 bcm
- **February:** 16.3 bcm, +7% 17.4 bcm
- **March:** 15.6 bcm, +26% 19.7 bcm
- **April:** 15.8 bcm, +9% 17.2 bcm

Source: IEA, ENTSOG
LNG Ignores European Gas Market Even Though Deliveries are Breakeven at Current Prices on Full Cost Basis

Source: Bloomberg, Cedigaz, IHS
Calculated on the basis of Henry Hub Futures prices, \( P = HH \times 115\% + X \)
where \( X \) – costs of liquefaction, shipping to Europe, regasification
As Contract Obligations are not Fully Met, Costs for Spot LNG Volumes Could be Subsidized

Source: IHS, Gazprom Export
Asian Seasonal Price Premium Explains LNG’s Idiosyncrasy of Europe

Sources: Bloomberg, Interfax-GGA, Customs Statistics of S. Korea
Year-by-Year North-West Europe Receives Less LNG for Same Size of Asian Premium

*Monthly averages
Asian premium is JKM-NBP spread
Source: Bloomberg, IHS Markit, Interfax-GGA, Platts
High Capacity Utilization of Eastbound Routes for Gas Supplies in 2017

* incl. LNG trading between European countries and capacity of FSRUs, excl. small-scale LNG supplies
** pipeline gas
*** on the basis of technical capacity of 16 bcm per year (according to PJSC Gazprom)
Source: ENTSOG, Bloomberg, GIE, IHS, Eustream, PJSC Gazprom

- **Finland**: 30% in 2016, 28% in 2017
- **Nord Stream**
  - from Norway: 77% in 2016, 82% in 2017
  - from Algeria: 2016: 27%, 2017: 26%
- **Via Belorussia**
  - 2016: 88%, 2017: 91%
- **Via Ukraine**
  - 2016: 63%, 2017: 74%
- **Blue Stream***
  - 2016: 82%, 2017: 96%

**LNG***
- 2016: 23%, 2017: 26%
Natural Gas as the Most Reliable And Cheapest Source Of Hydrogen

Hydrogen could be produced from natural gas at the lowest cost, both at present and in future.

Technologies:
- PEM - Proton Exchange Membrane
- SOEC - High temperature solid oxide electrolysis cell technology
- REP - Reformer-Electrolyzer-Purifier

*Average for Integrated and Standalone Cases

Source: DOE
THANK YOU FOR YOUR ATTENTION!