

DISTRICT HEATING AND COOLING IN HØJE TAASTRUP - DENMARK

Fjernvarme og fjernkøling i Høje Taastrup



Fig 1: The centralized cooling unit in Høje Taastrup [Høje Taastrup Fjernvarme].

Summary of the project

In 2016, the vegetable market in Høje Taastrup was replaced by Copenhagen Markets, a new and comprehensive vegetable market with a large cooling demand. The local district heating company, Høje Taastrup Fjernvarme, delivers district cooling to the market through a large joint grid. An electrically-powered refrigeration compressor supplies the cooling. Hereby, individual and less efficient cooling systems were replaced by a centralized cooling unit that benefits from economies of scale. Return flow from the district cooling network contains excess heat, which is upgraded through a heat pump to supply hot water to the district heat consumers.

The district cooling is typically cooled to 6 °C. However, chilled water is to be delivered at temperatures between 2 and 5 °C to the stalls at Copenhagen Markets. An extra

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chiller is therefore established which can cool the water to minus 8 °C. The heat pump increases the returning flow temperature in the cooling network from 16 °C to 73 °C. The overall system takes advantage of co-producing cooling and heating, where production of cooling cannot be delivered without production of heat. The heat pump contributes with roughly 2.5 % of the total heat consumed by the approximately 6 700 consumers at Høje Taastrup Fjernvarme.



The system is currently the most comprehensive district cooling system in the Nordic Region. Fruits, vegetables, and flowers are preserved at optimal temperatures while district heating prices are lowered. The district cooling system displaces old refrigerator units which lowers the overall energy consumption and benefits the environment.

The next stage in Høje Taastrup is to expand the district cooling network and add more heat pumps, thereby increasing the numbers of consumers. District cooling proves to be an important part of the future urban development for both comfort and process needs and there is a large potential for district cooling in Denmark.

Expected results

- The COP of the refrigerator is 2.16 and the COP of the heat pump is 3.14. The total COP is 5.3.
- Fine-tuning the system to optimize heat pump operation, hopefully increasing the COP-value.
- In the future, the cooling network is to be expanded and more heat pumps are to be added.
- An aquifer thermal energy storage (ATES) unit is to be constructed.
- The overall cooling potential in Høje Taastrup is estimated to be 56 MW.

FACTS ABOUT THIS PROJECT

Building type: Vegetable market
Heated floor area [m²]: 15 000 m²
Installed cooling capacity [kW]: 2 000 kW
Installed heat capacity [kW]: 2 300 kW
District heating network: 6 784 consumers
Heat source: Heat from district cooling
Participating countries: Denmark
Time frame: Finished in 2016
Link to web page or report:
<http://www.htf.dk/> (in Danish)

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**IEA Technology Collaboration Programme on
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