Short overview of the Baltic electricity market

Prof. Vidmantas Jankauskas

Energy Regulators Regional Association (ERRA)
Contents

- Baltic power system
- Restructuring of the Latvian electricity sector
- Restructuring of the Estonian electricity sector
- Restructuring of the Lithuanian electricity sector
- Creation of a common market
- Development of interconnections
Baltic power system
Structure of generating capacities in 2009, MW

- Lithuania
- Latvia
- Estonia

- Nuclear
- Condensed
- CHP
- Hydro
- IPP
Structure of generation capacities in the Baltics in 2009

- Nuclear: 39%
- Thermal (oil shale): 32%
- Thermal (natural gas, HFO): 14%
- HPP: 13%
- HPSP: 2%
Power plants in the Baltics

Largest power plants

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narva TPP</td>
<td>1615</td>
<td></td>
</tr>
<tr>
<td>Baltia TPP</td>
<td>765</td>
<td>wind</td>
</tr>
<tr>
<td>Tallinn CHP</td>
<td>190</td>
<td>1000</td>
</tr>
<tr>
<td>Total</td>
<td>2570</td>
<td></td>
</tr>
</tbody>
</table>

Latvia

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riga CHP1</td>
<td>144</td>
<td>Riga CCGT 400</td>
</tr>
<tr>
<td>Riga CHP2</td>
<td>627</td>
<td>Coal 400</td>
</tr>
<tr>
<td>Daugava HPP : 402+263+870</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2067</td>
<td></td>
</tr>
</tbody>
</table>

Lithuania

<table>
<thead>
<tr>
<th>Plant</th>
<th>Capacity</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithuanian TP</td>
<td>1800</td>
<td>new NPP</td>
</tr>
<tr>
<td>Kruonis PSHP</td>
<td>900</td>
<td>2000-3000</td>
</tr>
<tr>
<td>Vilnius CHP</td>
<td>384</td>
<td>new CCGT</td>
</tr>
<tr>
<td>Kaunas CHP</td>
<td>170</td>
<td>440</td>
</tr>
<tr>
<td>Kaunas HPP</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3556</td>
<td></td>
</tr>
</tbody>
</table>
Structure of generation capacities in the Baltics in 2010

- Thermal (oil shale): 33%
- HPP: 13%
- Thermal (natural gas, HFO): 54%
Baltic electricity system

- Installed capacities in 2005, GW:
  - Estonia – 2.9
  - Latvia – 2.1
  - Lithuania – 4.9

- Electricity consumption in 2005, TWh:
  - Estonia – 6.0
  - Latvia – 6.8
  - Lithuania – 8.1
Historically - part of the bigger system
Challenges to the electricity sector of the Baltic States

- Closure of biggest generator (1350 MW) – Ignalina NPP by the end of 2009
- Need to upgrade and modernize remaining thermal power plants and CHP to comply with the EU environmental regulations
- Basic renovation of the district heating networks
- Completion of liberalisation of the electricity market and establishment of a common Baltic electricity market;
- Interconnections with Western and Northern European grids
- Significant expansion of renewable electricity production
Structure of electricity supply in Latvia

GWh

- DG
- Power import
- Central Thermal PP
- Central Hydro PP

ENERGY COOPERATION BETWEEN THE EU, THE LITTORAL STATES OF THE BLACK & CASPIAN SEAS AND THEIR NEIGHBOURING COUNTRIES
Operating modes of the Latvian power system

![Graph showing the operating modes of the Latvian power system for the year 2001. The graph includes data on imports, HPP, and CHP.]
Key issues of the Latvian electricity sector

Generation
- Lack of base load capacity
- Reconstruction of existing generation units and planning of new ones
- Dependency on Russian gas as primary energy source and need for the fuel diversification for generation of electricity
- Expected influence of CO2 emission limitations on generation

Transmission
- Adequate capacity of the existing transmission grid
- Future grid reconstruction and extension plans

Distribution
- Investments in distribution networks with a long pay back period
- Challenging investments for any small DSO
Electricity market deregulation in Latvia

The Electricity Market Law defines the role of public supplier that currently is Latvenergo Group, responsible for:

- electricity supply to all non-eligible users
- purchase of RES and cogeneration electricity
- to be the supplier of last resort

Reorganization of Latvenergo Group is completed and subsidiaries are established:

- Sadales tikls AS (DSO) and Augstsprieguma tikls AS (TSO) in compliance with the European Parliament and the Council directive 2003/54/EK
- guaranteed access of the third persons (new electricity suppliers) to transmission and distribution networks
Current structure of the Latvian electricity market

**Generators**
- **Supported generation** (cogeneration, wind, small hydro, etc.)
- **Daugava HPP**
- **Import**
- **Thermal (condensing)**

**Traders**
- **Public trader**
- **Number of trading licenses issued**

**Customers**
- **Non-eligible customers**
- **Eligible customers**

30% Guaranteed purchase
70% Competition

Competition (currently price not competitive)

Source: Latvenergo, 2008
Market opening in Latvia

- Since 1st of July 2004 all non-domestic consumers are allowed to change electricity supplier.
- On 1st July 2007 electricity market was opened also for households - all electricity consumers in Latvia are allowed to change electricity supplier.
- Tariffs are approved by the Regulator and all customers are also paying the mandatory procurement component, which occurs when the public supplier purchases electricity from supported producers.
- From May 15 2008 all commercial clients are required to buy electricity in open market – and market forces started to work.
Experience from liberalization of the Latvian electricity market

- Strong political will and support is needed
- To open truly market, focus on elimination of fundamental restrictions is crucial
- Clear criteria should be created for market participants
- Regulator should be politically independent and with long term view on developments in electricity sector
- System operators should react and adopt quickly to changes during liberalization process
- Market trust and liquidity should be created by involving as many participants as possible and market should become regional, because our Baltic countries are too small.
Restructuring of the national monopoly in Estonia

Republic of Estonia
100% shares

Eesti Energia AS

- OÜ Põhivõrk TSO
- OÜ Jaotusvõrk DSO
- AS Narva Elektrijaamad generator
- AS Eesti Põlevkivi oil shale mines
- non-core activities
Estonia: electricity market liberalisation

- derogation of the EU Electricity Market Directive until 2009
- market opening 35% in 2009 and full opening in 2013
- oil shale generated electricity takes 90% of the market
- DSOs are obliged to buy from Narva PP and CHPs
- National Grid company was set up as an independent company in 2004 – legal unbundling
- decision to open electricity market for commercial consumers with consumption of more than 2 GWh annually from April 1, 2010
Estonia: *Eesti energia*

- *Eesti energia* is 100% state-owned, vertically integrated monopoly
- *Eesti energia* owns more than 95% of power production
- *Eesti energia* has 90% of the distribution market
Structure of electricity supply in Lithuania

- Thermal
- Hydro
- Nuclear

TWh

ENERGY COOPERATION BETWEEN THE EU, THE LITTORAL STATES OF THE BLACK & CASPIAN SEAS AND THEIR NEIGHBOURING COUNTRIES
Electricity domestic consumption and exports in Lithuania
New market structure

Monopoly

Competition

Transmission grid

Generators

Power exchange

Import/export

Distribution grid

Independent suppliers

Public supplier

Eligible consumers

Residential and small commercial customers
Lithuanian wholesale power market

- Electricity is traded by **bilateral contracts** (local contracts) or via **Power Exchange**
- All imported or exported energy is traded via Power Exchange
- Independent and price dependent bids are possible in PX
- For risk mitigation compensation mechanism can be used
Electricity portfolio

Electricity bought in Power Exchange

Bilaterally contracted electricity

Balancing electricity
Power Exchange – based on NordPool Spot

**Product:** hourly energy quantity

**Period:** 24 hours day-ahead

**Trading arrangements:** intersection of supply and demand curves, which is represented by the last supply bid matching demand bid

**Cross-border capacity allocation:** implicit auction – capacity and energy is traded simultaneously

**Trading days:** all year days

**Bidding arrangements:** specialized electronic trading platform provided by NordPool is in operation, where participants place their bids

**Currency:** Litas.

**Price settlement:** announcement until 14:30 LT time
Common Baltic market
Prices to final customers (€/MWh)
(EU energy, 2009)

- Dc
- Ib
- Ig

- Estonia
- Latvia
- Lithuania
- Finland
## Transfer capacities in normal conditions (DC Baltija)

<table>
<thead>
<tr>
<th>Link</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>St.Petersburg - Estonia</td>
<td>1000 &lt;&gt; 1000</td>
</tr>
<tr>
<td>Estonia – Pskov (Russia) - Latvia</td>
<td>1200 &lt;&gt; 1500 – (0,4 $P_{\text{INPP}}$ – 300)</td>
</tr>
<tr>
<td>Latvia - Lithuania</td>
<td>1000 &lt;&gt; 1600</td>
</tr>
<tr>
<td>Lithuania – Kaliningrad (Russia)</td>
<td>&gt; 700</td>
</tr>
<tr>
<td>Lithuania - Belarus</td>
<td>1400 &lt;&gt; 2200</td>
</tr>
<tr>
<td>Belarus – Smolensk (Russia)</td>
<td>1300 &lt;&gt; 1000</td>
</tr>
</tbody>
</table>
Steps towards market opening and harmonisation in all three Baltic States

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 07 2004</td>
<td>All commercial consumers are free to choose a supplier</td>
</tr>
<tr>
<td>01 07 2007</td>
<td>All residential consumers become eligible</td>
</tr>
<tr>
<td>15 05 2008</td>
<td>All commercial consumers in Latvia are forced to buy in an open market</td>
</tr>
<tr>
<td>17 06 2009</td>
<td>Baltic market integration plan signed</td>
</tr>
<tr>
<td>01 01 2010</td>
<td>Large and medium consumers in Lithuania are forced into open market</td>
</tr>
<tr>
<td>01 04 2010</td>
<td>Estonia opens electricity market</td>
</tr>
</tbody>
</table>
Road map to the Baltic market opening

- Approve the Baltic integration plan
- Abolish regulated tariffs
- Estlink open for capacity auctions

done

on-going

Remove cross-border trade restrictions
Fully separate TSOs
Introduce Estlink price area

1-3 years

Common day ahead market
Stepwise intro of intra-day market
Common reserves and balancing markets
Development of financial markets

3-5 years

Full opening of retail market
Common power exchange
Harmonisation of network tariffs
Electricity suppliers in the Baltics, 2010

- **Latvenergo**: 19%
- **Eesti energia**: 31%
- **Other Baltic**: 8%
- **Non-EU**: 31%
- **Estlink**: 11%
Interconnections
Future vision - 2015

1000 MW

3000 MW

1000 MW

1000 MW
**Future vision:**
possible electricity trade in 2015
(BCEM study, 2003)

<table>
<thead>
<tr>
<th>Country</th>
<th>Installed capacity / Max. system load</th>
<th>Total production / Total consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>LATVIA</td>
<td>2700/ 1500 MW</td>
<td>4.7 / 7.5 TWh</td>
</tr>
<tr>
<td>ESTONIA</td>
<td>2630 / 1695 MW</td>
<td>8.5 / 8.0 TWh</td>
</tr>
<tr>
<td>FINLAND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LITHUANIA</td>
<td>3700 / 2400 MW</td>
<td>10.8 / 12.1 TWh</td>
</tr>
<tr>
<td>RUSSIA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BELARUS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POLAND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SWEDEN</td>
<td>1000 MW</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- **Installed capacity / Max. system load**
- **Total production / Total consumption**
Thank you for your attention!