Energy supply systems in the BSR

1 District heating in the BSR

District heating (DH) has consolidated its position as one of the most common heating systems in the Baltic Sea Region (BSR). DH is considered as an efficient heating system especially when heat distribution distances are short and when the heating power towards the pipeline length is high. Therefore DH is common in cities and is typically used both for space heating and domestic hot water preparation in BSR. In some BSR partner countries, municipalities have the possibility to regulate buildings to connect district heating network.

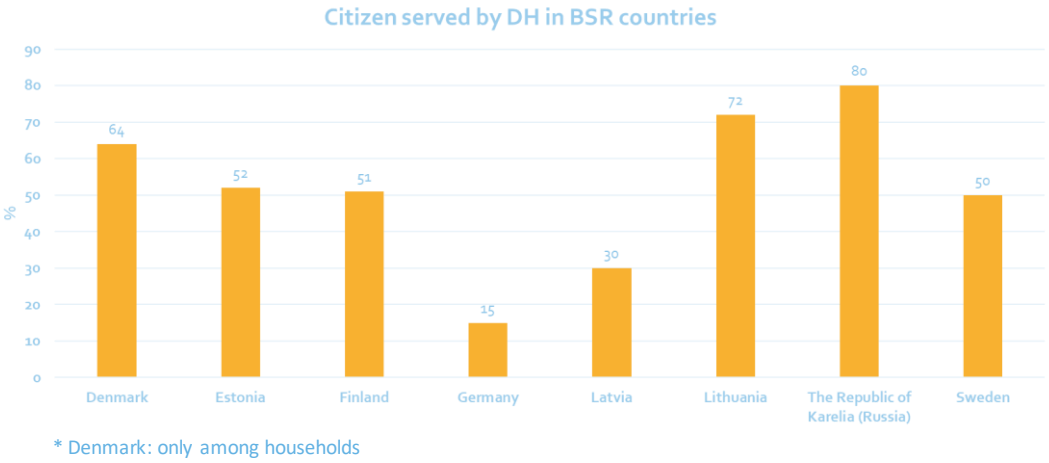

Figure 1. Citizen served by DH in BSR countries. (Source: LowTEMP Report (2019) "Report on current energy supply framework conditions for LTDH in partner municipalities and regions" [1])

Forms of ownership:

- Municipal owned district heating companies represent a great majority of the district heating companies.
- Characteristic of municipal owned utility companies is that some of these companies provide several utility services besides district heating generation and distribution, such as electricity production and distribution, water supply and sewage, and waste management.
- Also there are operational municipally owned district heating companies.
- Foreign corporations (typically subsidiaries) are often city-oriented in the BSR

BSR district heating generation:

- District heat is generated either with Combined Heat and Power units (CHP) or with heat only boiler units. CHP has established a strong position especially in urban areas in BSR.
- Heat only boilers are a more common solution for more sparsely populated areas, where one or more units are scattered along the district heating network.

- Short-term heat storages are used case-by-case, whereas seasonal long-term heat storages are rather uncommon in the BSR.

Fuels in BSR district heating generation:

- In general, district heating generation has been based on fossil and renewable fuels, which emerge to three main categories: solid fuels (coal, peat, wood fuels, muncipal waste), liquid fuels (industrial waste liquuour, sewage sludge, oil), and gaseous fuels (natural gas, liquefied petroleum gas, biogas).
- Apart from these commonly acknowledged fuels, utilizable waste heat e.g. waste heat from industrial or urban processes has recently become a potential alternative for district heating generation.
- In BSR countries, district heating is currently based strongly on fossil fuels, especially in larger cities.
- There are several BSR countries such as Denmark, Finland, Lithuania and Sweden that have succesfully converted their district heat production to be based more on biomass combustion or on other renewable energy sources.

District heating distribution in the BSR

- In general, district heat is distributed by district heating water in BSR countries, therefore steam based distribution techniques are rather occasional if not non-existing in some countries.
    - Common supply temperatures vary between 70°C to 115°C.
    - Common return temperatures vary between 45°C up to 65°C.
- The most typical DH system, used in the BSR, is a closed system, where the customers connect to the DH network via heat exchangers. Meaning the DH water does not circulate in the customers end systems e.g., in the heating network of a building.
- There are different temperature requirements for the district heating grids (e.g. to prevent bacteria and scalding)
- Heat distribution network heat losses vary strongly in BSR.
    - More advanced DH networks have haet losses between 5-15 %.
    - Old networks may have heat losses up to 30 % or beyond.

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Summary

STRENGTHS	WEAKNESSES
• District heating has a well-established position in BSR • A large proportion of district heating companies are municipally owned • Low temperature supply meets the heat demand of low energy buildings	• High investment costs on the demand side • Diversity of building stock • Lack of seasonal heat storages • Undefined pricing models for waste heat
OPPORTUNITIES	**THREATS**
• Utilizable low temperature waste heat sources • Potential to decrease heat distribution-related heat losses • Reduce dependency on fossil fuels • Reduce combustion-based district heat generation	• Demand side attitudes towards low temperature district heating • Lack of financing • Political decisions • Unexpected shutdowns of waste heat sources

References:

[1] P. Sneck. Report on current energy supply framework conditions for LTDH in partner municipalities and regions. 2019. Unpublished internal report of LowTEMP-project and part of background material. Compilation based on partners answers to pdf questionary.

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