Nuclear Power Program in Lithuania

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MOST IMPORTANT DATES IN THE DEVELOPMENT OF NUCLEAR ENERGY IN LITHUANIAN HISTORY

- In 1978, began construction of the Ignalina Nuclear Power Plant (preparatory work started in 1974).
- 31 December 1983, the first unit of Ignalina NPP began operating.
- 31 August 1987, the second unit became operational at Ignalina NPP
- In 1990, the energy system of Lithuania was transferred to the jurisdiction of the Republic of Lithuania.
- 18 November 1991, was established the State Nuclear Power Safety Inspectorate (VATESI).
- In 1993, Lithuania became a member of the International Atomic Energy Agency (IAEA).
- In 1996, the Seimas of the Republic of Lithuania passed the Law on Nuclear Energy.
- 1 January 1997, the Radiation Protection Centre (RSC) was established.
- In 1999, the Seimas of the Republic of Lithuania passed the Law on Radiation Protection.
- In 1999, the Seimas of the Republic of Lithuania passed the Law on the Management of Radioactive Waste.
- 16 May 2001, the State Enterprise Radioactive Waste Management Agency (RATA) was established.
- 10 October 2002, the Seimas of the Republic of Lithuania approved an updated Lithuanian National Energy Strategy, which stated that it was necessary to ensure the continuity, succession and development of safe nuclear energy.
- 1 May 2004, Lithuania became a member of the European Union, simultaneously becoming a member of the EURATOM.
- 31 December 2004, the first unit of Ignalina NPP was shut down.
- In 2007, the Seimas of the Republic of Lithuania passed the Law on the Nuclear Power Plant, which turned on the “green light” for the implementation of a new nuclear power plant project in Lithuania.
- 31 December 2009, the second unit of Ignalina NPP was shut down.
# Generating Capacities in Lithuania

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<th>Fuel</th>
<th>2006</th>
<th>2010</th>
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<tr>
<td><strong>Nuclear: Ignalina</strong></td>
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<td><strong>Thermal:</strong></td>
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<td>Elektrėnai (condensing)</td>
<td>2330</td>
<td>2380</td>
<td>2460</td>
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<tr>
<td>Gas, HFO, orimulsion</td>
<td>1500</td>
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<tr>
<td>Vilnius CHP</td>
<td>380</td>
<td>370</td>
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<td>Gas, HFO</td>
<td>180</td>
<td>170</td>
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<tr>
<td>Kaunas CHP</td>
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<td>Gas, HFO</td>
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<td>180</td>
<td>260</td>
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<td>Mažeikiai CHP</td>
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<td>HFO</td>
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<tr>
<td>Others</td>
<td>1020</td>
<td>1030</td>
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<tr>
<td><strong>Hydro:</strong></td>
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<tr>
<td>Kaunas HPP</td>
<td>100</td>
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<tr>
<td>Kruonis PSP</td>
<td>900</td>
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<td>Small scale HPP, total</td>
<td>20</td>
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<td><strong>Other renewables:</strong></td>
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<tr>
<td>Wind</td>
<td>40</td>
<td>220</td>
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<td>Others</td>
<td>30</td>
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<tr>
<td><strong>Total generation</strong></td>
<td>4690</td>
<td>3630</td>
<td>3830</td>
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<tr>
<td><strong>Total without hydro and wind</strong></td>
<td>3640</td>
<td>2400</td>
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<tr>
<td><strong>Daily demand</strong></td>
<td>1880</td>
<td>2370</td>
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<tr>
<td><strong>Peak demand</strong></td>
<td>2100</td>
<td>2450</td>
<td>2900</td>
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</table>
ENERGY GENERATION

2009
• Ignalina NPP ≈ 71 %
• Thermal PP ≈ 18 %
• Others ≈ 11 %

2010
• Thermal PP ≈ 82 %
• Others ≈ 18 %

Lithuania until 2016 (NordBalt, LitPolink interconnections) highly depends from import of electricity and fossil fuel from one supplier. Needs support in developments of electricity infrastructure. Taking in to account decommissioning of Ignalina NPP, CO₂ emission allowances (cost) for Lithuania are highly important.
DOMESTIC DEMAND OF ELECTRICITY

Domestic demand of electricity in 2009

Domestic production

Import

Domestic demand of electricity in 2010

Domestic production

Import
NATIONAL ENERGY STRATEGY FOR LITHUANIA

National Energy Strategy adopted in 18 January 2007. Strategic objectives of Lithuania’s energy sector:
• energy security;
• sustainable development of the energy sector;
• competitiveness;
• efficient use of energy.

Seeking to implement strategic objectives, one of the main tasks of the National Energy Strategy are set: to ensure the continuity and development of safe nuclear energy; to put into the operation of a new regional nuclear power plant not later than by 2015 in order to satisfy the needs of the Baltic countries and the region.
STRUCTURE OF PRIMARY ENERGY CONSUMPTION

IN 2008

- Natural Gas: 30.8%
- Oil Products: 29.9%
- Nuclear Energy: 28.3%
- Firewood and other Renewables: 8.6%
- Coal and Peat: 2.3%

IN 2025 (FORECAST)

- Natural Gas: 30%
- Nuclear Energy: 25%
- Oil Products: 25%
- Local and Renewables: 20%
- Nuclear Energy: 30.8%
CONSTRUCTION OF NEW GENERATION CAPACITY

Planned new generation capacity

- New 400 MW CCGT unit in Lithuanian Power Plant (under construction 2012)
- New nuclear power plant:
  - 1 unit 1000 MW (2018)
  - 2 unit 1000 MW (2021)
  - possible 3 unit 1000 MW (2024)

Planned, but implementation under question:

- New 312 MW CCGT unit in Kaunas power plant (2012 m.)
- New 25 MW electrical power CHP unit in Klaipėda power plant (2012)
- New unit in Mažeikiai power plant 48 MW (2013)
- New 400 MW CCGT unit in Lithuanian Power Plant 400 MW (2015 no funding)
- Second 35 MW electrical power CCP unit in Panevėžys CHP power plant (2015)

Several small CCP units and CHP units designed for use of biomass, total capacity - 51 MW:
Several small CHP units, designed for burning of waste, total capacity - 60 MW.
FUTURE ENERGY SYSTEM

- Baltic energy market;
- Interconnection with Poland;
- Interconnection with Sweden;
- Interconnection with Finland.

New Nuclear Power Plant

ENTSO-E
POLITICAL COMMITMENT ACROSS THE BALTIC FOR DEVELOPMENT OF NEW NUCLEAR

Baltic Energy Market Interconnection Plan
- Integration of Baltic / European systems

Commitment to interconnection projects
- Implementation of interconnections

Baltic Prime Ministers’ Joint Declaration
- Unified energy strategy objectives

National Energy Strategy
- Defines role of nuclear power in the energy mix

Government decree No.300
- Principles and goals of NNPP

New Nuclear Power Plant Law - passed
- Legal foundations for the Project

“The Prime Minsters... agreed to… continue cooperation... in the preparatory work on the new Visaginas Nuclear Power Plant Project” Joint Declaration of Baltic Prime Ministers, 27 April 2009
PUBLIC SUPPORT

Would you support a new nuclear power plant being built in Lithuania?

- Yes: 58%
- No: 28%
- No opinion: 14%
NUCLEAR ENERGY: KEY INSTITUTIONS

President

Parliament of the Republic of Lithuania

Government of the Republic of Lithuania

Ministry of Environment
Ministry of Social Security and Labor
Ministry of the Interior
Ministry of Health
Ministry of Transport
Fire and Rescue Department
State Border Guard Service
Radiation Protection Centre
State Nuclear Power Safety Inspectorate (VATESI)

INPP Security Unit

Ministry of Energy

State Security Department

Merger by October 2010
PROJECT LEGAL ENVIRONMENT

The majority of legal acts of nuclear energy are designed for the regulation of in operation Ignalina’s nuclear power plant.

The reconsideration of in force legal acts was taken to make an appropriate legal background for the proper regulation of new nuclear power plant build, including but not limited to licensing, nuclear and radiation safety, land and construction law.

1) a list of legal acts to be changed was developed and presented to the Ministry of Energy;
2) several amendments (Law on Nuclear Energy) are already made and several of projects (Law on Nuclear Safety) of the legal acts are drawn;
3) consultancies between state and municipal institutions and project implementing company are in progress.
LEGAL ACTS TO AMEND
(approximately 20):

Law on Nuclear Energy;
Law on Decommissioning Fund;
Law on Land;
Law on Land Reform;
Law on Construction and its leading legal acts;
Law on Nuclear Safety;
Law on Radiation Protection;
Law on Radioactive Waste;
Law on Maintenance of Potentially Dangerous Installations;
Legal acts on licensing;
Etc.
LAW ON NUCLEAR SAFETY


Main objectives of the Law on Nuclear Safety

- to make regulatory process clear and transparent;
- to streamline licensing and authorizations procedures;
- to strengthen regulatory body;
- strengthen responsibility to ensure public kept informed on status of nuclear safety.
RADIOACTIVE WASTE MANAGEMENT STRATEGY (2008)

• Adopted by the Government for 2008-2013

• Provides for the main directions of the management of radioactive waste

• Defines aims and tasks of the radioactive waste management

• It also provides for the preparation of management of operational radioactive waste from Visaginas NPP
NEW NPP PROJECT

• In December 2006, the Department of Nuclear Energy was established at AB “Lietuvos energija” (TSO) to begin the implementation of preparatory works for a new nuclear power plant project in Lithuania.

• In July 2008 was established Visagino Atominë Elektrinë, UAB (VAE).

Since 2006 were undertaken a number of preparatory works that are necessary in order to be properly prepared for the Tender to invite Strategic Investor to take the lead role in the Project and Tender for the Procurement of Technologies for New Nuclear Power Plant, its design and construction.
COMMERCIALLY AND ECONOMICALLY ATTRACTIVE PROJECT

Supply shortage developing in Baltic region over next decade:

• Developing supply shortage in the region
• Interconnected market will provide demand for NNPP power
• Power price alignment with Europe will contribute greatly to economic viability of Project
• Regional supply chain and industry low in cost relative to other European markets
• Development of the NNPP supports the “Green Agenda” and EU targets
## NEW NPP CONSTRUCTION PROJECT SCHEDULE

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<td><strong>Ordering of long-lead items</strong></td>
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<td><strong>EPC and financing agreements signed</strong></td>
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<td><strong>Preparation of Unit 1 Technical Design</strong></td>
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<td><strong>Preparation of sites</strong></td>
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<td><strong>Unit 1 construction licensing</strong></td>
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<td><strong>Start of Unit 1 operations</strong></td>
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CURRENT STATUS OF NEW NPP PROJECT

Milestones achieved to date

• New Nuclear Power Plant law ratified by Parliament
• Government Decree No. 300 signed
• Memorandum of Baltic Ministers on regional energy strategy signed
• Environmental Impact Assessment of the Visaginas site completed in 2009
• Business Proposal and Financing Plan prepared
  – Supports commercial and financial viability of the project
  – Identifies key considerations for Lithuania in creating an attractive
• Investment platform and regulatory regime
• Formal contact with potential regional partners established
• Negotiations on proposals received (Q1 2010)
• Ministry of Energy selected 5 non binding proposals for the strategical investor of NNPP. Later two binding proposals will be left. At the end of the year one strategical investor should be selected for the NNPP.
• The High Level Task Force on Nuclear Power Generation (HLTF) was set up via the Joint Communiqué of the Baltic and Polish Energy Ministers signed in the presence of the EC Energy Commissioner in Brussels on 31st May 2010.
NEXT STEPS IN NEW NPP PROJECT


• Planning phase (estimated 2010-2012/3)

• Construction phase (estimated 2012/3-2018/20)

• Estimated commissioning of the new power plant (estimated 2018-2020)
LIMITING FACTORS FOR TECHNOLOGY SELECTION

Possible limiting factors (criteria) for technology:

– Grid technical requirements to connect NPP - limitations to the single unit capacity;
– Licensing requirements:
  » Technology should be licensed in the country of origin or assessed by competent international organization (EUR for example);
  » Technical specification should be approved by VATESI;
– Other possible factors:
  » Heavy component transportation issues;
  » Vendor’s capacity.
NNPP EIA REPORT: SITE ALTERNATIVES

Both sites are suitable for the construction and operation of the new NPP, but Site No.1 is considered more favorable for the following reasons:

– Geological, tectonic and seismic conditions are more favorable at Site No. 1.

– Hydrogeological conditions are slightly more favorable at Site No. 1

– Considering the conditions for heated water cooling in the lake, Site No. 1 is more favorable.

– Construction of the NNPP at Site No. 1 would cause less negative impacts on biodiversity values
NNPP SITE ALTERNATIVES
Site No. 1
NNPP SITE ALTERNATIVES

Site No. 2
NNPP EIA REPORT: POWER GENERATION LEVEL AND COOLING ALTERNATIVES

• The targeted maximum power generation level of 3 400 MWe is acceptable from an environmental point of view

• As there is an upper limit to the amount of warmed cooling water which Lake Druksiai can tolerate, it may be necessary to implement other cooling solutions in combination with direct cooling

• Due to ecological reasons, direct cooling is only possible up to a thermal load to the lake from the NNPP of approximately 3 200 MW thermal released

• The current cooling water outlet is the best when the warmed up water area of the lake is used as a criteria
FOR MORE INFORMATION

Ministry of Energy of Lithuania
www.enmin.lt

Commission for investor process
commission@vae.lt

VAE

Visagino Atominė Elektrinė, UAB
www.vae.lt
Thank you for you attention