LATEST DEVELOPMENTS ON RES POLICY, IMPLEMENTATION AND PLANNING IN LITHUANIA

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Status of RES Policy in LITHUANIA

The National Energy Strategy of Lithuania.

The Ignalina nuclear plant (INP) of capacity 2600 MW must be closed (It is requirement of EU).

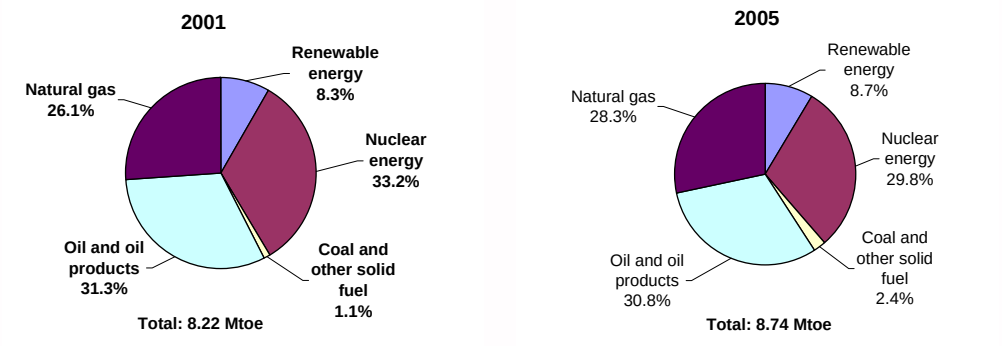
Already the first unit (capacity 1300MW) of INP is closed (in 2005).

The second unit (capacity 1300 MW) will be closed in 2009.

After that, the Lithuanian Thermal Power Plant (capacity 1800 MW) will become the major source of electricity.
For this reason there will be increased the use of RES in Lithuania

Status of RES Policy in LITHUANIA

Energy gross inland consumption structure in Lithuania



Status of RES Policy in LITHUANIA

In Lithuania there are used such kinds of RE, which are traditional for our country such as

- **firewood;**
- **wood waste;**
- **straw;**
- **hydro energy.**

Biofuels

Two years ago in Lithuania the biofuel was begun to produce and use
(The requirement of the EU Directive 2003/30/EC on promotion of the use biofuels for transport)

The policy of Lithuania in the area of biofuels is:

Up to 2010 biofuels should comprise not less than 5.75% of fuel existing in the market.

In Lithuania there were erected some plants for production of biofuels as well as

- **Bioethanol and**
- **Biodiesel.**

Status of RES Policy in LITHUANIA

Other kinds of RES

There are erected pilot projects of

- **wind energy;**
- **biogas;**
- **geothermal energy;**
- **solar energy and other ones.**

In Lithuania there are most popular such projects as well as:

- **hydro energy,**
- **plants of combustion biomass, and**
- **in last time wind energy.**

In Lithuania RE is used for production heat and electricity.

SUPPORT MEASURES FOR RES USE IN LITHUANIA

According to legislation requirement the companies of electricity supply network must:

1. Purchase the electricity produced from RES in Lithuania.
(It is possible to realize not exceeding of the established government quota).

1.1. There is fix purchase process according to quata up to 2010 years or sometimes for longer time. There is such price for:

- Wind energy - 22 ct LTL/kWh (6.37 ctEuro/kWh);
- Hydro energy– 20 ct LTL/kWh (Capacity of hydro power plants is less as 10 MW);
- Bioenergy – 20 ct LTL/kWh (5.79 ctEuro/kWh).

1.2. Without quota for wind turbine capacity less as 250 kW
Later than 2010 year there will be market conditions.
(1ct = 0.01 LTL, 1EURO = 3.45 LTL)

Wind Turbines

Only in 2004 the first wind turbine capacity 600 kW was erected in Lithuania.

In 2006 the first wind park of 8 turbines capacity 2 MW each was erected and connected to electricity network.

According to government resolution till 2010 in Lithuania there will be erected 200 MW total capacity of wind turbines.

SUPPORT MEASURES OF RES IN LITHUANIA

Hydro energy

In Lithuania there are large and small hydro power plants (HPP)

Large HPP(capacity more as 10MW):

Kaunas HPP
Total capacity 105 MW;
Production in 2005 384.6 GWh.

Small HPP (capacity less as10MW)

In 2005
Number: 77
Capacity 24.8 MW
Production 66.1GWh

Biogas

In Lithuania there are some biogas pilot cogeneration units for the production heat and electricity. They are:

Company "Vycia" in Kaunas
1 unit capacity 185 kWel./300 kWheat

Waste Water Treatment Plant in Utena
1 unit capacity 275 kWel./440 KWheat

In JSC "Rokiskio suris" in Rokiskis.
2 units 165 kWel./264 kWheat

SUPPORT MEASURES OF RES IN LITHUANIA

The National Energy Strategy establishes a strategic
(It approved by Seimas of the Republic of Lithuania).

According to this Strategy the use of RES in Lithuania would increase up 12 % in the primary energy balance by 2010.

With regard to the requirements of the European Parliament and Council Directive 2001/77/EC "Regarding promotion of electricity production from RES"

In Lithuania there is the national target to produce 7% of electricity from RES by 2010.

In 1992 Lithuania together with 154 other countries has signed
The United Nations (UN) Framework Convention on Climate Change (FCCC) in Rio de Janeiro and
Others documents compliant with EU environment policy.

Lithuanian Parliament ratified the Convention in 1995 and
The Lithuanian Government approved FCCC National Programme in 1996.The major goals of Lithuanian government are:

- **to reduce the import of energy resources,**
- **to reduce the climate change impact,**
- **to cut the CO_2 emissions as well as address other environmental issues.**

SUPPORT MEASURES OF RES IN LITHUANIA

National Energy Efficiency Programme,

This is Special Programme as financing instrument for implementation of actions related to energy saving and utilisation of local and renewable energy sources.

There are such main goals of the programme:

1. Developing, revising and updating studies and programmes for utilization of local, renewable and waste energy resources and organizing their implementation.

2. Analyzing and assessing the implemented projects on utilization of local and renewable energy resources.

3. Implementing demonstrational solar and wind energy projects and continuing implementation of other projects on utilization of RES
4. Developing methods and schemes for collecting wood residue and straw for fuel, evaluating and implementing the methods and schemes.

5. Producing equipment that uses local and renewable energy resources while providing necessary assistance to the companies producing the equipment

A comprehensive policy on alternative energy was formulated during ten years (1990 – 2000).
A strategy to promote the use of alternative energy sources like biomass, small hydropower, biogas, wind energy, etc have been adopted.

The National Energy Strategy is renewed every five year.

LEGISLATION BASE

The major legal acts relevant to local and renewable energy sources (RES) have been selected and revised. These acts include:

- **National Energy Strategy,**
- **Law on Energy,**
- **Law on Electricity,**
- **Law on Biofuel, Biofuels for Transport and Bio-oils**
- **Law on Heat, and**
- **others.**

Large cluster of environmental acts.

1.The 21 January 1992 Law No. I-2223 (1996, 1997, 2000, 2001) of the Republic of Lithuania "On Environmental Protection";

2.The 4 November 1999 Law No. VIII-1392 of the Republic of Lithuania "On Protection of Air";

3.The 16 August 1996 Law No. I-1495 (amended in 2000) of the Republic of Lithuania "On Environmental Impact Assessment of Planned Economic Activities)";

4.Ministry's of Environment Order No 387 on Setting Rules on Natural Resources Usage, Permitting and Setting Standards for the Pollutants of 30 11 1999 (LAND 32 - 99;
5.The 22 November 1994 Law No I-671(amended in 2001) of the Republic of Lithuania "On Forests";

6.The 13 May 1999 Law No. VIII-1183 (amended in 200, 2002) of the Republic of Lithuania "On Taxes for Pollution of the Environment";

and other ones.

SUPPORT MEASURES OF RES IN LITHUANIA

Table 1. Overview of Lithuanian renewable energy policy

NAME OF POLICY	POLICY TYPE	RENEWABLE ENERGY	DATE	LEVEL OF ACTION
Law on Energy	**Promotion**	**All renewables**	**May 2002**	**National**
Law on Electricity	**Promotion**	**All renewables**	**July 2000**	**National**
Law on Heat	**Promotion**	**All renewables**	**May 2003**	**National**
Law on Biofuels and Biooils	**Promotion**	**Biomass**	**May 2000**	**National**
National Energy Strategy	**Targets, opportunities, actions**	**All renewables**	**Effective from October, 2002**	**National**
National Energy Efficiency Programme	**Implementation demonstration**	**All renewables**	**Effective from2001 to 2005**	**National**
Law on Monitoring of State Aid to Undertakings	**Environmental; grants**	**All renewables**	**Effective From May, 2000**	**National, regional**
Eco-Plants Feed-In Tariffs	**Feed-in**	**small hydro, biomass, wind**	**Effective From February 2002**	**National**
Public Service obligations	**Purchase (heat, electricity); competition (heat)**	**All renewables**	**Effective from 2002 (electricity); from 2003 (heat)**	**National**
Renewable Energy Targets	**Support of connection-to-grid cost**	**wind, small hydro, biomass, solar photovoltaic, waste**	**Effective January 2004**	**National**

RENEWABLE ENERGY RESOURCES

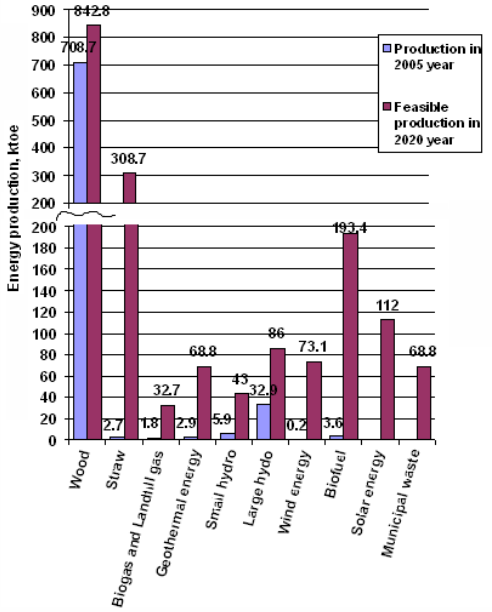
Refering to studies made by local and foreign specialists, the feasible potential of RES and local energy sources was established. Prospects for utilization of these resources for energy production was evaluated.

Table 1. Energy gross inland consumption and prospects of utilization using of RES

Sort of RE sources	*Gross consumption Thous. t of oil equivalent*					*Prospects of utilization Thous.t. of oil equivalent*	
	2001	*2002*	*2003*	*2004*	*2005*	*2010*	*2020*
Firewood and wood waste	654.4	659.3	672.3	694.7	708.7	817	842.8
Agriculture waste (straw)		2.9	3.8	3.9	2.7	43	308.7
Bioethanol (used to mix with gasoline)	-	-	-	0.1	0.8	20.5	71
Biodiesel (methyl-ester)	-	-	-	0.7	2.8	35.2	122.4
Biogas		1.5	1.8	1.6	1.8	12	24.1
Landfill gas	-	-	-	-	-	-	8.6
Wind energy	-	-	-	0.1	0.2	23.9	73.1
Geothermal energy	-	9.5	3.0	2.9	2.9	9.5	68.8
Small HPP	3.5	3.1	3.5	5.3	5.9	11.5	43
Large HPP	24.5	27.3	24.5	30.9	32.9	28	86
Solar energy*							112
Municipal waste	-	-	-	-	-	-	68.8
Total	682.4	703.6	708.9	740.2	758.7	1000.6	1829.2
Gross inland consumption of total primary energy	8222.1	8783.2	9164.7	9284.0	8737.6	9200	9400

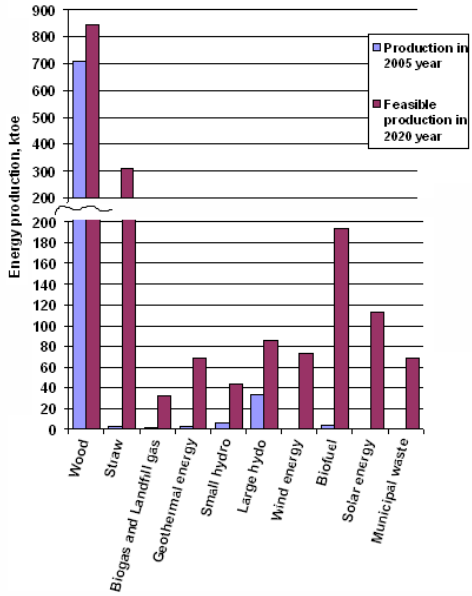
* There are pilot equipments
HPP id Hydro Power Plant

RENEWABLE ENERGY RESOURCES



Renewable energy production breakdown by source and feasible production using total potential RES for future utilization in 2020.

RENEWABLE ENERGY RESOURCES



Renewable energy production breakdown by source and feasible production using total potential RES for future utilization in 2020.

RENEWABLE ENERGY RESOURCES

Table 2. Wood resources for production of energy in Lithuania.

Short description of country		
1.1 population	[mill]	3.5
1.2 area .	[ha]	6,530,000
1.2 forested area	[ha]	2,045,300
1.4 energy plantation area	[ha]	About 300
2. Wood fuel for energy production potential		
2.1 wood	[m^3/y]	Total potential of wood felling (2020) – 7.4 million m^3 solid volume; Total potential of wood for energy (2010) – 5.15 million m^3 solid volume.
2.2 energy plants	[m^3/y]	no data
3. Estimated installed capacity		
3.1 boilers of capacity 10 – 20	[kW]	No data (initial stage)a
3.2 boilers of capacity 20 –1000	[kW]	13,380 kW installed in 23 boiler-houses up 2003, wood waste only
3.3 boilers of capacity > 1000	[kW]	237,720 kW installed in 44 boiler-houses up 2003, wood waste only
4. Annual wood production		
4.1 wood chips	[t/y]	525,000 (20 % content of moisture) equivalent to 1.0 million m^3 solid volume
4.2 wooden logs	[t/y]	2,900,000 (40 % content of moisture) equivalent to 4.2 million m^3 solid volume
4.3 energy plant chips	[t/y]	No data
4.4 industrial wood waste	[t/y]	813,000 (20 % content of moisture) equivalent to 1.55 million m^3 solid volume
5. Share of wood energy in country energy balance in 2005	[%]	8.1

STATUS OF THE IMPLEMENTATION OF THE RES TECHNOLOGIES

Market problems:

The market for wood chips and other wood residues is growing.
The same is characteristic to straw.

The price of wood waste is expected to rise.

The probable import of cheaper wood chips from Belarus is deemed as stop the growth of price.

The investment to wood waste burning technologies is rather large and makes even the greater impact on utilisation of wood waste as price of fuel;

In Lithuania there is no good conditions for development wind energy, there are big environment restrictions for construction wind parks, also there must be used big funding for the reconstruction of the electricity network. The threshold is 200 MW capacities of erected wind turbines up to 2010 year and 500 MW up to 2020.

The real potential of hydro energy is reduced according to the environment requirements. In this moment the construction of the large HPP on big rivers is forbidden and the best small rivers for hydro energy are included into the protected environment zones.

CONCLUSIONS

The most efforts in Lithuania were aimed at developing biomass (wood, chips, wood waste, straw, biogas) and small hydro projects and their subsequent implementation. In 2005 the total capacity of installed wood-chip-fuelled boilers reached above 450 MW. No serious obstacles can be seen for extension of wood fuel usage. Prices of fuel market depend on local conditions as well as of the number fuel consumers, capacity of installed of the wood burning boilers, etc. There is created local industry for production biomass combustion equipment.

Electricity production from local and RE sources is based on hydro energy. Lithuania has one large (105 MW) and a lot of small capacity (less as 10 MW) hydro plants. Installed total capacity of small hydro plants is above 24.8 MW.

There is only initial stage for production electricity in cogeneration utile from biomass, biogas and in wind parks.
In this moment according to Lithuanian government decision is done big progress for the installation of wind turbine. Till 2010 installed capacity of wind parks will encompass 200 MW.

The structural analysis of usage biomass shows that it is used mainly for heating energy production. At last time the biomass is begun to use into CHP for production of heat and electricity. In 2006 the reconstruction of Vilnius CHP-2 will be finished. There will be erected capacities
12 MW_{el} / 36 MW_{heat}

Thank You for Attention