SDH
solar district heating

Intelligent Energy Europe Programme
of the European Union

Project TEAKS (Technical Efficiency of CHP Systems)
Denmark

Responsible partners

Braedstrup District Heating, DK

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Model description

Created in 2008 by Braedstrup District Heating and the consulting company Ramboll.
The project was undertaken in order to ensure an optimum operation of all the elements of the production and distribution systems, all the way from the natural gas into the production plant to the last radiator at the consumer's installations. The project was supported by the Danish District Heating association.
The project, which is carried out by Braedstrup District Heating aims at analyzing all technical efficiency potentials - from fuel comes into the plant to, and including, the last radiator at the consumer-installation.
One of the prerequisites for the project was to calculate the savings from a reduced return temperature. The calculations from Braedstrup showed that for every °C the return temperature can be reduced, the savings of the overall system (production and pipelines) is 55 Euro cents.

The CHP-plant

The conclusion of the studies are that there are potential savings by a further reduction of the exhaust gas temperatures from the engine plants (condensation of exhaust gases). Besides an ensuring of lower return temperature from the pipe-system there are not significant efficiency potentials to retrieve on the plant.

The pipelines

There can, of economic advantages, be further renovations of certain pipe sections in order to replace existing prefabricated pipes with new, highly insulated pipes with smaller dimensions. Then the circulated amounts of water and the heat losses will be reduced. The greatest efficiency gain; however is to reduce the average temperatures in the pipelines.
In order to reduce the forward temperature there is installed a temperature optimizing system which continuously is calculation the needed forward temperature from the plant to insure 60 degrees C with every customer.
That means that the forward/return temperatures today are 68/35 °C in summer and 75/34 °C in winter. The goal is to reduce the return temperature even more.

Energy efficiency on the customer side

New tariff system

In order to reduce the return temperature is the tariff-system modified by introducing a "Return temperature tariff". All the meters are being read every month and the annual average return temperature has been read every end of the year.
Is the average return temperature at a consumer higher than 35 degrees C the heat prize will rise with 55 Euro cents per degree C per consumed MWh heat (the same 55 Euro cents as the above mentioned calculated savings from a reduced return temperature).

Is the average return temperature lower than 30 degrees C the payment for the delivered heat is reduced with the same 55 Euro cents per degree C per consumed MWh heat. The spread between 30 and 35 degrees C is neutral area.

The "District Heating Service System"

To help the customers to insure so low a return temperature as possible the "District Heating Service System" has been introduced. It means, that the employees at Braedstrup District Heating are visiting every installation every 2-3 ears to ensure, that the heat installations are right inregulated, that all elements in the private heat-system are in right condition and that all of them works right.

If improvements can be made, which gives possibilities to reduce the return temperatures and to reduce the demand for high forward temperatures , and then gives possibilities for reducing the operating costs of Braedstrup District Heating (and thus for the community, since all customers owning company) gives Braedstrup District Heating grants for these improvements to the customers district heating installations.

This means, that the "District Heating Service System" is "help to self-help".

Roles of the different actors

Braedstrup District Heating was managing the project and the consulting company Ramboll made the calculations and the final report.

Swot analysis

Strengths	The project identified various efficiency potentials. The most pronounced argument was that there should be an increased focus on user installations to ensure that the heat is used optimally and that the supply and not least the return temperature could be reduced. This in order to reduce losses in the pipelines and to increase the efficiencies of all the production units. This applies to both engines, boilers and, not least, the solar thermal system.
Weaknesses	None identified.
Opportunities	The project gave rise to set up a "District Heating Service Scheme" where Braedstrup District Heating's employees offers free inspections of all user installations to ensure that the installations are correctly adjusted and to identify potentials for improvement of the installations, for example installation of new valves or by increasing of the heating surface area. A satisfactory heating surface area is a prerequisite for the proper cooling of the district heating water and thus a satisfactory return temperature. Braedstrup District Heating offers grants for improvements of the installations according to well-defined and fair guidelines. Similarly, a return temperature tariff is introduced, which rewards installations with a low return temperature and punishes installations with a high return temperature. The return temperature tariff works so that if the average annual return temperature is above 35 °C the consumer pays 0.55 € per °C over 35 for each MWh. If the average annual return temperature is below 30 °C, the consumer's heating bill is reduced by 0.55 € per °C below 30 for each MWh. It should be noted that return temperatures are calculated by the electronic meters for each consumer and the meters are remotely read every month.
Threats	None identified.
Improvements/recommendations/lessons learned	In order to introduce the above mentioned return temperature tariff, a well-defined information of the consumers is recommended.

Replication potential

Highly relevant elements to ensure reduced losses in the distribution systems, increased efficiencies in production systems and thus low heating rates.

Links

www.braedstrup-fjernvarme.dk