

E.ON Feed-in model for solar thermal heat in Hamburg Germany

Responsible partners

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Model description

The model was presented in an official press release [1] on the 01.07.2011.

The main actor is E.On Hanse Wärme, operator of the district heating net in eastern Hamburg. The company also operates 150 other district heating nets in north Germany, with more than 900 energy production and CHP plants.

The model is linked to the two laws on energy in buildings:

- Energy Saving Ordinance (EnEV)
- Act on the Promotion of Renewable Energies in the Heat Sector (EEWärmeG).

E.On opened the district heating net in eastern Hamburg for feeding-in solar heat. Operators of solar thermal collector plants larger than 100 m² have the possibility to feed their heat into the net and store it there. During 8 months, the producer continues to own the heat, and can use it anytime (the net's heat losses are not taken into account). This means that solar heat produced in the summer can be used in the winter. (When the solar heat is not needed by other customers at the time it is supplied to the grid, it can be stored in a 4,100 m³ underground tank). For this storage service, E.On will charge the producer. The price announced in 2010 was 2,1 to 2,5 Ct/kWh.

There are two possibilities:

- The solar plant is built on a building (mostly in the frame of a retrofitting). The housing enterprise owning the plant is producing the heat, storing it in the net and using it later (see Figure 1).
- The solar plant is built at another location along the net by a third party: the plant operator. The plant operator produces the heat, stores it into the net and sells it to the housing enterprise (see Figure 2).

It does not only work for solar heat as also heat produced thanks to other renewable energies, industrial waste heat and CHP heat can be decentrally fed-in the net.

The first idea was for the solar heat to be fed in the return pipe, the return temperature of the net being 60°C in summer and 55°C in winter. But this seems to have evolved too (2) and the feed-in should now be possible in the feed or return pipe, depending on the average delivery temperature of the solar plant. The maximal feed-in temperature being 100°C to avoid changing the grid temperature. But this project also is an opportunity to study the technical feasibility and possibilities of decentral feed-in in a district heating net.

Economic model:

- E.On has an economical income by storing the heat and a good image for the company due to this 'green instrument'.
- The housing associations retrofitting (or building) buildings can find in this offer an easy way to comply with the laws regarding energy efficiency of the buildings. The Energy Saving Ordinance (EnEV) imposes a maximum limit for the primary energy factor of renovated buildings which is not easy to comply with when retrofitting the building's en-

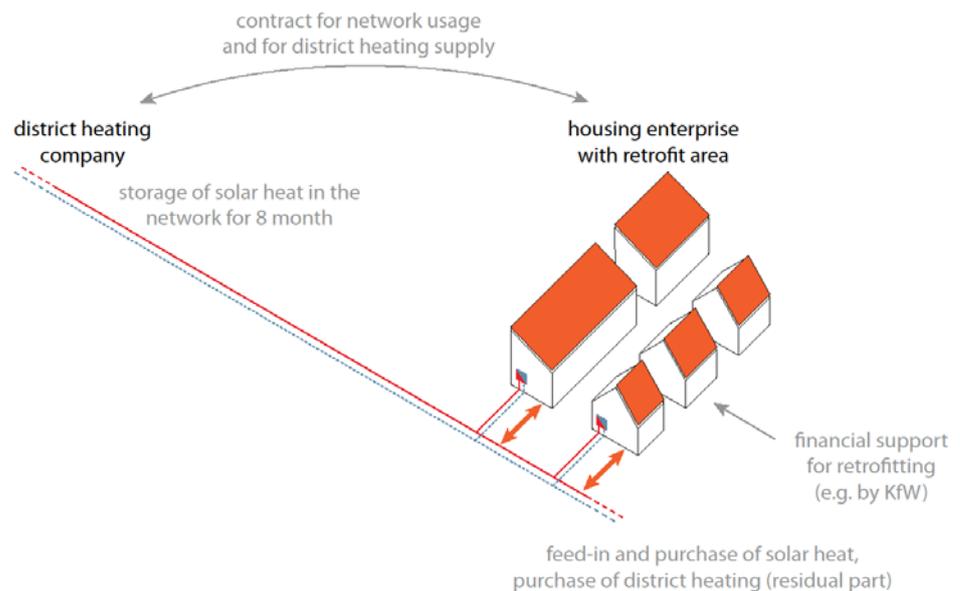
velope only. Thus, the primary energy factor of the heat supply often has to be reduced too by adding renewable energies. E.On's offer to its customer is interesting for them because they just need to build the collectors and feed-in the net through a substation, sparing the space in the building for storage and a complex regulation system, or buy the solar heat directly from an operator of a solar plant feeding in the net.

- Potential operators of solar plants feeding into the net could, as third parties, sell heat directly to the housing associations, using the net for bridging the gap between production and consumption times.

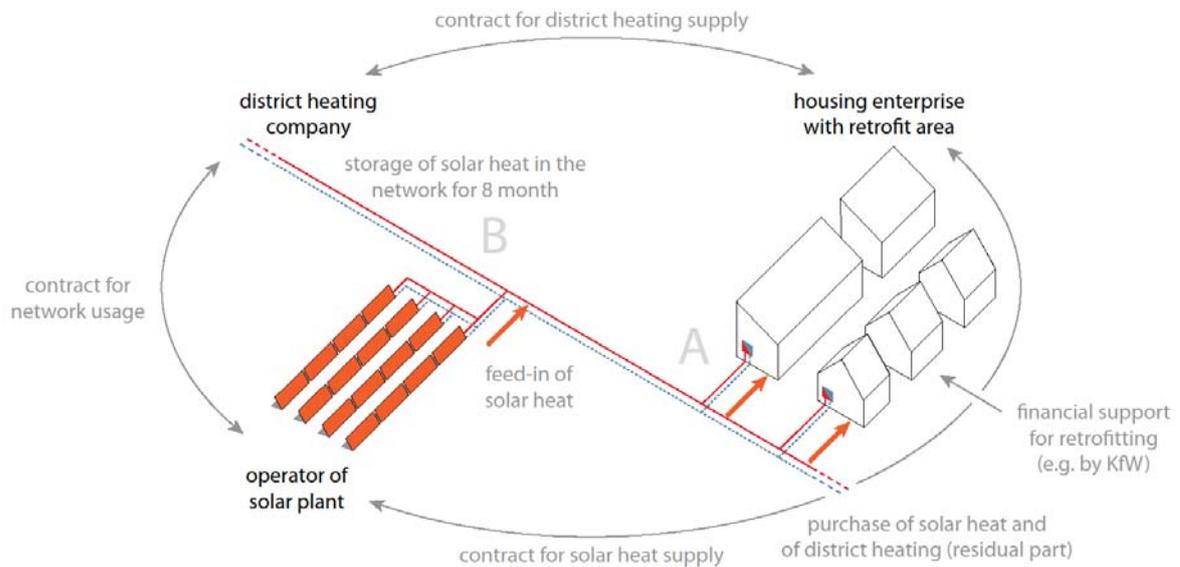
E.On Hanse Wärme is the operator of the net and offers the storage service. The main target group for this model are housing enterprises.

E.On Hanse Wärme initiated the project and also built the demonstration (and only for the moment) collector plant feeding in the net.

The housing associations can buy a storage service from E.On if they build a solar plant and feed-in the net, or buy solar heat from another operator feeding in the net. In this second case, the operator of the solar plant is the one to use E.On's storage service.



Feed-in model for solar heat (solar plant on retrofit building)



Feed-in model for solar heat (solar plant and retrofit building in different locations)

The model is still being developed according to the experience gained through the demonstration plant built by E.On. Therefore, no financial or economic data is available yet. However, E.On Hanse Wärme's objective is, together with its customers, to install 20 000 m² solar thermal collectors (1).

In January 2013, an information meeting took place in Hamburg with E.On Hanse Wärme about the state status of the feed-in model, the barriers encountered and the necessary further development steps. A procedure of action was defined and agreed on with E.On Hanse Wärme.

Swot analysis

Strengths	<ul style="list-style-type: none"> • Allows solar heat storage from summer until winter, the solar fraction is optimized. • The solar collectors can be independent from the building to be renovated/built. • Win-win situation for the client and E.On or win-win-win situation if the solar plant's operator is different from the housing enterprise • Services and roles of parties fit well to their core competences • Economic aspects
Weaknesses	<ul style="list-style-type: none"> • 100 m² is already a large collector area which requires a certain size of project (certainly does not concern the single family home owners) • The legal, technical and economical conditions of the feed-in are not yet completely defined.
Opportunities	<ul style="list-style-type: none"> • Development of technical know-how on decentralized feed-in in a district heating net • Clear recognition of the case as a possible fulfilment of the law's requirements
Threats	<ul style="list-style-type: none"> • It is still to be checked exactly what situations are accepted as fulfilment of the law. For example a client building a collector plant feeding into the net and taking the heat from the net at another location is a situation that could be problematic as it is not described in the law.
Improvements/recommendations/lessons learned	<ul style="list-style-type: none"> • Clarify conditions so that the clients know more about their engagement

Replication potential

It is highly replicable in all places with large scale district heating, with a good storage capacity or smaller scale but with a seasonal storage. The heat feed-in must be technically possible (temperatures and pressures) in the net.

Links to web site and/or documents for more detailed information

- (1) <http://www.eon.com/de/presse/news/pressemitteilungen/2011/7/1/e-dot-on-startet-europaweit-einmaliges-projekt-zur-speicherung-regenerativ-erzeugter-waerme.html>
- (2) Germany: District Heating Companies encourage Customers to feed in Solar Heat, www.solarthermalworld.org
- (3) <http://www.solar-district-heating.eu/NewsEvents/News/tabid/68/ArticleId/6/Feedin-model-for-Solar-Thermal-Heat-in-Hamburg.aspx>