Natural Gas Security Of Supply in Europe and Hungary

13th meeting of the Group of Experts on Supply and Use of Gas

Tamás Kőrösi
Chairman

Agenda

• **European overview**
  - Energy import dependency
  - Dominancy of Russian Gas
  - European and neighbouring gas reserves
  - European gas supply routes
  - LNG supply
  - North-South Corridor
  - Southern Corridor
  - Gas storage overview
  - EU Regulation 994/2010 on Security of Supply

• **Security of gas supply in Hungary**
  - Primery energy sources
  - Gas supply crisis, January 2009
  - Role of Russian import
  - Development in transmission
  - Strategic storage
  - Development in storage
  - Total capacities of the network
Strategic problem of the EU:

High energy – import dependency %

Source: EUROSTAT
EU 27 Gas Consumption

Source: EC. DG Ener
Source: EC. DG Ener
EU 27 Russian Import Quantities

Source: EC. DG Ener
Total World reserves: 187100 BCM; EU-27 Import: ~300 BCM/year

European and Neighbouring Gas Reserves

The Netherlands: 0.6 %
Norway: 1.1 %
Russia: 23.9 %, 44800 BCM
Ukraine: 0.5 %

Middle-Asia
Turkmenistan: 4.3 %
Uzbekistan: 0.8 %
Kazakhstan: 1.0 %

Middle-East:
Iran: 15.8 %
Qatar: 13.5 %
Saudi A.: 4.3 %
UAE: 3.2 %
Iraq: 1.7 %

Source: BP
European Gas Supply Routes

Existing and Planned (P) Transmission Pipelines
Total Russian: ~300 BCM, Nabucco 31(-10) BCM

Import Choice:
- Russia;
- Middle-East;
- LNG (Algeria, Qatar, Nigeria)

North Stream
Russian-German Pipeline, Ready

LNG

South Stream, P

150

Brotherhood

55 mrd m³

Slovakian Connect, P

Plan

Croatian LNG Terminal, P

LNG

Russian Sources
GAZPROM

Blue Stream, P

61

16

Nabucco, P

HUNGARIAN ENERGY OFFICE
European LNG Import Forecast

Source: European Commission, DG ENER
LNG Terminals in Europe

LNG receiving facilities in Europe

Receiving terminals
- Existing
- Under construction *
- Proposed **

* Not showing expansions
** Selected projects in N Europe

Source: European Commission, DG ENER
Current projects on the SGC list

- Trans-Anatolian Compression station at Kipi
- White Stream
- SCP-X
- ITB
- East Mediterranean Pipeline (East Med)
- Trans-Mediterranean Gas Pipeline

Source: European Commission, DG ENER
### Current projects on the SGC list

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trans-Anatolian</td>
<td>▪ New 50” inch gas pipeline with overall length of approximately 2000 km and approximate capacity of 16 bcma in the beginning, expandable up to 32 bcma, originating at the Eastern and exiting at the Western border of Turkey with Bulgaria/Greece.</td>
</tr>
<tr>
<td>Nabucco West</td>
<td>▪ The pipeline will cross Turkey, Bulgaria, Romania and Hungary and run to Austria. Construction is anticipated to commence in the year 2013. Start of operations is expected in 2018</td>
</tr>
<tr>
<td>Compression station at Kipi</td>
<td>▪ This project consists in the installation of a compressor station at the GR/TR border that will greatly increase the capacity of the Turkey-Greece interconnector. This project is necessary both for the increase of the import of gas by Greece from eastern sources as well as for the operation of the projects: IGI-Poseidon, IGB and TAP, sponsored by third parties</td>
</tr>
<tr>
<td>ITB</td>
<td>▪ Pipeline of 200km (75km on the Bulgarian territory and 125 on the Turkish territory) between the compression station located in Lozenetz and the gas metering station of Malkochlar. The capacity of the pipeline will reach 3-5bcm/a in the first phase and will reach 9bcm/a in a second phase</td>
</tr>
<tr>
<td>White Stream</td>
<td>▪ Capacity will be built up in stages using multiple offshore strings, WS will provide flexibility in terms of timing of each increment of capacity. Reinforces route through Turkey.</td>
</tr>
<tr>
<td>Trans-Mediterranean Gas Pipeline</td>
<td>▪ Transmission pipeline for the transport of natural gas from the Levantine Basin into Greece’s National Gas Transmission System, through Cyprus. The proposed gas transmission pipeline will have a total length of around 1,400km and could allow for reverse flow. Other relevant project infrastructure (facilities) includes three compressor stations – one located onshore Cyprus, the second onshore Crete (Greece) and the third onshore mainland Greece.</td>
</tr>
<tr>
<td>East Mediterranean Pipeline (East Med)</td>
<td>▪ It will carry around 8 billion cubic meters annually and is estimated that is will be around 1100 kilometers in length. East Med is considering a landfall in Crete before its final destination the mainland of Greece which could also allow the off take of gas in Crete.</td>
</tr>
<tr>
<td>SCP-X</td>
<td>▪ This upgrade of the South Caucasus Pipeline (SCP) runs in the same corridor as the Baku–Tbilisi–Ceyhan pipeline. The expansion includes around 400km of 56” diameter pipeline looping in Georgia along the existing right of way and the construction of two additional compressor stations in Georgia.</td>
</tr>
</tbody>
</table>

Source: European Commission, DG ENER
### Gas Storage overview

**Total UGS working gas volumes [Million m³] of European countries on 31 December 2011**

<table>
<thead>
<tr>
<th>Country</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>4184</td>
</tr>
<tr>
<td>Belgium</td>
<td>700</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>500</td>
</tr>
<tr>
<td>Croatia</td>
<td>600</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>3200</td>
</tr>
<tr>
<td>Denmark</td>
<td>1000</td>
</tr>
<tr>
<td>France</td>
<td>12700</td>
</tr>
<tr>
<td>Germany</td>
<td>20200</td>
</tr>
<tr>
<td>Hungary</td>
<td>6100</td>
</tr>
<tr>
<td>Ireland</td>
<td>230</td>
</tr>
<tr>
<td>Italy</td>
<td>15725</td>
</tr>
<tr>
<td>Latvia</td>
<td>2300</td>
</tr>
<tr>
<td>the Netherlands</td>
<td>5200</td>
</tr>
<tr>
<td>Poland</td>
<td>1800</td>
</tr>
<tr>
<td>Portugal</td>
<td>180</td>
</tr>
<tr>
<td>Romania</td>
<td>2800</td>
</tr>
<tr>
<td>Slovakia</td>
<td>2800</td>
</tr>
<tr>
<td>Spain</td>
<td>2700</td>
</tr>
<tr>
<td>Sweden</td>
<td>9</td>
</tr>
<tr>
<td>Turkey</td>
<td>1600</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>4600</td>
</tr>
</tbody>
</table>

**Source:** New UN ECE Study on UGS
Main prescriptions:

- Creation of reverse flow availability on every interconnector pipeline until the end of 2012 (or request for exemption)

- Risk Assessment of gas supply in every Member State until 3rd December 2011

- On the base of the Risk Assessment:
  - Emergency Plans
  - Preventive Action Plans
Role of Natural Gas in Hungary

Primery energy sources

- Natural gas: 39.7%
- Crude oil and products: 14.1%
- Solid: 12.0%
- LPG: 3.0%
- Primary electricity: 0.4%

Source: HEO
### Natural Gas Supply 2012

<table>
<thead>
<tr>
<th></th>
<th>BCM</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Hungarian Supply:</strong></td>
<td>10.24</td>
<td>100</td>
</tr>
<tr>
<td><strong>Domestic Production:</strong></td>
<td>2.07</td>
<td>20.2</td>
</tr>
<tr>
<td><strong>Imports (diversified):</strong></td>
<td>8.17</td>
<td>79.8</td>
</tr>
<tr>
<td>Eastern Direction:</td>
<td>3.57</td>
<td>34.9</td>
</tr>
<tr>
<td>Western Direction:</td>
<td>4.60</td>
<td>44.9</td>
</tr>
</tbody>
</table>
Managing the Gas Supply Crisis, January 2009

Absolute peak (highest total consumption ever): 89,74 MMm$^3$/day (February 9, 2005)

Source: HEO
Existing transmission system

Source: FGSZ
Development in Transmission

Transmission interconnection capacities

- **HAG** (western import) 12.1 Million m³/day (4.42 Bcm/year)
- **Brotherhood** (Russian import) **56.3 Million m³/day (20.5 Bcm/year)**
  + 12 Million m³/day transit (4.38 Bcm/year)
- **Romanian Interconnector** (operated since July 2010)
  4.8 Million m³/day (1.75 Bcm/year)
  → 12.0 Million m³/day (4.4 Bcm/year)
- **Croatian Interconnector** (operated since March 2011)
  19.1 Million m³/day (6.5 Bcm/year)
- **Slovakian Interconnector** (project just started)
  6 Million m³/day (2.2 Bcm/year)
  → 14.4 Million m³/day (5.3 Bcm/year)

Source: HEO
Strategic Storage

In accordance with the Act 26 of 2006 on the Security Storage of Natural Gas:

– A new strategic storage facility had been constructed until 1 January 2010 (Algyő gas-field, at the Szőreg-I layer in Southern Hungary)
  – Working gas capacity: 1.2 billion m³
  – Withdrawal capacity: 20 Million m³/d (for min. 45 days)
  – For the exclusive supply of household and communal consumers

In the same facility MOL had got a license and made a development for commercial storage with
  – Working gas capacity: 700 Million m³
  – Withdrawal capacity: 5.0 Million m³/d

Source: HEO
### Storage Capacities 2012

**Storage Capacities**

<table>
<thead>
<tr>
<th>Storage Unit</th>
<th>Working gas capacities [MMm³]</th>
<th>Peak withdrawal capacities [MMm³/d]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zsana</td>
<td>2 170</td>
<td>28.0</td>
</tr>
<tr>
<td>Hajdúszoboszló</td>
<td>1 440</td>
<td>20.8</td>
</tr>
<tr>
<td>Pusztaderics</td>
<td>340</td>
<td>3.1</td>
</tr>
<tr>
<td>Kardoskút</td>
<td>280</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Strategic UGS</strong></td>
<td><strong>1 200</strong></td>
<td><strong>20.0</strong></td>
</tr>
<tr>
<td><strong>Szőreg-I.</strong></td>
<td><strong>700</strong></td>
<td><strong>5.0</strong></td>
</tr>
</tbody>
</table>

**TOTAL**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>6130</strong></td>
</tr>
<tr>
<td><strong>80.1</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Total injection capacity:** 45.9 MMm³/day

Source: HEO
# Total Capacities of the Gas Network

[MMm³/day]

<table>
<thead>
<tr>
<th>Source: HEO</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Capacity (MMm³/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Production</td>
<td>10.5</td>
</tr>
<tr>
<td><strong>IMPORT</strong> Western (HAG)</td>
<td>12.1</td>
</tr>
<tr>
<td><strong>IMPORT</strong> Eastern (Brotherhood)</td>
<td>56.3</td>
</tr>
<tr>
<td>Romanian interconnector</td>
<td>4.8</td>
</tr>
<tr>
<td>Croatian interconnector</td>
<td>19.1</td>
</tr>
<tr>
<td><strong>STORAGE</strong></td>
<td>80.1</td>
</tr>
<tr>
<td>- <strong>Commercial UGS</strong></td>
<td>60.1</td>
</tr>
<tr>
<td>- <strong>Strategic UGS</strong></td>
<td>20.0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>182.9*</td>
</tr>
</tbody>
</table>

*Enough to cover winter daily consumption down to -17 °C daily average temperature (no need to interrupt)*
Thank you for your kind attention!

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