

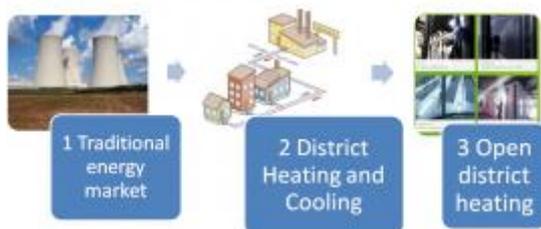
Open district heating and prosumers in the Swedish DHC Market

Open DHC networks are a means to make the district heating system more effective by realizing the synergies between the heating needs of residents, and the cooling needs of businesses such as data centres. Using existing networks to distribute energies from points with excess supply to points with excess demand, commercial potential is realized for the energy company and for a growing number of trading partners. The initiative was launched by Fortum and other energy companies (see links below).

Open networks are tightly linked with the notion of prosumers. The word prosumer is a portmanteau, blending the words producer and consumer into one. In this context it designates a node in the network that can function as an energy producer and a consumer. As a producer, the node can feed excess energy into the network, and as a consumer it can consume energy from the network. In more precise terms, we define prosumers as:

- Small producers of heat
- Producers that do not have a professional organization for delivering heat
- Producers that do not deliver heat as their primary business or have limited know how in the heating business.
- Producers that are too small to handle with separate “deals” for each customer and that can use a standard business offer instead.

The evolution of DHC energy market



Open DHC networks can be seen as a third generation in the evolution of the thermal energy market and the relationship between energy producers and energy consumers.

1. The first generation thermal market can be seen in the traditional energy network first generation in the evolution consists of a clear division of labour between producers of thermal energy and its consumers. Energy companies are the sole producers of energy, usually with large boiler stations, where energy is produced at a large scale. Energy companies then deliver the thermal energy to consumers such as residents and businesses, customers who consume energy at a relatively smaller scale.
2. In a typical district heating and cooling network the market is fragmented. Energy companies produce most of the energy, but they can use residual heat (waste heat) from large industrial plants such as waste petro-chemical plants, pulp and paper or steel mills. Heat is still produced at a large scale and consumed by customers at a small scale.
3. In Open district heating, energy companies operate the distribution system, mediating thermal energy between various "prosumers". The market can be in form of a boerse with a spot market, or have different forms of tariffs.

Newer distribution system technologies, such as the so called fourth and fifth generation district heating systems makes it easier to integrate small scale supply sources. Lower temperatures

makes more residual heat sources available as well as makes it possible to use ordinary building heat pumps to upgrade residual heat temperature. Distributed circulation pumps and "smart" building substations are other things that ease integration.

Prosumer investments in the Swedish district heating market

To understand the forces driving prosumers to invest, interview based research was made year 2016 on the Swedish district heating (DH) market. Potential prosumers willingness to deliver heat to district heating network and their willingness to invest to do so was investigated. Such prosumers include supermarkets, small scale data centres and other small businesses.^[1] A set of interview guides for investigating the prosumer concept was developed, and the interview guides were adapted to different kinds of stakeholders; DH companies, prosumers and experts.

The study highlights the unique business model of the prosumers in the decentralized energy market. The existing prosumer installations and the ones underway in Sweden 2016 are mainly solar heating facilities and residual heat upgraded by heat pumps (e.g. from the comfort cooling systems in commercial buildings).

The study identifies the environmental, commercial and technical drivers for businesses to become prosumers as well as technical and commercial opportunities and challenges. Environmental-related aspects were often seen to be prioritized above profitability aspects as drivers for investment and development. Opportunities and challenges largely depend on the unique context and conditions in which DHC networks operate, e.g. network size, temperature program, whether the network already is fed by large scale residual heat, heat from waste incineration or combined heat and power plants fired with residual fuels.

The study also concludes that the prosumer model is probably easier to implement in distributed thermal energy markets that are relatively new, small or less dense. This is partly because the technical solution is being formed and there is more flexibility during initial stages of development and implementation, i.e. fourth or fifth generation distribution systems makes technical implementation easier. However, some energy companies see the open network paradigm and the prosumer concept as a natural extension of their current model and part of their vision for the future.

Read More

External links

- [Fortum's Open District Heating strategy : "Making District Heating Systems more effective"](#)
- [The EU's Heating and Cooling Strategy : "Towards a smart, efficient and sustainable heating and cooling sector"](#)
- [Finnish Energy's "Strategy for the district heating sector"](#)

References

1. [Jump up↑ Driving forces for prosumer investments in the Swedish district heating market](#)