Potential Benefits of Regional Integration: Markets and Institutions

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Electricity Market Integration 2.0 in Central and South East Europe
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- The Hungarian Electric Power System – Motivation for Cooperation
- Examples of participation in regional cooperations
- Europe: The Patchwork of Regions – Goals and Conditions
Sources to cover total gross electricity consumption with import energy - 2016

<table>
<thead>
<tr>
<th>Source</th>
<th>[GWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total gross electricity consumption:</td>
<td>44 036</td>
</tr>
<tr>
<td>Domestic energy production:</td>
<td>31 311</td>
</tr>
<tr>
<td>Total imported energy:</td>
<td>12 725</td>
</tr>
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</table>
Installed capacity of the Hungarian system – Q1 2017

**Installed capacity:**
- **8576 MW**

**Installed capacity of Large power plants:** 7006 MW

**Installed capacity of Small power plants:** 1570 MW

**Constantly not available:** >1500 MW
Production and consumption plus import share

![Graph showing the production and consumption of energy in TWh over years from 1990 to 2016. The graph includes data on gross energy consumption of the Hungarian electricity system, generation of domestic power plants, and the ratio of import energy.](image-url)
Winter and summer peak load 1990-2016
RES installed capacity – Q1 2017 (MW)

Additional residential PV (under 50 kW): 164 MW

Future growth of additional residential PV (under 50 kW): ???
The Hungarian Transmission Grid

<table>
<thead>
<tr>
<th>Overhead Line</th>
<th>Route (km)</th>
<th>Circuit (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>750 kV</td>
<td>268,10</td>
<td>268,10</td>
</tr>
<tr>
<td>400 kV</td>
<td>2,284,12</td>
<td>2,978,42</td>
</tr>
<tr>
<td>220 kV</td>
<td>1,099,32</td>
<td>1,393,65</td>
</tr>
<tr>
<td>132 kV</td>
<td>142,04</td>
<td>199,24</td>
</tr>
<tr>
<td>Cable</td>
<td>16,64</td>
<td>16,64</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,810,22</strong></td>
<td><strong>4,856</strong></td>
</tr>
</tbody>
</table>

A magyar átviteli hálózat (2016)
The Hungarian transmission network (2016)
ENTSO-E mandated by Regulation (EC) 714/2009, is responsible for:

- ensuring the secure and reliable operation of the increasingly complex network;
- facilitating cross-border network development and the integration of RES;
- enhancing the creation of the Internal Electricity Market, IEM.
TSC is regional security coordination initiative (RSCI) of 13 TSOs, started in 2008

- Helping to ensure the secure and reliable operation of the increasingly complex network;
- Coordinated capacity calculation and development of methods
- NC/GL implementation: 5 services
4M Market Coupling – Day Ahead

PRICE CONVERGENCE IN CZ-SK-HU-RO DAY-AHEAD MARKET COUPLING 2016

- 4 különböző ár
  4 different prices
- 3 különböző ár
  3 different prices
- 2 különböző ár
  2 different prices
- Nincs árkülönbség
  No price difference

%
Generation Control Cooperation (eGCC) – CZ-SK-HU

RATIO OF GCC ENERGY AND TOTAL BALANCING ENERGY 2015-2016

Year/month

UPWARD

DOWNWARD
Europe: The Patchwork of Regions – Technical Coordination

• Highly meshed transmission grids – direct interdependence

• Requirements from the grid users
  • Fair access to the grids
  • Security of supply
  • Affordable costs

• Growing challenges
  • Changes in energy policies
  • Development of technologies
  • Physical and cyber security issues

• Individual TSOs alone
  • do not have the necessary tools
  • are not the most efficient to answer the challenges properly.

• Capabilities and responsibilities must be combined in the most efficient, but also in the most reliable way.
Europe: The Patchwork of Regions – Market coupling

- Developing common market places
  - physical wholesale
  - reserve power
  - balancing energy
  - transmission rights
  - financial products

- Standardised products, but tailor-made to cover real needs
  - specificities of the physical infrastructure – e.g. synchronous areas

- Harmonised rules

- Level playing field versus policy goals
Europe: The Patchwork of Regions – Conditions

• Pragmatic development in order to
  • maximise social welfare, but
  • preserve security and high quality of supply,
  • adjust structures and rules to new challenges and possibilities.

• Balance between freedom in the market and responsibilities for guaranteeing security of supply.

• Harmonisation of the legal frameworks
  • within the EU
  • among EU-members and non-EU states
  • not only for energy regulations, but also in related other legislations.

• Clear decisions concerning balance and focus among different energy policy goals – long-term stability.

• Timely actions to ensure fulfilment of preconditions, and to avoid risks out of control.
Thank You For Your Attention!