INOGATE/ERRA Training Programme:
Introduction to the Regulation of Electricity Markets
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Istanbul, Turkey

ELECTRICITY MARKET INTEGRATION ACROSS COUNTRIES

Péter Kaderják
Director
Regional Centre for Energy Policy Research (REKK)
THE RISK OF SMALL, ISOLATED, LIBERALISED ELECTRICITY MARKETS

- Unregulated monopoly/oligopoly instead of a regulated monopoly
- High market power in generation – risk of high prices after price liberalisation
- This might discredit the whole reform process

**Solution:** market integration (regional / internal market)
EXAMPLE: BENELUX

Ownership of generation capacity [%]

Netherlands: Wholesale market
- SPE: 24%
- Delta Nutsbedrijven: 9%
- Nuon: 34%
- Essent/EPZ: 7%
- Electrabel: 3%

Belgium: No wholesale market
- Remaining: 86%

Competitive Wholesale Market?
- SPE: 4%
- Delta Nutsbedrijven: 4%
- Nuon: 14%
- Essent/EPZ: 5%
- Electrabel: 19%

Market sizes

J.de Jong, 2006

Energy cooperation between the EU, the littoral states of the Black & Caspian seas and their neighbouring countries
EXAMPLE: CEE

Dominant company's share in local production (%)

Dominant company's share in regional production (%)
Electricity consumption and exchanges in regions in Europe in 2005

UK and Ireland
Cons. 400 TWh
Exch.int. 2 TWh = 0.5%
Exch.ext. 12 TWh = 3.0%

Central Western Europe
Cons. 1310 TWh
Exch.int. 97 TWh = 7.4%
Exch.ext. 111 TWh = 8.6%

Northern Europe
Cons. 388 TWh
Exch.int. 36 TWh = 9.3%
Exch.ext. 28 TWh = 7.2%

Baltic countries
Cons. 23 TWh
Exch.int. 2 TWh = 10.0%
Exch.ext. 3 TWh = 13.0%

Central Eastern Europe
Cons. 335 TWh
Exch.int. 39 TWh = 11.6%
Exch.ext. 70 TWh = 20.9%

South East Europe
Cons. 207 TWh
Exch.int. 25 TWh = 12.1%
Exch.ext. 20 TWh = 9.7%

Cons. = Consumption
Exch.int. = Cross-border electricity inside region
Exch.ext. = Cross-border electricity between regions

ENERGY COOPERATION BETWEEN THE EU, THE LITTORAL STATES OF THE BLACK & CASPIAN SEAS AND THEIR NEIGHBOURING COUNTRIES
Much trading is taking place across the EU member states.....isn't this enough?

Interconnected market = integrated market?

Difference?
PRINCIPAL CONDITIONS

• **CONTESTABILITY** The more contestable is a local electricity market by new entrants (suppliers and generators), the better this market is positioned for market integration.
  • Contestability: demand can be served by competing suppliers.

• **INTEGRATION** of product (electricity) and transmission rights (*in EU: CB capacity*) markets
  • Related issues: congestion management, CB capacity auctions, coordinated auctions, market splitting, market coupling….
REGIONAL MARKET: THE VISION

PRECONDITIONS:
- G free to schedule
- Access to local grid
- Access to interconnection
- Trading service available
- L is free to contract
- Access to balancing
- No foreclosure on target market
- One-stop shop

Generation (G)
100 MW
Load (L)
(Alternatively: wholesale market, balancing market)
MARKET INTEGRATION CHECKLIST

PRECONDITIONS:
- G is free to schedule
- Access to local grid
- Access to interconnection
- Trading service available
- L is free to contract
- Access to balancing
- No foreclosure on target market
- One-stop shop

POTENTIAL DISTORTIONS:
- Capacity witholding
- Discriminatory access
- Preferential contracts (AAC)
- Costly entry regulation
- Monopoly supply provision
- Restricted balancing regime
- Prohibitive access charges
- Separate product and CB capacity markets
MAJOR OBSTACLES TO EFFICIENT MARKET INTEGRATION: SUMMARY

- Technical limitations
- Effective lack of physical infrastructure
- Regulatory diversity
  - Market model, access charge levels
  - CB management regimes
  - Lack of cooperation and coordination
- Market abuse
  - Network operators
  - Generators
- Political economy of energy prices
CESE COMPETITIVE MODEL: BASE CASE SCENARIO

- CEE price zone
- SEE exporters: Romania, Bulgaria, BiH
- HR, SR, BiH and ME price zone
- Slovenia and Austria joins German price zone
- Winners? Losers?
MARKET INTEGRATION: INTERNATIONAL EXAMPLES
US MARKETS – A PATCHWORK

Source: Energy Velocity

Updated December 8, 2009

Electric Market Overview: RTO Map

Regional Transmission Organizations

Alberta Electric System Operator (AESO)

Ontario Independent System Operator

New England ISO

Source: Energy Velocity
THE REGIONAL ELECTRICITY MARKET (MER)

Maximum Demand Year 2003

Perez-Arriaga, 2005

Energy cooperation between the EU, the littoral states of the Black & Caspian seas and their neighbouring countries.
PROPOSED INTERCONNECTION ROUTE

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>LENGTH (km)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guatemala</td>
<td>242</td>
<td>13.4</td>
</tr>
<tr>
<td>El Salvador</td>
<td>260</td>
<td>14.4</td>
</tr>
<tr>
<td>Honduras</td>
<td>266</td>
<td>20.3</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>284</td>
<td>15.8</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>515</td>
<td>28.6</td>
</tr>
<tr>
<td>Panamá</td>
<td>135</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1802</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Perez-Arriaga, 2005

ENERGY COOPERATION BETWEEN THE EU, THE LITTORAL STATES OF THE BLACK & CASPIAN SEAS AND THEIR NEIGHBOURING COUNTRIES
SEE INTERCONNECTION

• Main area:
  Romania
  Bulgaria
  Serbia & Montenegro
  Kosovo
  Bosnia-Herzegovina
  Croatia
  FYR Macedonia
  Albania
  Greece

• Periphery - members:
  Turkey
  Italy
  Austria
  Slovenia
  Hungary

• Neighbours:
  Moldavia, Ukraine
  Other UCTE countries
OTHER REGIONAL MARKETS / INITIATIVES

- Australia
- Nordpool
- Iberian market
- England & Wales
- Ireland & Northern Ireland
- BELPEX: French – Belgian – Dutch market coupling
- MIBEL: Spain - Portugal
- Energy Community in SEE
SOME EXPLANATORY VARIABLES

- Sufficient interconnection
- Tradition in TSO/ISO cooperation
- Market size
- Generation mix
- Local market power issue
- Wholesale price differences
- Net export position
- Political awareness and will
MAJOR AREAS FOR COMMON ACTION

• Common infrastructure development projects
• Coordination of congestion management
• Primary action at the (day ahead) wholesale level
• Less willingness to harmonise national level market structures
• Super national institutions (RTSo, regional regulator)
THE EU APPROACH TO ELECTRICITY MARKET INTEGRATION
EU INTERNAL ELECTRICITY MARKET: BASIC LEGAL FRAMEWORK

- Directive + Regulation on cross border capacity allocation and management
- Inter-TSO Compensation scheme: tariff-free internal market
- Original idea: integrated internal electricity market for EU-15 (27) – serious lack of interconnection capacities – price zones
- 2004-2005: First regional markets, then complete internal market
- Establishment of ACER - 2009
RELACIÓN ENTRE CAPACIDAD COMERCIAL Y PUNTA DE DEMANDA

RATIO: COMMERCIAL INTERCONNECTION CAPACITY / PEAK DEMAND

%
## Regions of the Electricity Regional Initiative

<table>
<thead>
<tr>
<th>Region</th>
<th>Lead Regulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltic</td>
<td>Latvia (PUC)</td>
</tr>
<tr>
<td>Estonia, Latvia and Lithuania</td>
<td></td>
</tr>
<tr>
<td>Central-East (CEE)</td>
<td>Austria (E-Control)</td>
</tr>
<tr>
<td>Austria, Czech Republic, Germany, Hungary, Poland, Slovak Republic and Slovenia</td>
<td></td>
</tr>
<tr>
<td>Central-South (CS)</td>
<td>Italy (AEEG)</td>
</tr>
<tr>
<td>Austria, France, Germany, Greece, Italy and Slovak Republic</td>
<td></td>
</tr>
<tr>
<td>Central-West (CW)</td>
<td>Belgium (CREG)</td>
</tr>
<tr>
<td>Belgium, France, Germany, Luxembourg and the Netherlands</td>
<td></td>
</tr>
<tr>
<td>France, UK &amp; Ireland (FUI)</td>
<td>United Kingdom (Ofgem)</td>
</tr>
<tr>
<td>France, the United Kingdom and Ireland</td>
<td></td>
</tr>
<tr>
<td>North</td>
<td>Denmark (DERA)</td>
</tr>
<tr>
<td>Denmark, Finland, Germany, Norway, Poland and Sweden</td>
<td></td>
</tr>
<tr>
<td>South-West (SW)</td>
<td>Spain (CNE)</td>
</tr>
<tr>
<td>France, Portugal and Spain</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Key developments per topic

The regions continue their work on three major priorities: harmonisation and improvements to congestion management (calculation and allocation); harmonising transparency; and integrating balancing markets. There have been a number of concrete developments in each of the seven electricity regions in 2008 and 2009. Some highlights are set out below topic by topic.
INTEGRATION OF PRODUCT AND TRANSMISSION MARKETS: MARKET COUPLING

„…Market Coupling between Denmark and Germany

The long-term perspective of the regional initiative in Northern Europe is to optimize the use of interconnection capacities between the Scandinavian and the central European electricity markets.

In this context, it is the aim of the five project partners E.ON Netz, Energinet.dk, VE Transmission, Nord Pool Spot and EEX to implement a market coupling system for more simplified cross-border electricity trading between Denmark and Germany. After the establishment of the new market coupling system, all capacity on the Kontek interconnection and the daily capacity on the interconnection between Western Denmark and Germany will be utilised through an implicit auction. The annual and monthly explicit auctions on the interconnection between Western Denmark and Germany will continue. It is expected that this leads to a significant increase in economic welfare.

The project partner will establish a new company, called European Market Coupling Company GmbH (EMCC), located in Hamburg. EMCC is intended to provide specific services for the operation of market coupling to TSOs and power exchanges. …”

(To be launched on September 29, 2008)