

Thermonet provides greater reach for collective heating supply

Roughly half of Danish households have collective heating supplied through district heating. However, collective heating can also be supplied through decentralized heating systems (local “island solutions” and thermonets) and are an environmentally friendly alternative for villages and other settlements that are located away from the traditional district heating systems.



Funded by the Horizon 2020
Framework Programme of the
European Union



GATE
21



Photo: Shutterstock

For many of us, the first thing we think about when it comes to district heating is water that is heated up centrally and sent out to consumers through insulated pipes. This traditional district heating works well when there is a short distance between consumers and when the consumption is at a certain level, minimizing heat losses in the pipes. These conditions are typically found in larger cities, which is why more than 60 percent of the total heating demand in Danish buildings is already covered by district heating.

However, there is potential for more, and experts recommend that the district heating network have to be expanded to cover up to 74 percent of Danish households. The remaining 26% consists of detached houses, villages, and smaller urban areas, where the prerequisites for traditional district heating are not present due to distance or because there are too few buildings to provide a sustainable business case.

The picture changes significantly if you loosen the assumptions about central production and insulated pipes. It opens up for other solutions, including district heating based on thermonet, which can reach the areas that cannot be supplied with traditional district heating.

In short, a thermonet is an uninsulated pipeline network that connects ground source heat pumps with one or more energy sources, such as waste heat or geothermal energy, where the temperature can be close to ground heat temperature. Each building has their own “ground source” heat pump connected to the pipeline network.

The backbone of a traditional district heating system is the collective pipeline network. With the help of the established infrastructure, energy sources can be brought into play that are not available to the individual consumer. The same applies to a thermonet. Here, the insulation is simply removed and the steel pipes are replaced with PE pipes, as known from water supply. From the collective pipeline network, heat can be directed into individual heat pumps, after which the heat can be used for heating and domestic hot water.



Line-losses: No longer an issue

With one stroke, all talks about line losses and thus talk about energy density is less important. Instead of losing energy, the network now becomes part of the energy production because the pipes absorb heat from the ground. Between 25 percent and 50 percent of the energy that needs to be delivered from a thermonet can be collected from the part of the network that distributes heat. The rest must be covered by an energy source, and there are many possibilities.

Anything that has a temperature above five degrees can be a potential energy source for a thermonet. Energy collectors, groundwater wells, wastewater pipes, lake heat, cooling processes, horizontal geothermal heat exchangers, shallow geothermal boreholes, outdoor air, or return heat from traditional district heating.

A future-proof energy supply

Since the temperature in the network is low, a heat source can also be passive cooling. This is especially relevant in new buildings and as existing houses are brought up to current insulation standards. Passive cooling is so much more energy-efficient than air conditioning systems.

The potential is great if all consumers become aware that they can get collective heating supply if they just join forces with their neighbors. They are also helping to ensure a more environmentally friendly heat source, as well as a collective pipeline network that can later be upgraded with new heat sources as technological development advances.

Considering that termonet could account for 20 percent of the heating supply in Denmark and more in other countries, termonet is certainly a technology that should be considered as an alternative to individual solutions in villages and areas that are far from traditional district heating. Especially if there is an opportunity to utilize a nearby source of waste heat.

Termonet

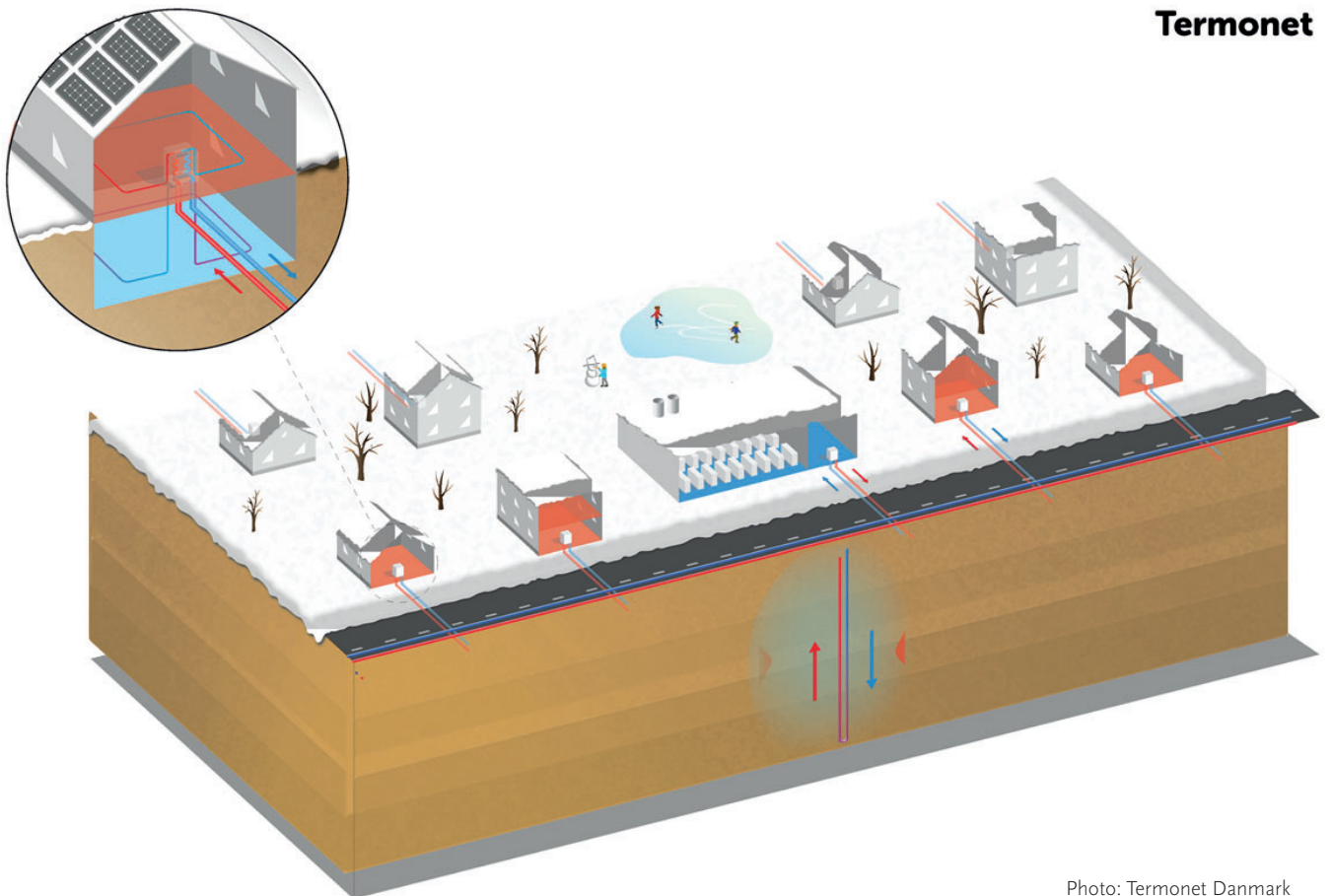


Photo: Termonet Danmark

RoundBaltic creates political focus on solutions like Thermonet

The RoundBaltic project has supported the rollout possibilities of Thermonet by presenting the solution to relevant stakeholders and promoting financing opportunities.

The main barriers and concerns encountered have been the political view on the subject. Throughout the project, it has been a priority to accommodate the political focus on district heating and the incorporation of Thermonet into the Danish heat supply act. This is essential for municipalities for them to include the solution in their heat planning and thereby getting financing with municipal guarantee. Alternatively, other financing products must be in place, combining various private financing sources, and where the Thermonet systems are operated through for example local energy communities.

RoundBaltic has established forums, such as roundtables, for dialogue and exchange between relevant stakeholders and authorities in the field. Such as municipalities, utility companies, the Danish Energy Agency, citizens and actors within financing. This has helped to mobilize resources and initiate cooperation between different stakeholders, who would not have come together without the coordinated effort.

As such RoundBaltic has contributed to the further implementation of Thermonet systems as well as dissemination of knowledge about Thermonet systems.

Contact

Tommy Olsen
Gate 21
Senior Project Manager
tommy.olsen@gate21.dk
+45 2810 3695



Photo: Gate 21