Renewable Energy in Lithuania

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Key points of the presentation:

- Legal and economical settings for the renewable energy production in Lithuania
- Means for stimulating renewable energy production
- Implementation of the new EU Directive on the Energy from Renewable Sources
- Overview of the main renewable energy sources exploited in Lithuania:
  - Biomass
  - Hydro energy
  - Wind energy
  - Geothermal energy
  - Solar energy
- Greenhouse Gas Emission Trading Scheme
- Carbon capture and storage
- Nuclear energy future in Lithuania
- Conclusions

Legal and economical settings for the renewable energy production in Lithuania

- The Baltic States have quite limited own energy resources and in the Accession Agreement with the EU Lithuania has verified its target to increase the share of electricity produced from renewable energy sources (RES) by the year 2010.
- The increased use of renewable energy has been declared as one of the main Lithuania's policy priorities in the energy sector and is highlighted in the National Energy Strategy (Resolution No. X-1046, 18 January 2007) as well as in other legal acts regulating activities in energy sector.
- Currently renewable energy makes up 11,4% of energy produced and approximately 4,6% of electricity produced in Lithuania (source: public entity European Information Centre).
- The usage of RES in Lithuania is constantly growing. For example, in 2007 Lithuania used 25,1% more RES than in year 2000.

Renewable energy evolution in Lithuania

- Lithuania has a scientific, technological and industrial potential for renewable energy development.
- Despite its small capacity, the RES sector is currently undergoing rapid development. In 2001, RES sector featured only with wood fuel and hydropower. However, during past 8 years other RES have been significantly developed.
- Wood fuel and wood waste fuel are the most widely used means for renewable heating in Lithuania – up to 87% (2007 data). The remaining 13 percent falls to other RES.
- The biggest renewable potential in producing electricity in Lithuania is found in the field of hydro and wind energy.
- It is expected that the usage of biomass in electricity generation will rise nine fold between 2009 and 2017, whereas electricity from wind is expected to rise 54 times between 2009 and 2017.

Promotion of renewable energy production and purchase in Lithuania

- Holders of electricity supply licences are obliged to purchase electricity generated by wind, biomass, and sun power stations as well as hydroelectric power stations with the installed capacity not exceeding 10 MW, and sell it to the consumers.
- Electricity produced using renewable energy resources must be purchased at the higher tariffs established by the National Control Commission for Prices and Energy (NCCPE), which currently vary from EUR 0.07 to 0.086 per kWh depending on the type of renewable and waste energy resources. The aforementioned tariffs are applicable as of 1 January 2009 and granted until 31 December 2020.
- Power plants using renewable energy sources are given a 40% connection fee discount when connecting to the existing systems of energy undertakings.
- The producers of biomass that is intended for power plants are encouraged by receiving special land concessions.

Fiscal and financial measures for stimulating renewable energy production:

- Energy taxes, *e.g.,* feed-in prices for electricity produced from CHP, special energy pricing methodology for heat and hot water.
- Reduced VAT for energy appliances, *e.g.,* VAT reduction from 18% up to 9% for insulation and modernization of buildings.
- Emission taxes, *e.g.,* the Programme of the Production and Use of Biofuel in 2004 - 2010 provides for pollution tax exemptions.
- Excise tax, e.g. excise relief for energy products from biological materials or materials that include biological additives.
- Discount for investment, *e.g.,* investment subsidies and loans on favourable terms are made available by the Lithuanian Environmental Investment Fund.
- As of 2021 the production of renewable energy will be stimulated by introducing the “green certificate” system.

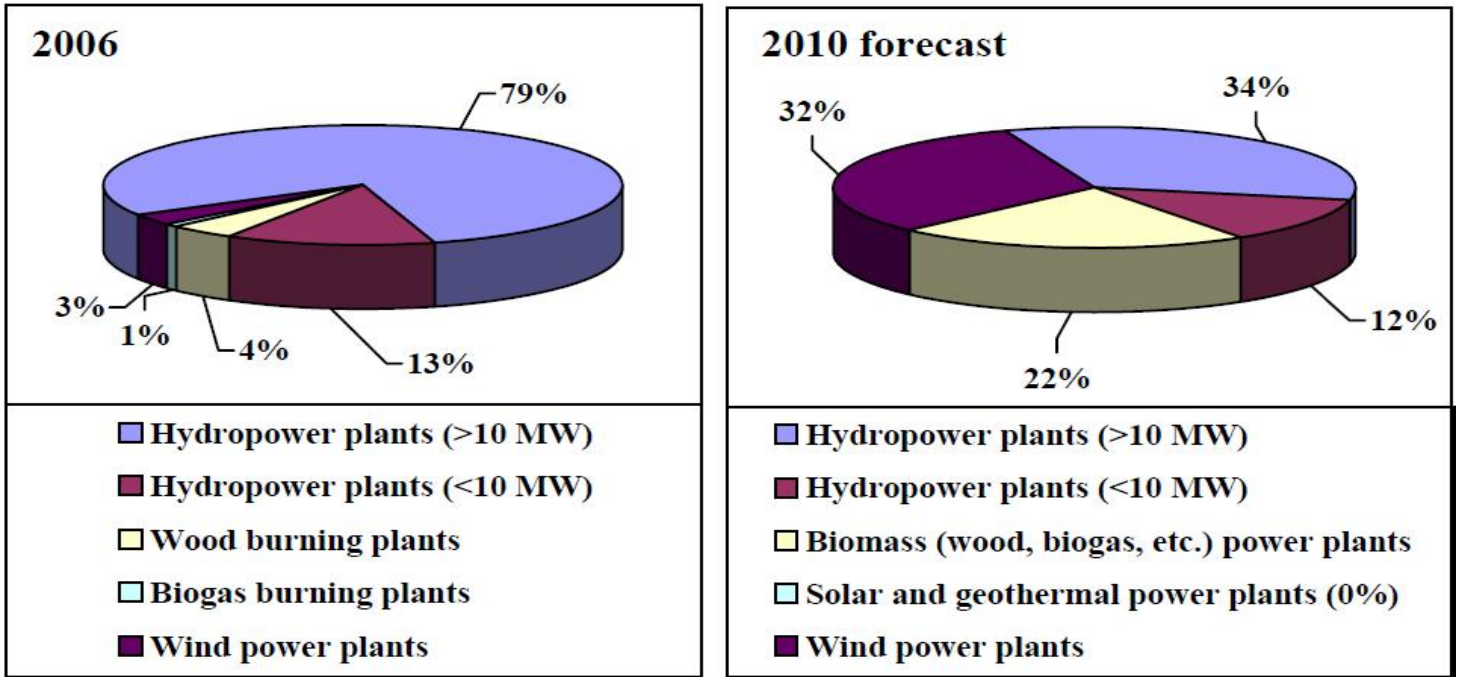
The implementation of the new Directive on Energy from Renewable Sources

- The Directive on the Promotion of the Use of Energy from Renewable Sources (2009/28/EC, OJ L 140/16, 5.6.2009) sets the target for Lithuania to generate 23% of its total primary energy balance from renewable sources by 2020. In addition, at least 10% share of renewable energy in final consumption of energy in transport should be reached by 2020.
- Lithuania as well as other Member States has to achieve its national target by addressing three separate sectors where renewable energy is used: electricity, heating and cooling, and transportation.
- In April 2009 the Lithuanian Parliament appointed a group of Parliament Members to draft the Law on Renewable Energy. The law should consolidate the legal basis for exploration and use of all means of the renewable energy as well as regulate the functions and the responsibility of the public institutions.
- It is expected that the proposals for the draft law and other possible legislation will be presented to the Parliament by the end of 2009.

The main provisions of the draft Law on Renewable Energy:

- Support energy production from RES and develop an efficient system for renewable energy promotion;
- Clarify and simplify requirements for the renewable energy businesses, guarantee more favourable regime for the renewable energy start-ups, promote expansion of the exciting renewable energy power plants;
- Implement the undertaken obligations in reducing climate change, ensure safe and non-detrimental energy supply and increase the usage of RES;
- Establish future objectives for renewable energy extraction;
- Improve the administration of RES and establish flexible system for renewable energy connection to the power networks;
- Stimulate healthy competition in the market for energy.

Production of electricity from renewable energy resources in Lithuania



Sources: 1. AB Lietuvos Energija (2006).
2. Forecast by the state enterprise Energy Agency for 2010.

The usage of biomass

- Biomass is one of the most promising types of RES in Lithuania. It consists of various plants and organic substances.
- Biomass is divided into:
  - Biofuel: biodiesel and bioethanol
  - Biogas
  - Energy crops
  - Wood

Biogas

- Around 1 million metric tons of industrial and household waste is produced in Lithuania each year. Biodegradable waste compounds 50% of that amount.
- Separated biodegradable waste could be used for the production of energy with annual biogas production potential of 87.4 million m^3 (524.4 GWh). For example, animal manure could be used in approximately 30 pig farms, 343 various companies, and 704 large cattle farms.
- However, currently not much is done in this field, because Lithuanians are still sceptical regarding this business and the majority of companies dispose of manure without showing interest in producing biogas energy.
- To date, less than 10 biogas power plants operate in Lithuania and recycle city sewer sludge, pig manure, and a variety of organic waste. The majority of them use biogas to produce electricity. In 2007 biogas composed only 0.02 % of all energy produced in Lithuania.
- This sector has great potential for development in the future especially now when the NCCPE approved EUR 0,086 per kWh tariff and the Lithuanian Association for Biogas was established.

Wood-based fuel

- Lithuania has a vast potential of wood-based fuels, as 31% of the country is covered by forest. As a result the plant biological mass (wood residues, straw, energy plants) is one of the most significant renewable energy sources, which comprises the important part of the local fuel.
- This can be estimated as a total wood stock of 378 million m^3, while the annual felling volume of wood is 6 million m^3.
- The consumption of wood fuel and wood waste fuel is around 3.7 million m^3. Wood accounts for 6 percent of the total energy produced in Lithuania.
- Most wood fuel is sawmill waste.
- Forestries have started selling logging waste and an increasing number of boiler operators use it for fuel.
- Timber potential has nearly been exhausted; however, there is still a lot of wood/logging waste available.
- The available resource of forest logging is around 1 million cubic m^3. In order to consume this in one year, a total capacity of 300 MW boilers would be required.

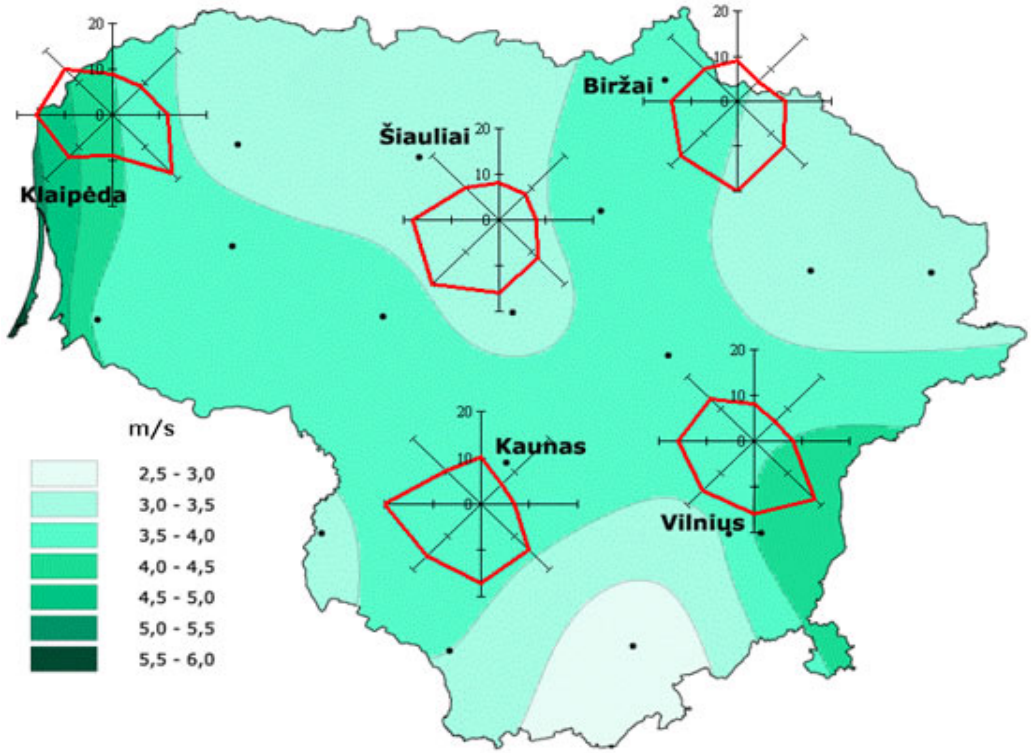
Hydro energy in Lithuania

- Hydropower resources that are available in Lithuania total 2.7 billion kWh per year.
- 8% of the hydropower energy comes from two major rivers – Nemunas River and Neris River.
- Currently there is only one large-scale Kaunas hydropower plant (HPP) in Lithuania located on the River Nemunas. It has a total capacity of 100 MW and total output of 375 GWh per year.
- To date more than 80 small HPP have been already built or are under construction. Their total capacity exceeds 14 MW and production amounts reach approximately 0,2 106 GJ of electricity per year.
- The value of annual production of electricity by all market players in the hydropower sector in Lithuania (in 2007) was EUR 6-7 million.
- However, only 14% of available hydropower resources are being used. This is only 0.3 % of total energy production in Lithuania.

Small-scale hydropower plants

- Although large hydropower plants are more economically efficient, their construction is more complex due to strict ecological and large investment requirements.
- As a result there is a significant growth in small-scale hydropower (the capacity of under 10,000 kW).
- The Government of Lithuania encourages private capital to renovate old hydropower plants and build new small ones on existing ponds.
- There are about 130 possible locations for building or renovating small hydropower plants in Lithuania, with a total possible power production up to 60 million kWh per year.
- The plants are expected to be renovated in 5 - 7 years.

Wind power resources in Lithuania



Source: Lithuanian Hydrometeorology Service

Wind speed at a height of 10 meters above the surface (meters per second)

Wind energy in Lithuania

- The Government of Lithuania is promoting wind energy, which is one of the most clean sources for producing electricity. For example, Lithuania participates in a power project aimed at creating proper conditions for efficient development of wind power production in the Baltic Sea region.
- In 2008, the total capacity of 36 wind power plants that operate in Lithuania was 52.3 MW, it amounts to 1% of the total electricity produced in Lithuania.
- Lithuania's National Energy strategy plans that by 2010 total power of wind plants will reach 200 MW and will amount up to 3% of the total energy produced due to obligations imposed by the EU to increase the share of electricity produced from renewable energy resources.

Future perspectives of wind power

- Lithuania plans to implement wind power projects in its territorial waters.
- Unfortunately, the coast line is only 99 km and is allocated for various types of use.
- The Strategic Committee for Energy made a decision that wind power facilities in the sea will be developed starting from 2010.
- Currently, a feasibility study is being prepared for this type of activity and an environmental impact assessment is being carried out to balance the interest of those engaged in sea transportation, fishing, and wind power production.

Geothermal energy

- Geothermal energy in Lithuania is produced from a water basin horizon at a depth of up to 100 meters in Klaipėda and Vilnius. Thermal output equals to 0.114 MWt.
- In 2007 there was produced produced 9 GWh of geothermal energy in Lithuania, which amounted to 0.013% of the total energy produced in Lithuania.
- Geothermal energy for heating private houses can be produced by installing heat pumps. At a depth of 1–1.3 m, pipes are installed that collect energy.
- 8% of the required heat energy of households could be produced in this way.
- Geothermal electric energy may be produced from hot dry rock available only in Western Lithuania, at a depth of 2.5 - 4.5 km.

Solar energy

- Lithuania receives 1,000 kWh/m2 (total: 65 million kWh) of solar energy per year. But more than 80 percent of it is distributed during the 6 months from April till September.
- There are some small private installations that use solar energy for their needs; however, at present there are no large photoelectric power plants operating in Lithuania.
- Due to Lithuania's geographical location, i.e. seasonal, daily, and meteorological changes, it is not expected to make its electricity requirements solely from photo electricity.
- The potential of photoelectric power plants is far greater than that of other renewable energy resources. Unfortunately, development of these power plants is impeded by a much higher price per watt of electricity than the price of a traditional power plant.
- However, we expect that situation might be substantially changed by implementing new technological principles and materials as well as establishing limitations for non-renewable energy resources.

Greenhouse gas emission trading scheme

- Provisions of the Emissions Trading Directive establishing the EU ETS have been transposed into Lithuanian law.
- It sets out, inter alia, the national institutional framework, procedure of allocation of greenhouse gas ("GHG") emission allowances ("Allowances") for operators, stipulates the emission permitting procedures for the installations, as well as establishes the grounds for operation of the national Greenhouse Gas Emission Allowance Registry (the "Registry").
- The key national authorities responsible for administrative tasks of the EU ETS are:
  - The Ministry of Environment (allocation of Allowances (together with the Ministry of Economy));
  - Public Enterprise Lithuanian Environmental Investment Fund (Registry management, auctions);
  - Regional Departments of Environmental Protection (issuing of permits, monitoring, inspection);
  - State Environmental Protection Inspectorate (monitoring, emission reports); and
  - The National Accreditation Office (accreditation of verifiers).

National GHG emission allocation plan

- The national allocation plan ("NAP") is the basis for allocation of Allowances to specific operators of the installations covered by the EU ETS.
- According to the NAP for 2008-2012, 44.26mt of Allowances will be distributed during the period (8.85mt per year):
  - 35.72mt of the Allowances will be distributed between the operating installations listed in the NAP;
  - 7.22mt will be placed in the reserve for new entrants;
  - 1.32mt will be placed in the reserve for Joint Implementation projects.
- Due to the forthcoming decommissioning of the Ignalina Nuclear Power Plant (NPP), a greater reliance on the remaining power plants as well as consequent increase of CO2 emissions was expected. As a result the EU agreed on slightly increasing the annual average quantity of Allowances for Lithuania.

Carbon capture and storage

- Currently there are no legal acts or legislative initiatives relating to carbon capture and storage (“CCS”) activities.
- CCS issues are occasionally analysed by Lithuanian scientists, expressing preference to the prospective sequestration of CO2 in monoclinal saline aquifers.
- However, it should be noted that to date economic conditions are not favourable enough for high-priced CCS projects in Lithuania.
- If any incentives regarding CCS activities appear, they would be deliberately implemented to the existing legislation.

Nuclear energy future in Lithuania

- The closure of Ignalina NPP is the biggest challenge to the energy sector development of Lithuania as currently it generates up to 70% of total electricity.
- The First Unit was decommissioned on 31 December 2004. The Second Unit is expected to cease operation by 31 December 2009.
- After the shutdown the plant is planned to be transformed into a radioactive waste storage facility.
- Following the closure of the Ignalina NPP, Lithuania will face a shortage of electricity which will be compensated by import.
- On 28 June 2007, the Parliament of Lithuania adopted the Law on Nuclear Power Plant which established a legal framework for the construction of a new nuclear power plant in Lithuania. Participation of Poland, Latvia and Estonia in the project is expected.
- The new power plant is envisaged to start operation in 2018.

Future plans

- Even after the decision to build a new nuclear power plant has already been taken by the Government, further development of the usage of renewable energy sources for electricity generation shall be given a considerable attention.
- Hydro power plants and the Kaunas Hydro Power Plant is expected to remain the main source of "green" electricity, however, the amount of wind power plants and electricity they generate is expected to increase significantly.
- Construction of electricity bridges with Poland and Sweden shall remain among strategic national projects with the aim of integrating Lithuania to Western Europe's and Scandinavian electricity networks, ensuring reliable supply of electricity, reducing country's energy dependence on Russian Federation after the decommissioning of Ignalina NPP and enhancing overall competitiveness of the electricity market.

Conclusions

- The main installations for heat production from renewable energy sources are biomass (wood, chips, wood waste, straw and biogas). Hydro is the main renewable energy source for power production. However, the use of wind energy for power production over couple past years has significantly increased.
- After 2009 Ignalina NPP will be closed down and the price of electricity is expected to increase. Therefore, there is a great need for a future development of the renewable energy field in Lithuania.
- It is expected that RES will become more attractive for energy producers, because payback time of RES plants is likely to decrease.
- Despite some inefficiencies in current regulation, it is expected that the new Law on Renewable Resources will shape simpler and more transparent administrative procedures, which will attract more investments and private capital in RES.

International awards

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Thank you!

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