LIETUVOS ATSINAUJINANČIŲ IŠTEKLIŲ ENERGETIKOS KONFEDERACIJA

Renewable energy development in Lithuania

Experience, mistakes, lessons

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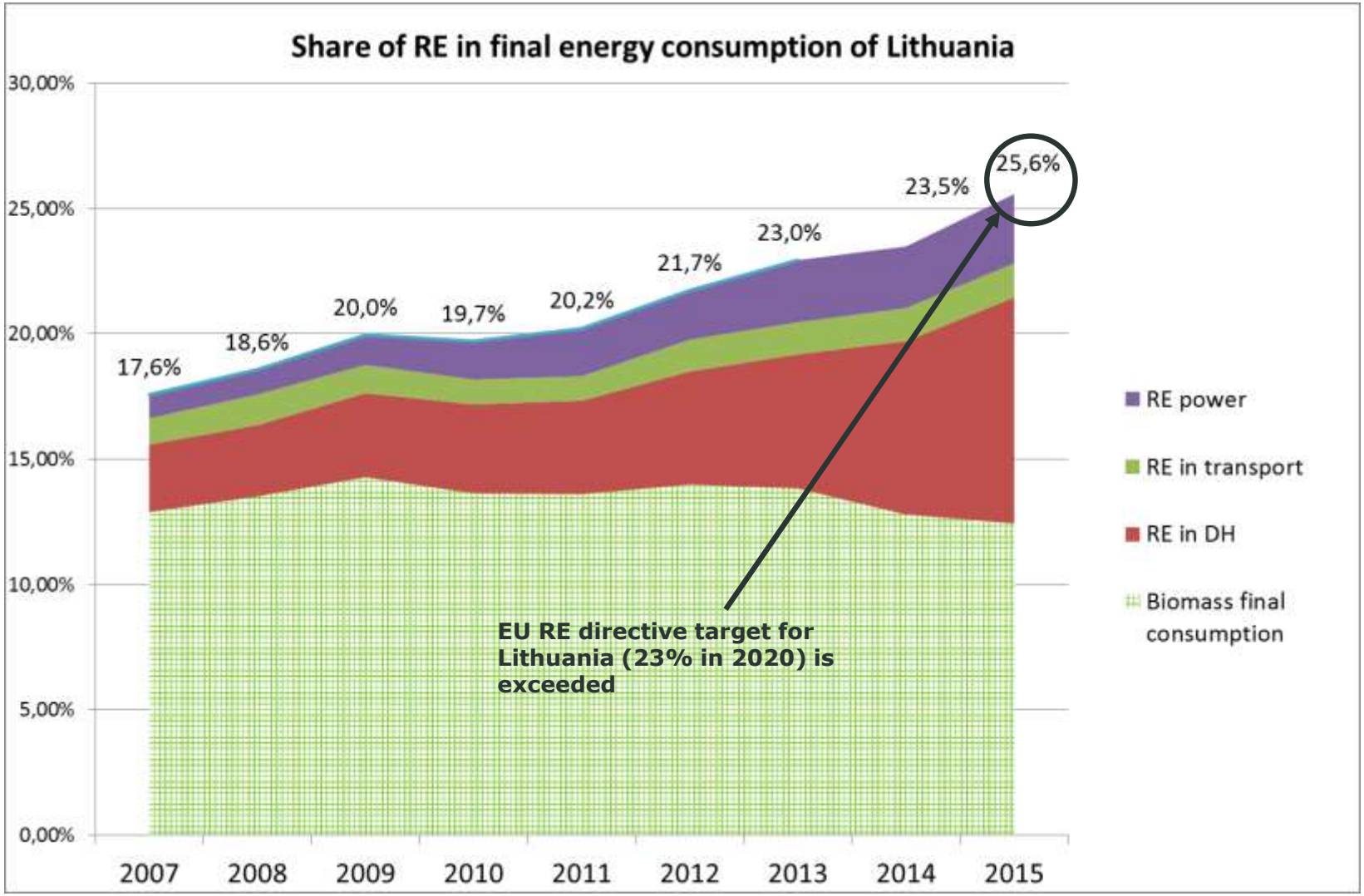
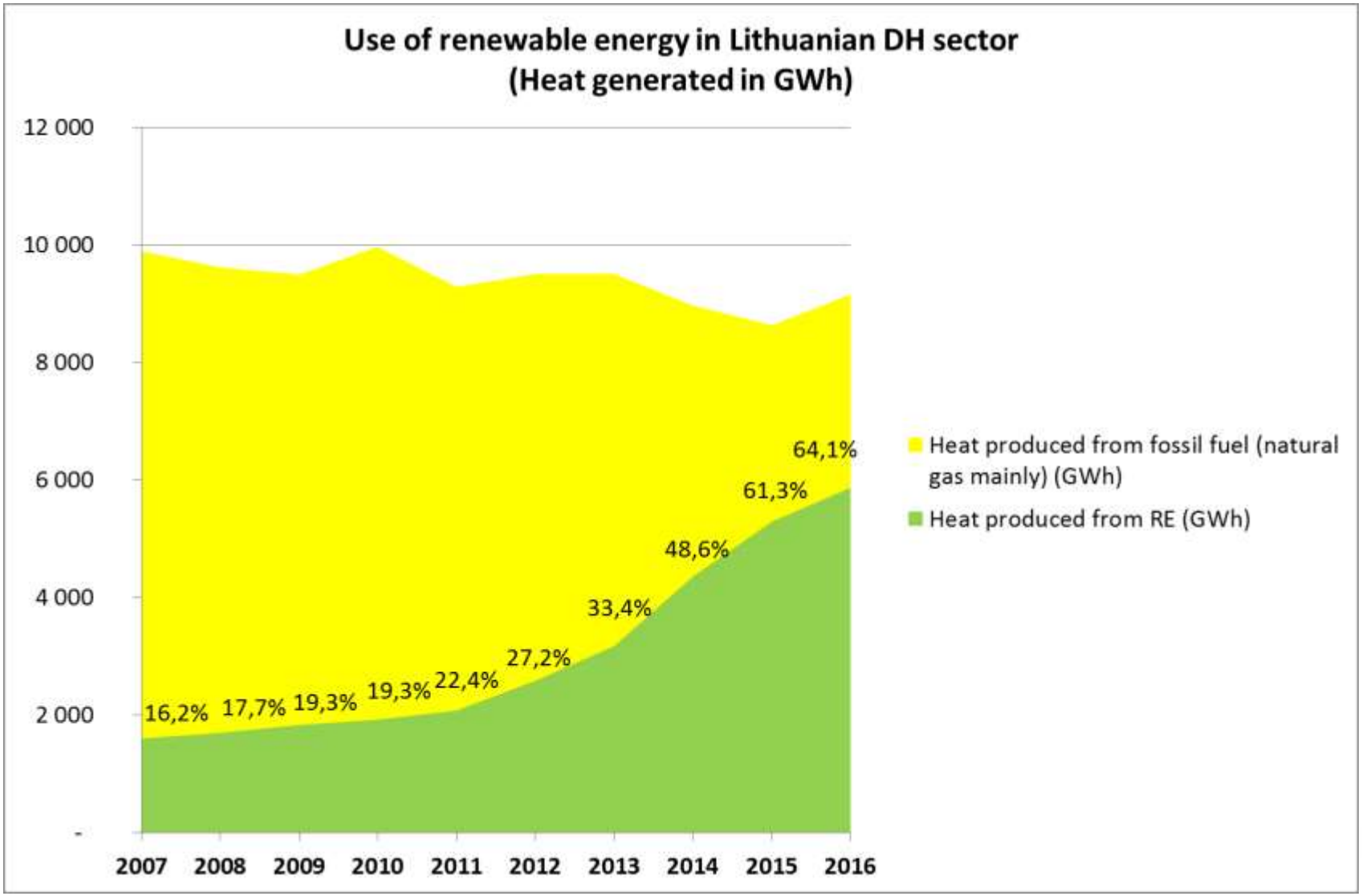
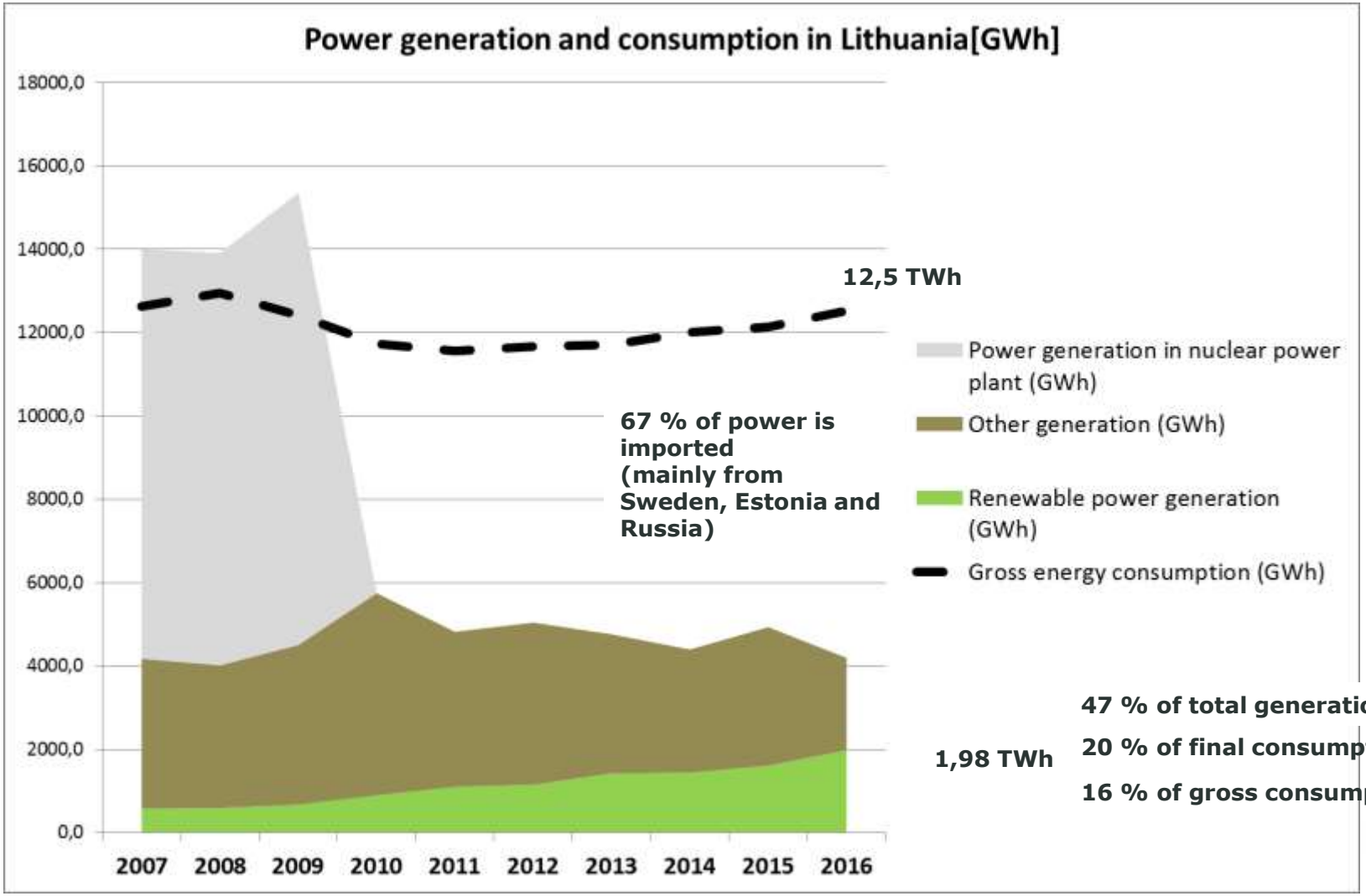
LITHUANIA
Data on renewable energy generation


Share of RE in final energy consumption of Lithuania
30,00%
25,00%
20,00%
15,00%
10,00%
5,00%
0,00%
17,6%
18,6%
20,0%
19,7%
20,2%
21,7%
23,0%
23,5%
25,6%
2007
2008
2009
2010
2011
2012
2013
2014
2015
EU RE directive target for Lithuania (23% in 2020) is exceeded
RE power
RE in transport
RE in DH
Biomass final consumption

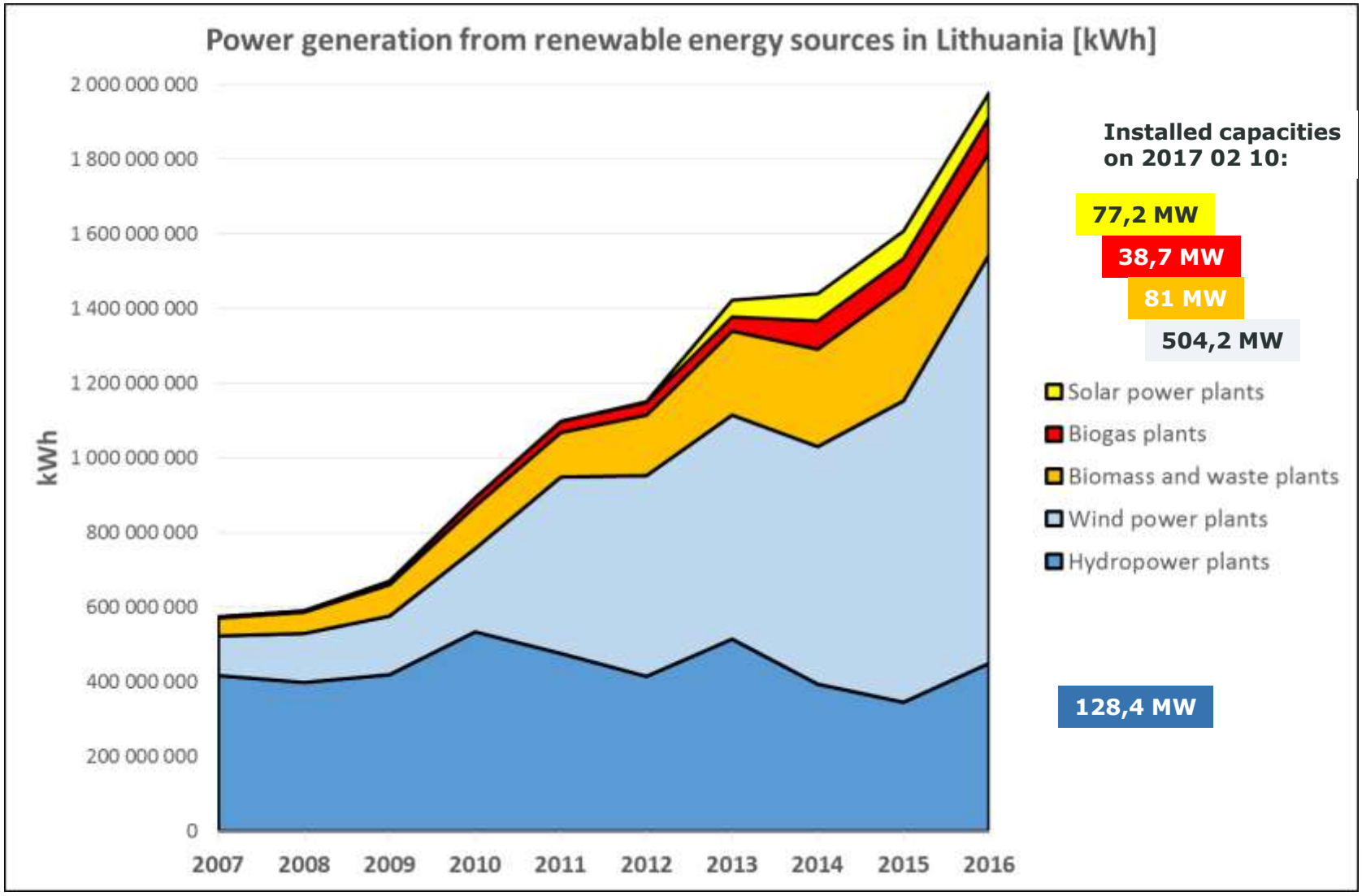
Heat supply to District Heating systems



Power generation and consumption



Power from renewable energy generation



Top 10 EU Member States wind markets relative to their power consumption
(ratio installed capacity in 2016/average 2016 power consumption)

RANKING	COUNTRY	RATIO
1	Lithuania	15.7%
2	Ireland	12.8%
3	Germany	10.0%
4	Netherlands	7.1%
5	Finland	6.2%
6	Denmark	6.0%
7	Portugal	4.8%
8	Greece	4.1%
9	Poland	3.6%
10	Sweden	3.2%

LITHUANIA

IS THE EU MEMBER STATE WITH MOST 2016 INSTALLATIONS RELATIVE TO ITS POWER CONSUMPTION

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Long term forecast of development of renewable energy

Potential of renewable energy development of Lithuania

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Fraunhofer ISI

Energy Economics Group

ECOFYS

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SEURECO

Employment and growth effects of sustainable energies in the European Union

FINAL REPORT

Contract no.: ENER/C1/428-2012

The project funded by the European Commission, DG Energy, under contract ENER/C1/428-2012

Delivered: August 2014

Renewable energy development effect on economic growth

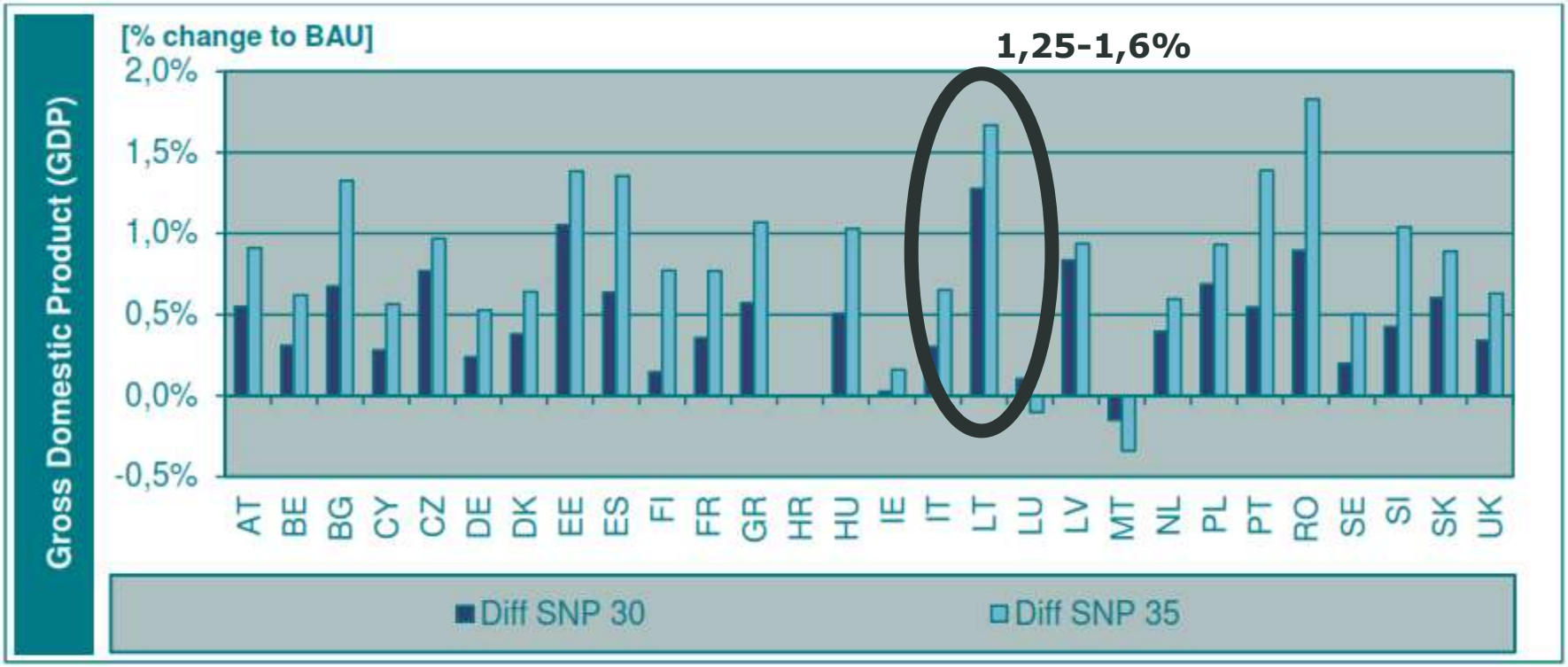


Figure IV-3: Member States GDP, % deviation compared to BAU, average 2021-2050 based on NEMESIS

Forecast of renewable energy generation in 2050

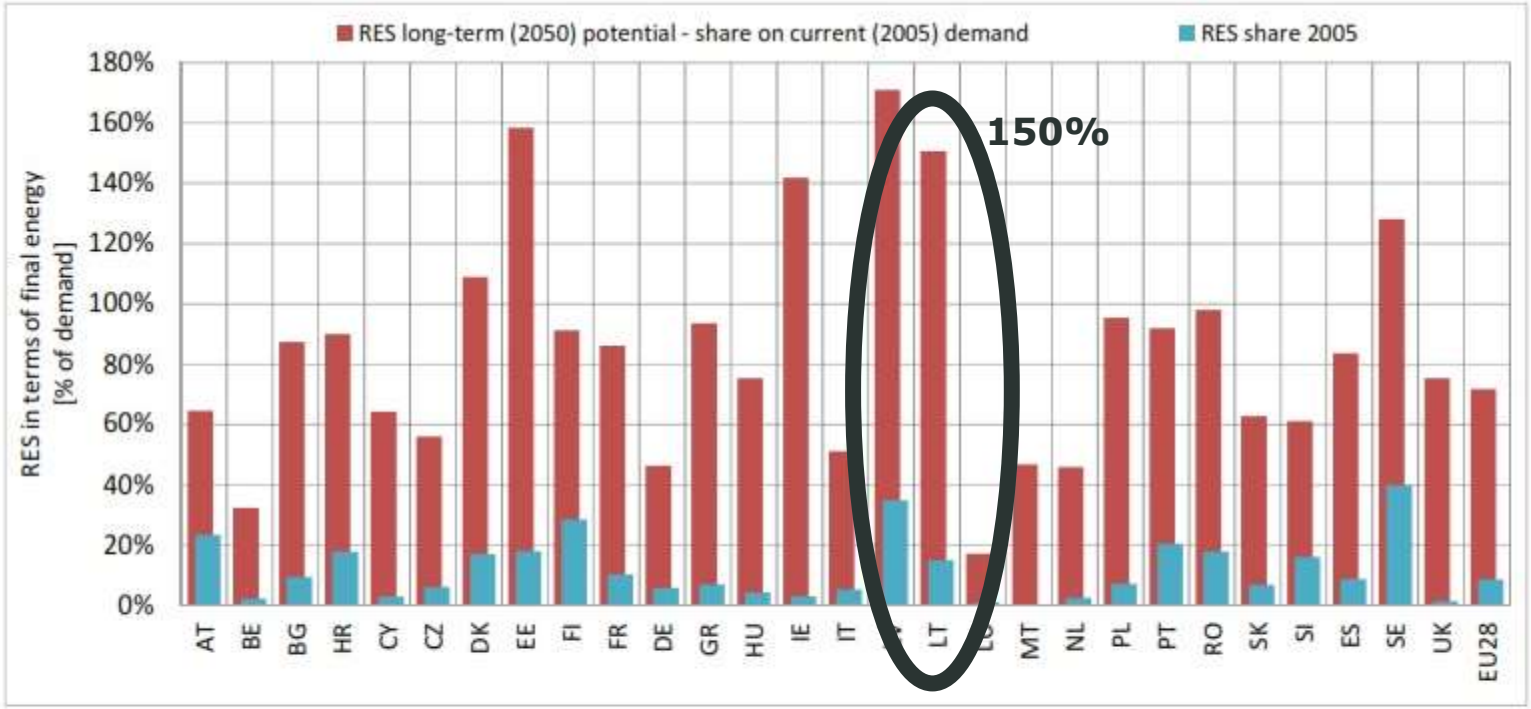


Figure V-6: Achieved (2005) and total long-term (2050) potential for RES in terms of final energy for all EU Member States (EU 28) – expressed in relative terms, as share on (gross) final energy demand

Forecast of power from renewable energy generation in 2050

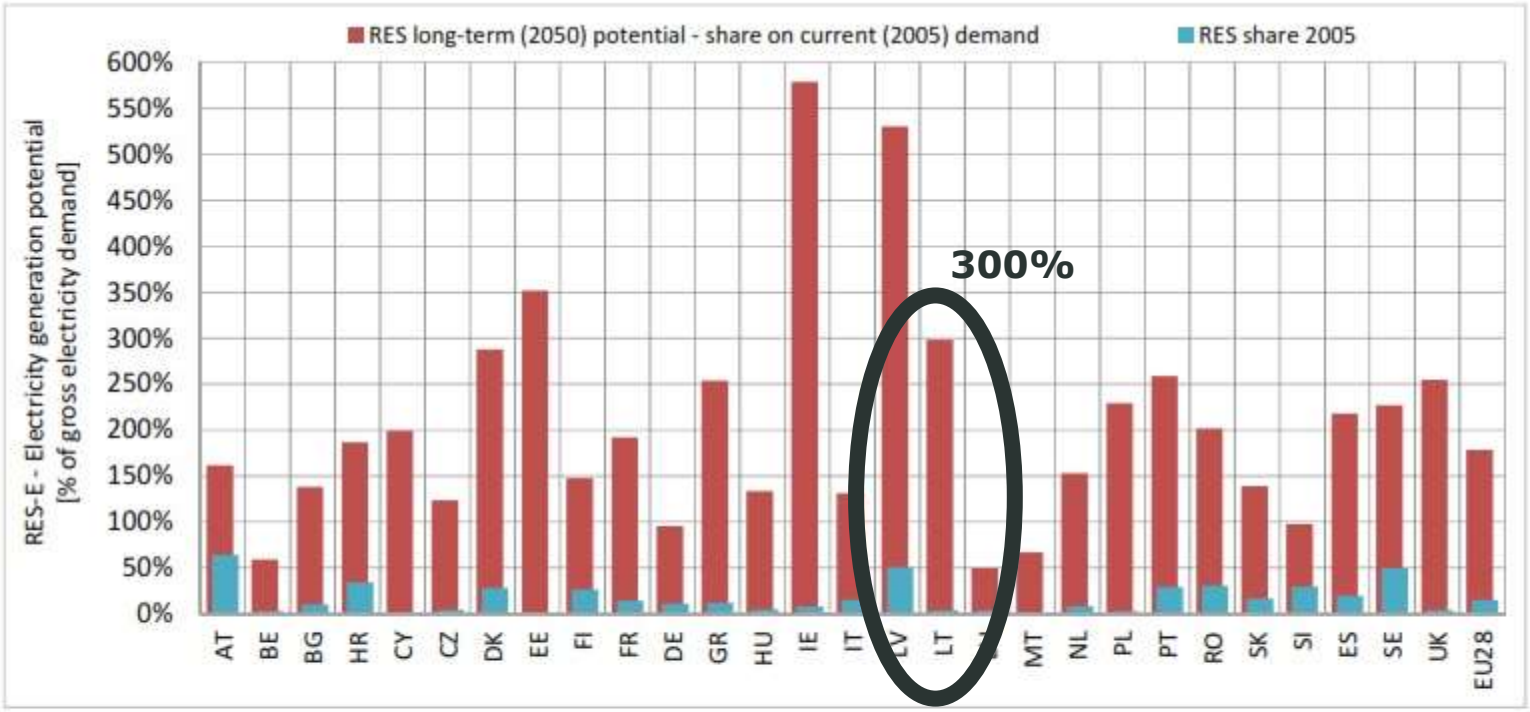
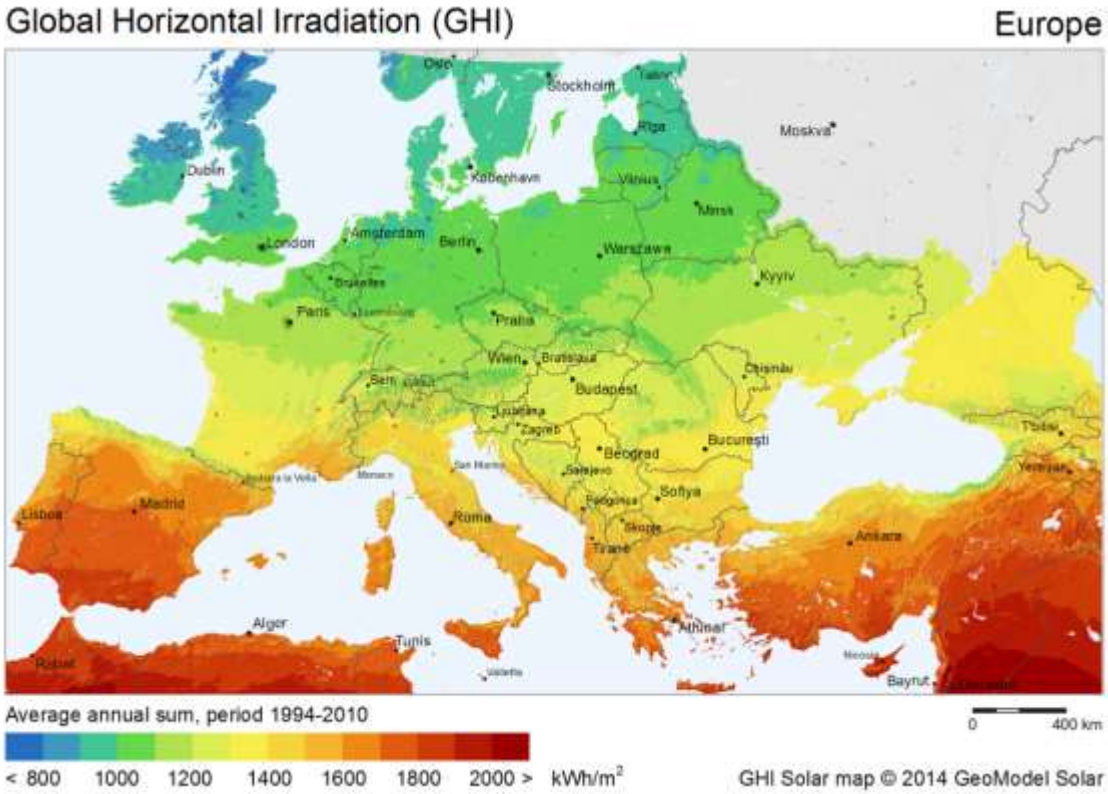


Figure V-10: Total realisable long-term potentials (2050) and achieved potential for RES-E in EU 28 countries as share of gross electricity demand (2005).

Conditions for solar energy



http://solarelectricityhandbook.com/solar-irradiance.html

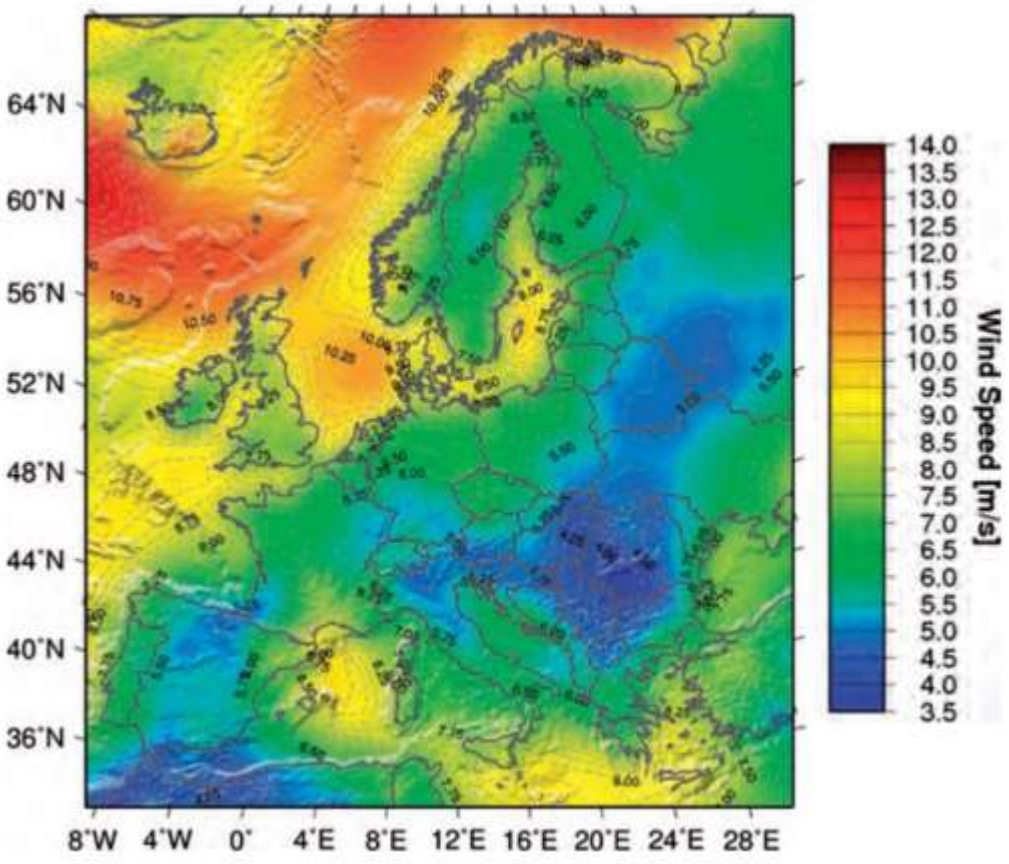
Solar Irradiance (facing directly south kWh/m2)

Valletta	1915
Nicosia	1881
Lisbon	1760
Roma	1687
Madrid	1593
Athens	1553
Tbilisi	**1371**
Sofia	1359
Bucarest	1327
Zagreb	1286
Ljubljana	1234
Budapest	1226
Bratislava	1158
Vienna	1158
Klaipėda	**1139**
Paris	1137
Amsterdam	1099
Copenhagen	1060
Tallinn	1052
Stockholm	1050
Riga	1050
Warsaw	1037
Praha	1036
Brussels	1036
Vilnius	1003
Helsinki	1000
Berlin	994
London	990
Dublin	883

Conditions for solar energy

- Area of roofs of all buildings in Lithuania (2015): 204 938 098 m2
- Solar panels covering 33% of the area could produce **100%** of Lithuanian power demand

Conditions for wind energy



	Area where average wind speed > 5.8 m/s [th. km2] National Renewable Energy Laboratory (US)	Annual power consumption (2015) [TWh]	[km2/ TWh]
DE	26.0	597	44
LT	1.9	10,8	176
LV	4.3	6,7	642
EE	19.2	8,0	2400
LT+ LV+ EE	**25.4**	**25.5**	**996**

Wind energy conditions in Lithuania are 4 times better than in Germany!

If installed wind power density (MW/km2) in Lithuania was identical to the situation in Germany, wind power plants in Lithuania would produce 200% of total power demand of Lithuania!

Great power interconnections allows easy integration of large amount of VRE power

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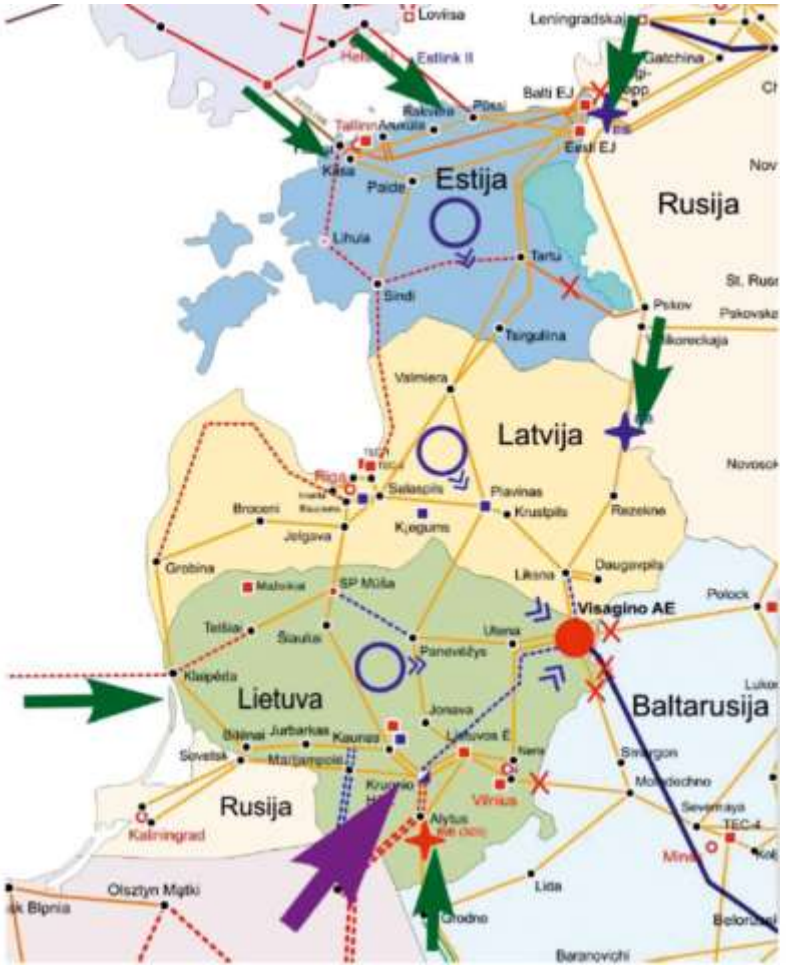
- Total peak demand of Baltic countries is about 4500 MW

- Interconnections:

  to Finland about 900 MW
  to Russia about 1600 MW
  to Belarus about 1350 MW
  to Sweden 700 MW
  to Poland 1000 MW
  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



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Baltic countries is the best place for renewable energy in EU!

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Experience

Renewable energy support schemes

- **Investment subsidies** (EU funds, budget, climate fund)
  - Subsidized biomass boiler houses in DH sector, biomass CHP plants, biogas plants, individual pellet boilers in housing, small solar collectors in housing, ...
  - Maximum intensity and requirements for subsidy receivers set, then selection of subsidy receivers were carried out by responsible authority

Renewable energy support schemes

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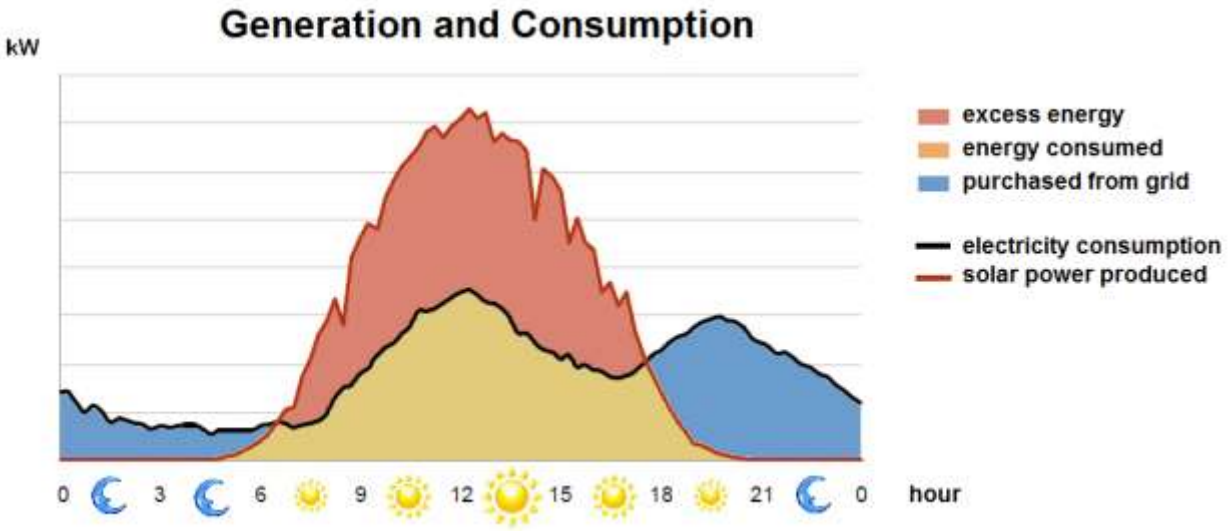
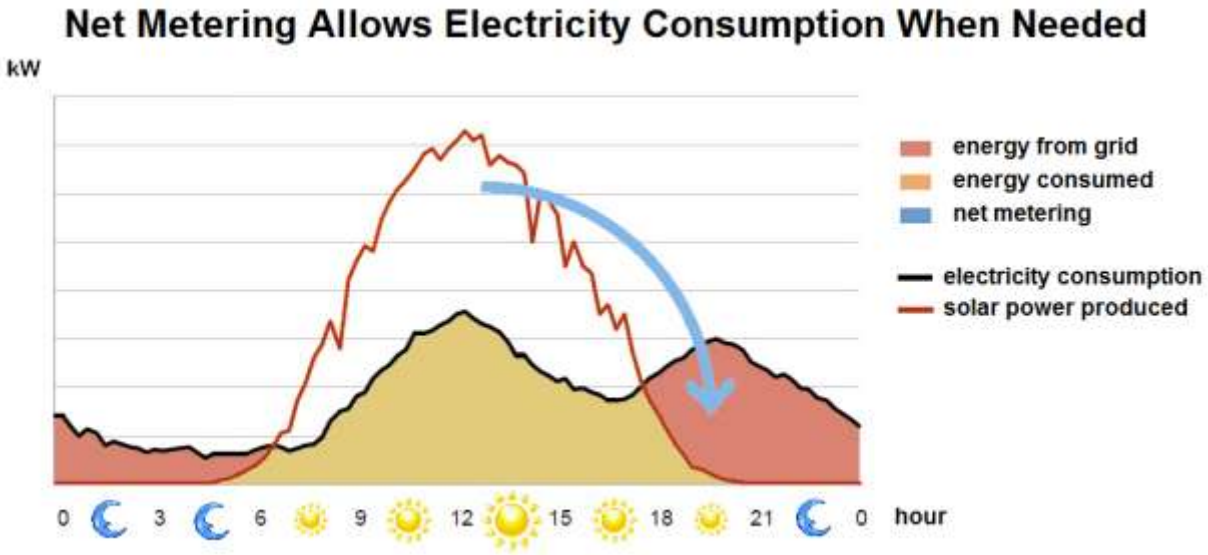
- **Feed-in tariff for green power**
  - For power produced in hydro power plants, solar PV plants, biomass CHP plants, biogas plants, wind power plants
  - Valid for 12 years from start of production
  - Difference between fixed price and market price is payed to producers from public service fund is is financed by power consumers, paying addition to power price
  - Different schemes used:
    - Fixed feed in taroff for all potential producers (different for different kind of power producers)
    - Auctions – pricing comitee establishes ceiling for feed-in tariff, then investors which proposes least feed-in tariff are selected

Renewable energy support schemes

- **Obligations**
  - Obligation to mix biofuel
  - Obligation to connect new green power producers
  - ....

Net metering scheme





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LITHUANIA
Mistakes, lessons

Way of thinking of majority of politicians

"Scandinavian"

"Eastern European"

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

EU directive requirements are considered

Goal: lowest share of energy expenditures (incl. external cost) compared to incomes of business and population in long term perspective

Goal: lowest price of energy today

Lesson

- Macroeconomic analysis of renewable energy development should be carried out
  - Estimating impact of renewable energy devolpment on:
    - Energy prices
    - Green jobs
    - Added value created
    - Reduction of external cost
  - Preparation of long term renewable energy development scenario which would represent most added value to national economy

Mistakes/Lessons

- **Over-motivation**
  - Too high feed-in tariffs
  - Subsidiesed investment which is profitable without subsidies

- Renewable energy support scheme must equally split benefit of renewable energy development to investors and society (system where every consumer and investor is motivated to behave in the way what is most beneficial for the society)

Mistakes/Lessons

- **Biurocracy, lengthy procedures**
  - Decisions on support takes a long time
  - Non transparent procedures triggers legal actions

- Support schemes should be as clear and specific as it is possible

Mistakes/Lessons

- **Motivation of wrong investments (looking from long term perspectives)**
  - For example – support schemes promotes investment into heat only biomass boilers in DH systems, loosing cogeneration potential

- Support schemes should be set after long term renewable energy development plan is approved

Mistakes/Lessons

- **Frequent changes in support schemes, retroactive measures**

- Support schemes should be carefully planned

Lithuanian Renewable Energy Confederation is ready to help Georgia to prepare:

- Sustainable renewable energy development plan for Georgia
- Balanced renewable energy support scheme
- Master plans for development of renewable energy in different regions/cities
- Feasibility studies for separate renewable energy based projects

Or just share experience (as with friends)

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Thank you for your attention!

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