



**Auditing energy issues:
energy conservation and district heating systems**

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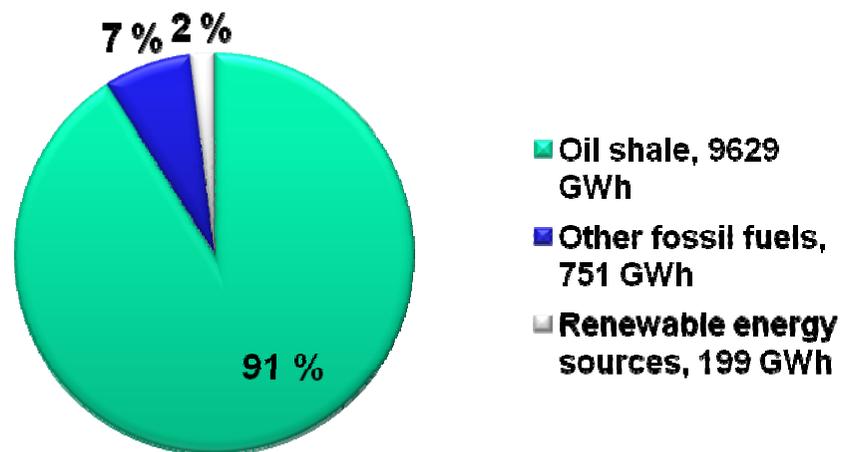
Presentation covers:

1. Short introduction to Estonian energy system and greenhouse gas emissions
2. Audit “Activities of the state in achieving energy conservation”
3. Audit on Sustainability of the District Heating (DH) Systems

Production of power in Estonia in 2008

- Gross production of power - 10,5 TWh
- Estonias own consumption -7,4 TWh
- Export - 2,3 TWh
- Production of **1 kWh** power generates approximately **1,18 kg of CO₂**

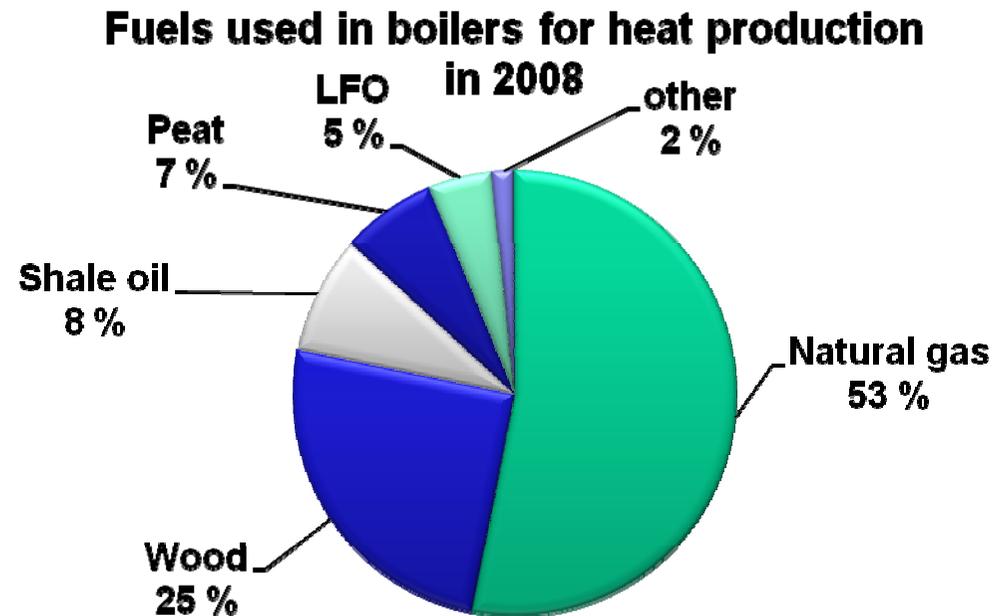
**Fuels used for power production,
2008**





Production of heat in Estonia in 2008

- Production of heat - 9,2 TWh
- 6,9 TWh of heat was delivered to consumers via district heating systems



Greenhouse gas emissions in 2007

- **14 million tons CO₂ eq** (22 million tons CO₂ eq emissions and 8 million tons CO₂ eq removals)
- Energy sector (incl. Transport) contributes **86%** of GHG emissions
- Estonia's GHG emissions contribute 0,4% to EU-s total emissions, but emission per capita is one of the highest in EU.



Oil shale power plant

(Photo: RAUNO VOLMAR, EPL)



Audit “Activities of the state in achieving energy conservation” 2009



Oil shale

(photo: POSTIMEES/SCANPLY)

Audit “Activities of the state in achieving energy conservation”

Aim:

The European Union has set the goal of saving 9% of energy in final consumption by 2016, which will help to alleviate the environmental problems caused by the use of fossil fuels and increase the competitiveness of the economy. Estonia should save 2678 GWh of energy (1785 GWh for 2013).

Scope:

The National Audit Office assessed whether or not the state has a clearly agreed action plan for more economical use of energy. Also the implementation of energy conservation principles in the public sector was analysed (mainly procurement of energy efficient equipment).

Audit questions and main results

Main questions

1. Does the state have an action plan for saving energy and does it help to achieve the goal?
2. Does the state set an example of saving energy?

Main results

- It is unlikely that Estonia will be able to save the expected 1785 GWh by 2013. As the action plan postpones the direct conservation activities, Estonia will have to make considerable efforts from 2013 to 2016 in order to save 9% or 2678 GWh of energy.
- The state does not set an example in saving energy (procurements).



Challenges

1. Energy statistics has poor quality in Estonia (e.g data about energy efficiency);
2. State has not evaluated the performance of the different energy saving measures;
3. Methodology for measuring the influences of the proposed measures has not been worked out

therefore

- it was impossible to evaluate how much energy had been saved already with the different actions (with the previous action plan);
- the influences of different energy saving measures in the action plan could not be evaluated



Challenges continued

Therefore the evaluation of the action plan was made on the basis of the nature of the measures:

- Most of the measures were preparations on real actions of saving energy (e.g. studies, awareness building, training, preparation of legal acts etc), therefore it is quite unlikely to achieve the goal with those measures.
- Unfortunately the potential influence of the preparative measures was not analysed (e.g. to see whether the preparative measures are creating the platform to achieve easily the future energy savings).
- Some of the measures were in action plans of different fields (e.g. transport development plan), but those were not taken into account.

The directive allows to update the plan in 2013 and still reach the final 9% goal.



Results

Therefore:

- the result of the evaluation was that with present action plan Estonia cannot probably reach the interim goal for 2013 and must work harder during the period of 2013 -2016.

Another analysis:

- 120 state procurements were analysed
- There were only two procurements that had energy saving criterion (procurements of cars, the criterion was lower use of fuel)



Auditing district heating networks





Problems related with district heating systems

- DH systems exist in almost every city, town and districts.
- DH-systems were mainly established during 1965-1990 (Soviet times)
- In the 1990-2000 there were not enough investments to the DH-systems, therefore quite a lot of them are worn-out.
- DH networks cause huge loss of energy. The average loss is approximately 25%; in some cases 35 – 45% and in severe cases it could reach up to 80%.
- Some DH systems will never be viable nor sustainable, because they have not enough consumers, networks are too big and cause loss. That increases prices for consumers. But in most cases they are still in use.

Audit about sustainability of district heating systems

Scope

- To analyse whether the district heating sector is sustainable:
 - systems are well maintained,
 - the DH- companies are self-sufficient,
 - produce less air pollution.

Main questions:

- Do the legal acts create a framework that allows district heating sector to develop in a sustainable way?
- Does the price regulation process assure the competitiveness and sustainability of DH-companies?
- Does the state have a vision and measures for the development of DH-sector?

Challenges

- The state has no proper overview about the district heating systems. Therefore we do not know:
 - How many DH-networks exist in Estonia?
 - What condition are they in?
 - Are they well maintained and self-sufficient?
 - How big is the heat loss from the networks?
 - How much investments do they need?
- DH systems belong to the local municipalities (or they have sold them to private companies) and therefore the state indicates that DH is the responsibility of local municipalities.
- Different approaches to price regulation (Competition Agency and municipalities).
- State has not adopted a development plan for DH sector



Methodology

- **Questionnaire for local municipalities** (220 municipalities) to find out the technical situation of their networks, investment need, principles of price regulation, changes in the technical situation etc.
- **Analysis of price regulation of 16 DH-companies**
 - Are all the companies treated equally with the price regulation?
 - Does the price regulation admit of investments (to networks)?
 - Does the price regulation help the state to increase the share of renewable energy sources?
- **Analysis of the documents of state support mechanisms**
 - Is the state support afforded to DH systems that could be viable but are not able to invest without support?



Results

- Audit will be published in autumn 2010



Thank you!

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