Renewable energy in Lithuania

Opportunities and obstacles

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LITHUANIA
information about the country
Lithuania
information about the country

- Area: 65,300 km²
- Population: 2,94 million
  (like 2/3 of Kentucky state)

GDP per capita $26,700 (Kentucky – $33,400)

Gross energy consumption per capita 94 mln Btu (Kentucky - 427 mln Btu)
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Total gross energy consumption of Lithuania (toe)

- Other (toe)
- Net-import of electricity (toe)
- Net import of oil and oil products (toe)
- Imported natural gas (toe)
- Renewable energy (toe)

Closure of Ignalina NPP

2007: 9,000,000 toe
2008: 8,000,000 toe
2009: 7,000,000 toe
2010: 5,000,000 toe
2011: 3,000,000 toe
2012: 2,000,000 toe
2013: 1,000,000 toe

2007: 2,160,000 toe
2008: 2,160,000 toe
2009: 2,410,000 toe
2010: 1,120,000 toe
2011: 0,600,000 toe
2012: 0,690,000 toe
2013: 0,600,000 toe
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Share of RE in final energy consumption of Lithuania

EU RE directive target for Lithuania (23% in 2020) is almost reached

Highest growth potential

- RE power
- RE in transport
- RE in DH
- Final consumption of biomass

2007  2008  2009  2010  2011  2012  2013
17.6%  18.6%  19.96%  19.72%  20.23%  21.73%  22.95%
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Power generation/consumption in Lithuania

Power sector represents 21.3% of final energy consumption of Lithuania

59.3% of power is imported (mainly from Estonia and Russia)

Nuclear (GWh)
Other generation (GWh)
Thermal PPs (gas and oil) (GWh)
Hydro Accumulation PP (GWh)
Renewable energy (GWh)
Gross energy consumption (GWh)

11707 GWh
1422 GWh

29.9% of total generation
15.9% of final consumption
12.1% of gross consumption
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information about the country

POWER SUPPLIED TO GRID FROM RENEWABLE ENERGY SOURCES IN LITHUANIA
(KWH)

Installed capacities on 2014 10 17:
- 67,5 MW
- 22,8 MW
- 76,0 MW
- 284,0 MW
- 26,8 MW
- 101 MW
LITHUANIA
information about the country

Use of renewable energy in Lithuanian District Heating sector
(Heat generated in GWh)

District heating sector represents 16.7% of final energy consumption of Lithuania

- District heating sector (GWh)
- Use of RE in District heating sector (GWh)

3070 GWh (33.4%)
Further possibilities (approved)

- **New on-shore wind power plants**
  Capacities 220 MWp
  Planned generation:
  0,65 TWh(p) (+ 7,3% of final consumption of LT)
  **UNDER CONSTRUCTION**

- **New biomass CHP plants in Vilnius and Kaunas**
  Capacities (total): 189 MW(p) + 408 MW(h)
  Planned generation:
  1,09 TWh(p) (+ 12,2% of final consumption of LT)
  2,49 TWh (h) (+ 27,1% of DH demand of LT)
  **UNDER PLANNING**

- **New small scale biomass and biogas power plants**
  Capacities 30 MW(p)
  Planned generation:
  0,20 TWh(p) (+ 2,2 % of final consumption of LT)
  **UNDER PLANNING/CONSTRUCTION**

- **Number of new biomass boilers in DH**
  **UNDER PLANNING/ CONSTRUCTION**
Is everything OK?
Is it enough?

**THE ANSWER IS – NO!**
Development is uneven and disharmonious
Development is uneven and disharmonious
LITHUANIA - Potential for renewable energy development
Lithuania - large biomass resources available (I)

Forests available for forestry (ha) / Final heat and power consumption (TWh)

Indication of wood biomass potential
Lithuania - large biomass resources available (II)

Crop yields (th. t) / (divided by)
Final heat and power consumption (TWh)

Indication of straw potential
Lithuania - large biomass resources available (III)

Animal and plant waste (th. t) / (divided by)
Final heat and power consumption (TWh)
Lithuania - favourable ratio (for cogeneration) of centralized heat and power

Approx. 50% of heat is supplied by DH systems
Cold climate
Low power demand (economy based on service sectors)
Lithuania – windy country


<table>
<thead>
<tr>
<th></th>
<th>Area with average wind speed at 50 m high &gt; 5.8 m/s [th. km²]</th>
<th>Gross power consumption in 2009 metais [TWh]</th>
<th>[km² / TWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE</td>
<td>26.0</td>
<td>580.2</td>
<td>45</td>
</tr>
<tr>
<td>LT</td>
<td>1.9</td>
<td>12.4</td>
<td>156</td>
</tr>
<tr>
<td>LV</td>
<td>4.3</td>
<td>7.2</td>
<td>561</td>
</tr>
<tr>
<td>EE</td>
<td>19.2</td>
<td>8.9</td>
<td>2169</td>
</tr>
<tr>
<td>LT+ LV+ EE</td>
<td>25.4</td>
<td>28.5</td>
<td>892</td>
</tr>
</tbody>
</table>
Lithuania – sunny country

Global horizontal irradiation
Great power interconnections allows easy integration of large amount of VRE power

- Total peak demand of Baltic countries is about 4500 MW

- Interconnections:
  - to Finland about 900 MW
  - to Russia about 1600 MW
  - to Belarus about 1350 MW
  - to Sweden 700 MW (from 2016)
  - to Poland 1000 MW (from 2016)
  - in TOTAL: about 5550 MW

- Kruonis hydro accumulation plant is available (900 MW + expansion planned)
  + Estonian planned new hydro accumulation plant
  + Latvian large hydropower plants
Baltic countries is the best place for renewable energy in EU!
Further possibilities (discussed)

- **Additional new on-shore wind power plants**
  Capacities: 350 MWp
  Planned generation:
  1,05 TWh(p) (+ 12 % of final consumption of LT)

- **Offshore wind power plants in Baltic sea**
  Capacities: up to 1000 MW(p)
  Planned generation:
  up to 4 TWh(p) (+ up to 44% of final consumption of LT)

- **New small scale biomass and biogas power plants**
  Capacities 150 MW(p)
  Planned generation:
  0,75 TWh(p) (+ 8 % of final consumption of LT)

- **Small scale solar PV plants**
  Capacities up to 500 MW(p)
  Planned generation:
  up to 0,5 TWh(p) (+up to 6% of final consumption)

- ...... other

RE power production will be larger than final power demand of Lithuania!
EXISTING OBSTACLES
Existing obstacle – Way of thinking of majority of politicians

“Scandinavian”

External benefits (green jobs, added value to economy, etc.) and external cost (climate change, pollution) are considered

Goal: lowest share of energy expenditures (incl. external cost) in the incomes of coming generation

“Eastern European”

EU directive requirements are considered

Goal: lowest price of energy today
Existing obstacle – Way of thinking of majority of politicians

“Scandinavian”

Concentration on creation of system where every consumer and investor is motivated to behave in the way what is most beneficial for the society

“Eastern European”

Concentration on implementation of large strategic energy projects

Some of them are good, some of them are not...
Some of them are obstacles for RE development even when they are not implemented...
WHAT ARE THE NEXT STEPS?
• High level study on estimation of external cost and benefit of development of renewable energy in Baltic states

• Common energy strategy of Baltic states

• Creation of system for public funding of RE development

• Attracting of EU and US investors into RE sector of Baltic countries (including technology development and production...)

Thank you for your attention!

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