LITGRID:
TOWARDS BALTIC STATES SYNCHRONISATION
WITH CONTINENTAL EUROPEAN NETWORKS

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2018-09-25
Electricity transmission system operator:

• Maintains stable operation of the national power system and controls electricity flows

• Enables competition in the open electricity market

• Implements the strategic projects integrating the national power system into the European power infrastructure and electricity market
Team of 230 professionals:

- The average employee age - 42 years
- The average experience in the energy sector - 12 years
- more than 60 projects
Vision:
„Europe‘s smartest transmission system operator“
Mission:
„Transmitting electricity across European markets, creating value for the society“
Electricity system reliability

Maintaining balance between electricity use and generation

RES integration

Energy Competence Centre

Critical electric power infrastructure

Integration into European grids

Strategic projects

Integration into European grids
„NordBalt“ and „LitPol Link“: projects of the highest strategic importance
„NordBalt“
- The first link with Northern Europe
- Capacity: 700 MW
- Length: 453 km
- Cost: 550M EUR

„LitPol Link“
- The first link with Western Europe
- Capacity: 500 MW
- Length: 163 km
- Cost: 580M EUR
LitPol Link
The first energy link between the Baltic countries and Western Europe

„LitPol Link“ brings:
- Market integration
- Security of supply
- Future for synchronization

For the Baltic countries close cooperation with Poland is the key to full-fledged integration with Continental Europe
The scope of the project

- Overhead power line length: ~163 km (112 km - in PL and 51 in LT)
- Back to Back (BtB) station Alytus;
- 330 kV Substation in Alytus;
- Price: ~ 580 million Euros (in PL and LT)
BtB HVDC converter + 400 kV switchyard
Overhead power lines
Ecological surveillance
Attention to the environment
The first power link between Lithuania and Sweden

- International project of high political importance
- Many parties involved, many supervisors interested
- Decisions requiring political will and responsibility

The king of Sweden Carl XVI Gustaf visits „Litgrid“, 2015 m.
- 453 km HVDC cable (400 subsea and 53 land cable)
- 700 MW capacity
- HVDC converters in Klaipėda ir Nybro (Sweden)
- Ensure diversified energy sources, price dropped in LT from 49 €/MWh to 36 €/MWh
Construction of converter station
Construction of converter station
HVDC cable

One of the longest undersea cables in the world (400 km)
Environment

- Lowest impact on environment due to technology choice:
  - Horizontal drilling under Curonian lagoon
  - High pressure water jet for cable installation on the seabed
  - Seabead exploration
Seabed exploration

- WW2 bombs/mines
- Sunken ship parts
- Sunken ship parts
- Old fishing nets
Concrete constructions - „mattresses“ laid 60 meters deep in the Baltic sea
Warships in the cable construction zone

2 identical incidents in the cable construction zone:
- In March and April of 2015

Russia demanded to move the cable-laying-vessels due to Russian military exercises in the territory

These actions violated international maritime law, cable-laying vessels operated in the Exclusive Economic Zones of Lithuania and Sweden
“They keep up constant pressure just to show they have influence,” Mr. Masiulis said. “It is all part of the general atmosphere of provocations and rising tensions in the region.”
• Wholesale electricity prices in Lithuania decreased by 16%
• Lithuanian consumers saved around 54M EUR
Market integration - new opportunities

Infrastructure, transparent rules and regulations empowers well connected and liquid market

Energy hub

The development of the Baltic sea region generation capacities is significant challenge requiring huge investments

New connections will double the choice of markets for trading electricity across the border
The zonal price model will ensure clear market signals for new investment in the transmission systems

Baltic cross border transmission capacity will increase by 40%; Baltic will connect 5 markets, including two new;
Well-developed power infrastructure opens opportunities for business
Synchronization with Continental European Network
In 1951, Austria, Belgium, France, Western Germany, Italy, Luxembourg, the Netherlands and Switzerland synchronised with the European Continental Network.

In 1958, the European Continental Network was fully synchronised.

In 1995, Poland, the Czech Republic, Slovakia and Hungary left the IPS/UPS system and synchronised with the CE.

In 2004, Romania and Bulgaria synchronised with the CE.

Portugal, Spain, former Yugoslavia, Greece and Albania synchronised with the European Continental Network.

In 2015, Turkey connects to the European Continental Network.

Lithuania, Latvia and Estonia plans to connect to the CE.

In 2025, Lithuania, Latvia and Estonia plans to connect to the CE.
Synchronization with Continental European Network - strategic goal of the Baltic States

Working synchronously means complete interdependency, like riding a tandem bicycle

Europe's synchronous power systems:

- Between 1998 and 2013 - 7 studies on Baltic and Continental grids integration:
  - grid interconnectors shall be built in the territory of EU;
  - synchronization is the European Project of Common Interest (PCI);
  - a study by EC JRC completed;
  - dynamic and frequency stability studies are implemented.
Existing BRELL ring
Interdependency scenarios for the Baltic States

In EU (Baltic States): Well developed infrastructure

In EU (Baltic States): Effective market operation

With 3rd countries: Infrastructure development plans are not co-ordinated

With 3rd countries: existing loop flows, priority transit of Kaliningrad

Interdependency in the future shall be based on shared EU values and trust among neighbours
New BRELL ring reinforcements
New BRELL ring reinforcements
Additional generation in Kaliningrad

Additional generation will make Kaliningrad flexible enough to desynchronize from the Baltic States.
Interdependence with third countries

- 2 reactor blocks of 1 200 MW just 40 km off Vilnius
- Planned start of operation - 2019 (2020)
- 100 km off Astravets NPP there are 919 thousands of Lithuania’s residents

Sources: MFA; Ari Beser „A Preventable Nuclear Threat You Most Likely Don’t Know About“, http://voices.nationalgeographic.com/2017/02/23/a-preventable-nuclear-threat-you-most-likely-dont-know-about/
How to stop electricity from Astravets NPP

Quick solution

Electricity from 3rd countries not traded at Nord Pool

Long-term solution

Power system synchronization with the Continental European Network
Timely synchronization is essential to avoid blackouts and disturbances

- In case the Baltic States will remain synchronized with IPS/UPS the blackout risks increase.
- Blackout in 2025 for Baltic States would costs from 1.3 to 2.1 billion EUR. That is almost twice more expensive than Baltic States synchronization using existing infrastructure.
- Russia and Belorussia might aim to break the BRELL ring as soon as 2021, thus desynchronizing Baltic States first.
Conclusions

Synchronization of the Baltic States’ electricity network with the European system would allow to:

1. Remove infrastructure and operational interdependency with the third countries;
2. Increase market effectiveness;
3. Increase energy security by decreasing the risk of the possible blackout.

Future shall be based on shared EU values and trust among neighbors.
Thank you!