

EXCESS HEAT AND COOLING AT BJERRINGBRO AND GRUNDFOS - DENMARK

Overskudsvarme og køling ved Bjerringbro og Grundfos



Fig 1: Energy central in Bjerringbro [www.danskfjernvarme.dk].

Summary of the project

In 2013 Grundfos, who is a pump manufacturer and Bjerringbro Varmeværk, the local district heating company, made a mutual investment in three heat pumps to co-produce heat and cooling. The traditional cooling systems at Grundfos in Bjerringbro have previously been disposing excess heat to the surroundings. This excess heat is now utilized in heat pumps which offers both a supply of heat to the district heating network and a supply of cooling to Grundfos.

Grundfos have a large cooling demand, mainly through summer periods, where the heat demand from the city is small, and vice versa. Therefore, an aquifer thermal energy storage is used in the summer to deliver cooling to Grundfos. In the winter, when the cooling demand is low, the aquifer is replenished with cooling from the heat pumps, who deliver heat to the city. Thereby excess heat is transferred from summer to winter.

” A GREAT EXAMPLE OF HOW SYNERGIES BETWEEN THE INDUSTRY AND DISTRICT HEATING CAN BE UTILIZED ”

The heat pumps further create larger flexibility at the district heating plant. When electricity prices are high, the natural gas-powered engines are operating and produce both heat and electricity. When the electricity prices are low, the heat pump system is used. This results in considerable CO₂-savings, when using the heat pumps for cooling and district heating, as gas-based heat and outdated cooling facilities are displaced.

Bjerringbro Varmeværk believe that heat pumps are the future of district heating. Simultaneously Grundfos needed to replace multiple older cooling





Fig 2: Bjerringbro Varmeværk in Bjerringbro [www.bjerringbro-varme.dk].

systems with a large central cooling unit. The heat pumps are accordingly a great example of how synergies between the industry and district heating can be utilized through recovery of excess heat. The overall system is continuously optimized to keep the operation costs as low as possible, which eventually benefits the consumers of district heating and reduces the price of district heating.

Results

- Excess heat is stored from summer to winter.
- Excess-heat tax is avoided since Grundfos is buying cooling and not selling heat.
- A COP of 4,6 produce 4,6 MWh-heat and 3,6 MWh-cooling for every 1 MWh-electricity.
- 15 % of the district heating is based on excess heat from Grundfos.

FACTS ABOUT THIS PROJECT

Building type: -

Heated floor area [m²]: -

Installed heat capacity [kW]: 3 700 kW

District heating network: 2 271 consumers

Heat source: Excess heat from Grundfos

Investment cost: 31.4 million DKK

Participating countries: Denmark

Time frame: Finished in 2013

Link to web page or report:

<http://www.danskfjernvarme.dk/groen-energi/projekter/drejebog-om-store-varmepumper> and

<http://www.bjerringbro-varme.dk/> (in Danish)

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IEA Technology Collaboration Programme on
Heat Pumping Technologies (HPT TCP)