THE ROLE OF GAS IN THE TRANSFORMING RUSSIAN ENERGY STRATEGY

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SKOLKOVO Business School
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“3D” - ENERGY TRANSITION DRIVERS

- Decarbonization: Integration of intermittent variable renewable generation sources
- Decentralization: Aggregation of multiple distributed energy resources
- Digitization: Application of new technologies to ensure reliable, robust, and resilient system
RUSSIAN ENERGY BALANCE IS STRONGLY DOMINATED BY GAS, PROVIDING 52-53% OF TOTAL PRIMARY ENERGY DEMAND

Russian primary energy demand

<table>
<thead>
<tr>
<th>Year</th>
<th>Gas</th>
<th>Liquefied fuel</th>
<th>Coal</th>
<th>Hydro</th>
<th>Nuclear</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>350</td>
<td>50</td>
<td>100</td>
<td>150</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>2010</td>
<td>340</td>
<td>55</td>
<td>105</td>
<td>145</td>
<td>35</td>
<td>55</td>
</tr>
<tr>
<td>2015</td>
<td>330</td>
<td>60</td>
<td>110</td>
<td>140</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>2020</td>
<td>320</td>
<td>65</td>
<td>115</td>
<td>135</td>
<td>45</td>
<td>65</td>
</tr>
<tr>
<td>2025</td>
<td>310</td>
<td>70</td>
<td>120</td>
<td>130</td>
<td>50</td>
<td>70</td>
</tr>
<tr>
<td>2030</td>
<td>300</td>
<td>75</td>
<td>125</td>
<td>125</td>
<td>55</td>
<td>75</td>
</tr>
<tr>
<td>2035</td>
<td>290</td>
<td>80</td>
<td>130</td>
<td>120</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>2040</td>
<td>280</td>
<td>85</td>
<td>135</td>
<td>115</td>
<td>65</td>
<td>85</td>
</tr>
</tbody>
</table>

Probable Scenario
Crit. Sc.
Fav. Sc.
THE MAIN POTENTIAL FOR ENERGY SYSTEM IMPROVEMENT LIES IN THE ENERGY EFFICIENCY

Russian GDP energy intensity compared to the world average

Source: Global and Russian Energy Outlook-2016, ERI RAS-AC
GLOBAL OIL PRICES AND ASIAN GAS DEMAND WILL DEFINE EUROPEAN GAS MARKET SITUATION

European scenario matrix

<table>
<thead>
<tr>
<th></th>
<th>Low oil price</th>
<th>High oil price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Asian demand</strong></td>
<td>Low LNG availability</td>
<td>Increasing competition for LNG with Asia/Further contract revisions by Gazprom</td>
</tr>
<tr>
<td><em>(no LNG glut)</em></td>
<td>Gazprom expanding gas exports</td>
<td></td>
</tr>
<tr>
<td><strong>NO CHANGE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weak Asian demand</strong></td>
<td>Increasing competition between pipeline gas and LNG</td>
<td>Tough competition between pipeline gas and LNG PRICE WAR (voluntarily increasing supply in order to drop prices and crowd away competitors)</td>
</tr>
<tr>
<td><em>(LNG glut)</em></td>
<td>Gazprom voluntarily decreasing contractual prices</td>
<td></td>
</tr>
</tbody>
</table>

- **European scenario matrix**

- **Low oil price** and **High oil price** scenarios are compared in the table above.

- **High Asian demand** (no LNG glut) scenario includes:
  - Low LNG availability
  - Gazprom expanding gas exports
  - NO CHANGE

- **Weak Asian demand** (LNG glut) scenario includes:
  - Increasing competition between pipeline gas and LNG
  - Gazprom voluntarily decreasing contractual prices

- **High oil price** scenario adds:
  - Increasing competition for LNG with Asia/Further contract revisions by Gazprom

- **European scenario matrix** highlights the impact of low and high oil prices on Asian gas demand and competition between pipeline gas and LNG.
NEW BUSINESSES

- Small-scale LNG
- Integrated gas-to-power solutions and distributed energy
- Hydrogen
- Bio-methane
- New trading platforms
THERE ARE 4 MAJOR LNG PRODUCERS EXPANDING THEIR LNG CAPACITIES…
LNG IS A BOOMING SEGMENT OF THE RUSSIAN GAS INDUSTRY

Russian LNG capacities build up

Sources: SKOLKOVO Energy Centre