

Sustainable district heating system in Kaunas

Lithuania, Kaunas region

Goals:

- Transfer from 96% of natural gas in 2010 to sustainable district heating using 100% RES (biomass, solar energy, municipal waste);
- Achieving social and economic benefits via reduction of heating tariffs;
- Achieving environmental benefits via reduction of GHG emissions due to replacement of fossil fuel (mainly natural gas).

Activities:

- Construction and re-construction of biomass boiler-houses and CHP plants;
- Introduction of independent producers;
- New options (waste, solar energy, etc.).



Figure 1. Biomass boiler-house of independent producer and Solar PV on the roof of AB Kauno energija

Main results

- Share of biomass – from 4% in 2010 to 91% in 2017;
- Biomass capacities – from 9.6 MW in 2010 to 290 in 2017;
- Heat tariffs reduction: from 8.84 ct/kWh in Oct. 2012 to 5.12 ct/kWh in Apr. 2018;
- Independent producers – from 1 in 2010 to 12 in 2017.
- Solar energy – 30.6 kW_{th} and 20 kW_{el} today and future investment foreseen;
- Waste CHP plant (24 MW_{el}+70 MW_{th}) – under construction.

Advantages	Drawbacks
Goals to reach 100% of biomass in DH are to be achieved	Overcapacity in new plants cause conflicts among stakeholders
Company level planning was implemented for DH company and independent producers introduced	Demand limit for boilers and CHP plants was not defined via planning, spatial planning chaotic
Heat tariffs were reduced significantly	In case of better planning, heat tariffs could be reduced even more
Replacement of old pipes reduced heat losses in the network	Technical problems emerged in the network
GHG emissions reduced due to transfer from natural gas to biomass	Local pollution increased near the boiler-houses

Main aspects and lessons learned

The development of district heating sector had a big number of planning, technical and public stakeholders and social partners, such as Municipality, DH company, independent producers, biomass exchange, residents of block apartment and a number of external lobby and consultants.

Municipalities have plenty of responsibilities in planning of RES in heat sector and supply and decision-making process lies on the municipal councils. However, planning indicators should be defined under intermediate planned national RES indicators and main conditions, defined for development of district heating and cooling sector using renewable energy sources.

Funding sources:

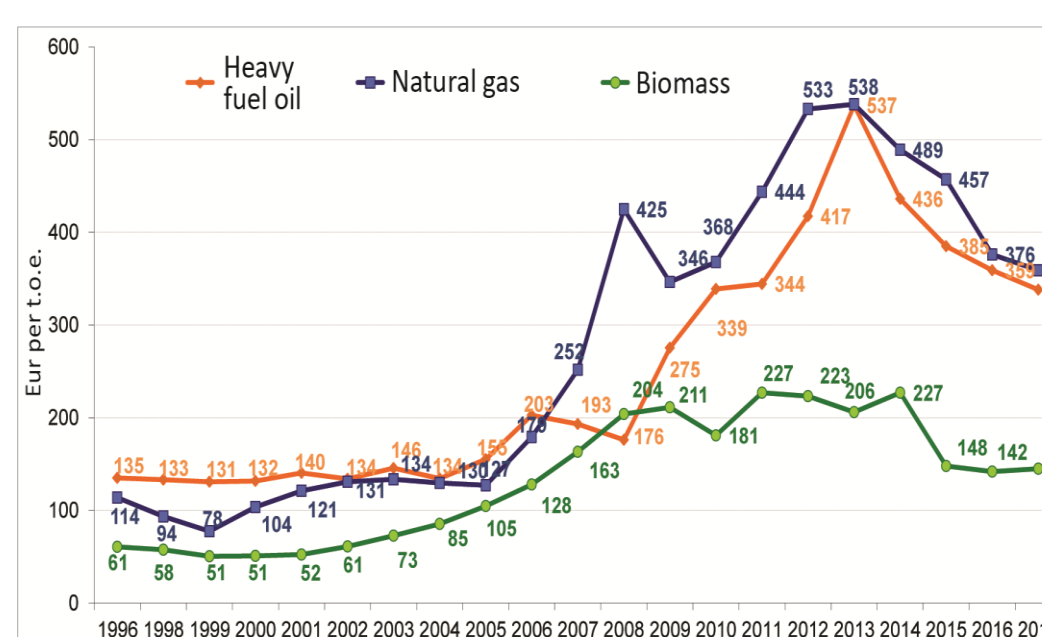
- For large projects (over 10 MW) - support for investment from EU Cohesion Funds under Cohesion Promotion Actions programme;
- For small projects (under 10 MW) – support from Lithuanian Environment Protection Investment Fund Programme, and Climate Change Special Programme;
- Own funding of the district heating company, incl. Bank loans;
- Municipalities can partly subsidize projects as main stakeholders of municipal DH companies.

Lessons learnt:

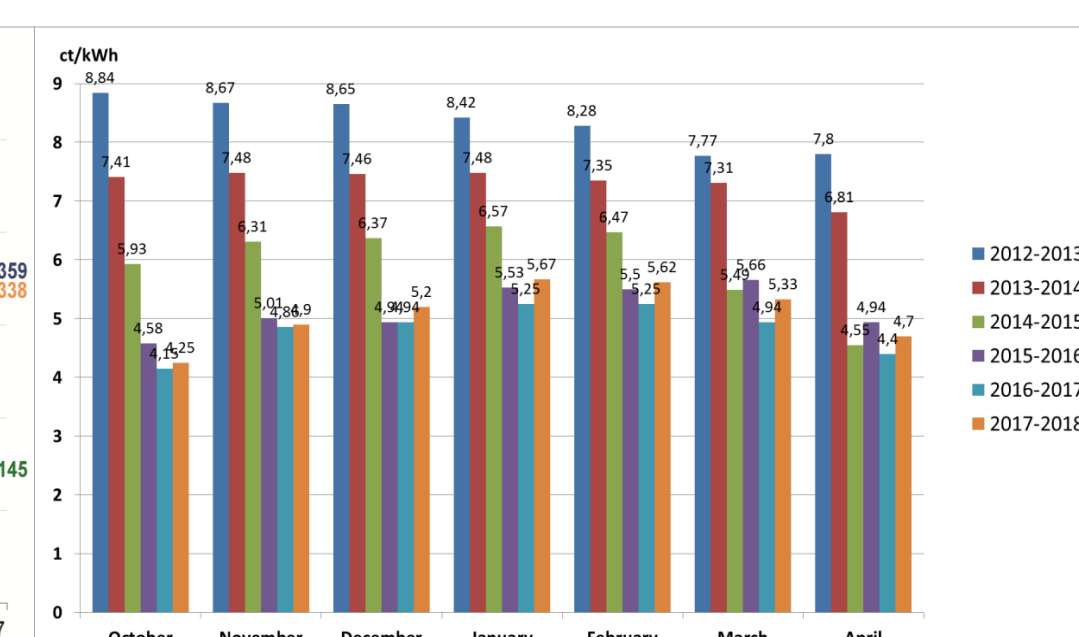
Though some conflicts (with population) are easy to solve via discussion and some positive actions, others (with partners – independent producers) are much more complicated;

Planning based on clear criteria should be introduced to avoid „chaotic“ development; Introducing new legal environment to heat producers solves some generation problems, but there are still conflicts in the activities of heat supply, which should be solved via discussions with authorities and among stakeholders.

(a) Fuel costs dynamics



(b) Heat tariffs dynamics



(c) Change of fuel structure from natural gas to biomass in the integrated network (by DH company in independent producers)

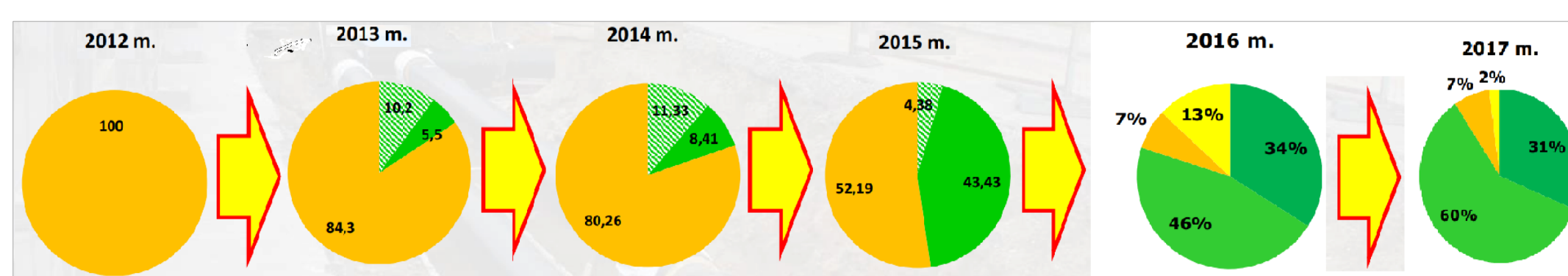


Figure 2. Main results: (a) fuel costs, (b) heat tariffs, (c) change of fuel structure

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