Excess heat from cooling at Grundfos

This case study is part of a project catalogue produced by ReUseHeat to provide inspiration on how to utilize excess heat from urban sources for heating and cooling purposes. The catalogue contains 25 existing or planned projects out of which 12 cases are Danish and 13 cases are from other European countries.[2]

Facts about this case

Installed heat capacity: 3700 kW
Heat source: Excess heat from cooling at Grundfos (40 °C)
Heat pump COP: 4,6
Production: 15 % of the district heating is based on excess heat from Grundfos
Investment cost: € 4.22 M
Period: Finished in 2013
District heating network: 2271 consumers

Link to web page:
http://www.bjerringbro-varme.dk/

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Source: Bjerringbro Varmeværk[1]

Description

In 2013 the pump manufacturer Grundfos and the local district heating company Bjerringbro Varmeværk, 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 (ATES) is used in the summer to deliver cooling to Grundfos. In the winter, when the cooling demand is low, the ATES is replenished with cooling from the heat pumps, which deliver heat to the city. Thereby excess heat is transferred from summer to winter.

Source: Bjerringbro Varmeværk[1]

The heat pumps increase 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results in considerable CO_2-savings when using the heat pumps for cooling and district heating, as gas-based heat and outdated cooling facilities are displaced.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 Simultaneously Grundfos needed to replace their outdated cooling-systems with a large central cooling unit.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 reduce the price of heating.[2]

References

1. Bjerringbro Varmeværk
2. Handbook - 25 cases of urban waste heat recovery