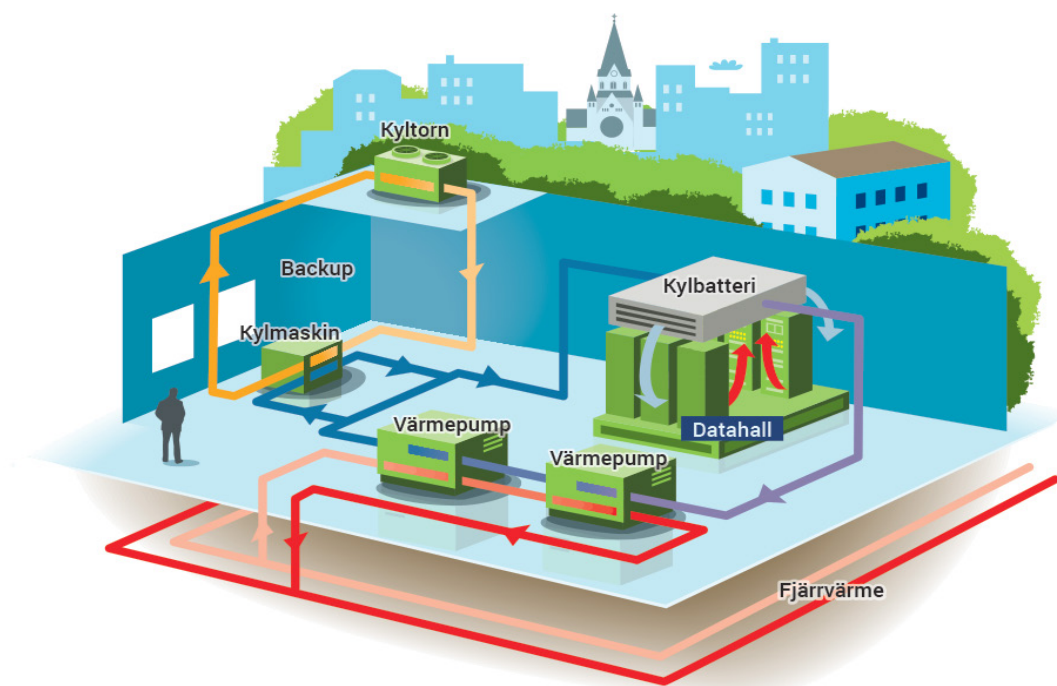


PROFITABLE HEAT RECOVERY WITH OPEN DISTRICT HEATING



Summary of the project

Stockholm Exergi has a business model called “Öppen fjärrvärme” or “Open District Heating”, where a company or organization with excess heat and located in connection to the district heating or cooling grids in Stockholm can sell the energy to the DH grid for market price. Open District Heating is a large-scale heat recovery model that is available to all actors, it is standardized and transparent.

One company using this is the internet service provider Bahnhof, located in southern Stockholm. Bahnhof has transformed an old mountain room into a futuristic data hall. The hall is called Pionen and consists of many cabinets filled with data equipment. With increasingly dense and powerful hardware, a modern computer hall becomes very energy intense and the cooling needs to be dimensioned to handle the heat from the cabinets.

From the start at 2007 when Bahnhof first took over Pionen and decided to build a computer hall, a conventional cooling system was installed. The surplus

”BAHNHOF BENEFITS FROM THE OVERALL PICTURE THAT OPEN DISTRICT HEATING PROVIDES IN TERMS OF ECONOMICS, ENVIRONMENT AND TECHNOLOGY”

heat from the condenser of the cooling machine was released to the environment with a fan.

Stockholm Exergi started a project called “open district heating”, which allows companies to sell surplus heat to the city’s district heating network. The solution for Bahnhof was a new installation with two series-connected heat pumps cooling Pionen. A 67-meter-long pipe connection has been connected from Pionen to the district heating network which makes it possible for Bahnhof to deliver their surplus heat to the district heating network. The compensa-



tion that Stockholm Exergi gives Bahnhof is entirely dependent on outdoor temperature. A cold winter day, a megawatt hour can be worth ten times more than on a hot summer day.

The open district project opens up for a new business model as it will be more profitable to build for instance a data hall near a district heating network than on a cheap plot.

The cooling facility consists of two series-connected heat pumps working as cooling machines. The two heat pumps have a total cooling output on 694 kW and a heat output on 975 kW. The system is oversized to make it possible for an increased input in the future and a larger energy density. The heat delivery is in normal operation approximately 600 kW and a delivery temperature on 68°C. The refrigerant is supposed to hold correct temperature on the cold side, if it doesn't than the old cooling machines starts.

The liquid cooling battery is cooling the data hall which increases the temperature of the water. The heated water is connected to the heat pumps which transfers the heat to the return pipe of the district heating which also is connected to the heat pumps. In that way surplus heat from cooling the data hall is being used in the district heating network. Heat transfer to the district heating network causes the water to a decrease in temperature. The water then circulates through the old cooling machine and in to the cooling battery again.

Results

- New business model for selling of excess heat to the district heating grid
- Cost-effective solution for process cooling
- Possibility of creating redundancy in the cooling system for increased operational reliability
- Heat recovery as part of sustainability work

FACTS ABOUT THIS PROJECT

Building type: All

Heated floor area [m²]: Hundreds of apartments

Heat source: Varying, e.g. data centers, grocery stores etc.

Location: Stockholm, Sweden

Company: Stockholm Exergi

Project partners:

- Stockholm city
- Bahnhof
- Hemköp
- Stiftelsen Stora Sköndal

Link to web page or report:

General: <https://www.opendistrictheating.com/>

Bahnhof example: <https://www.oppenfjarrvarme.se/case/bahnhof-pionen/>

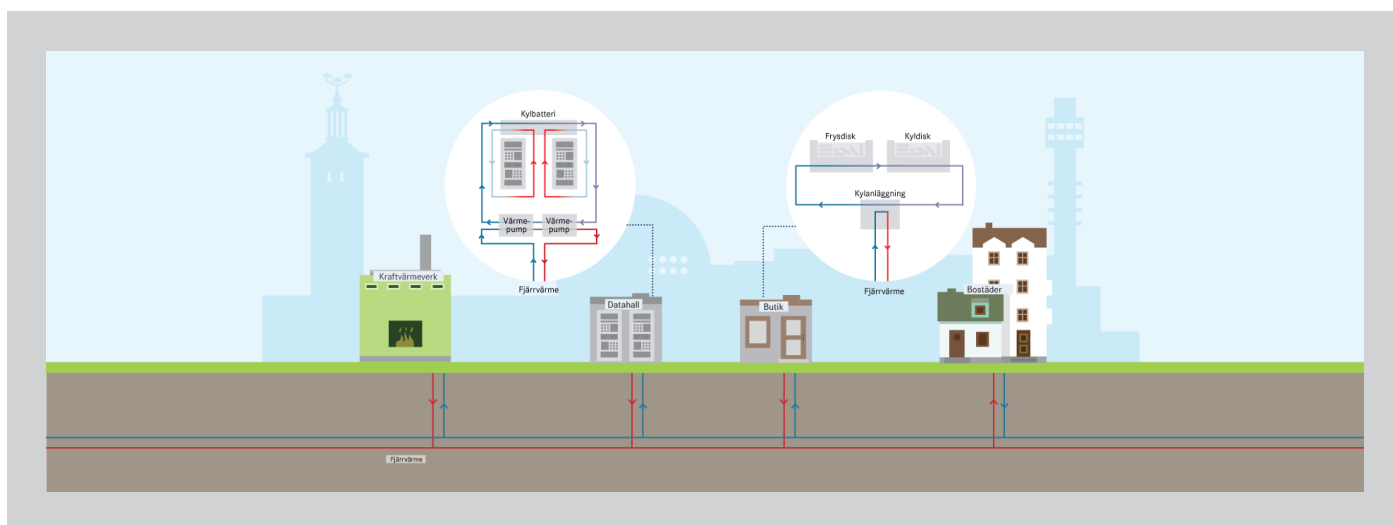
(in Swedish)

Contact information

Peter Sivengård, Stockholm Exergi

+46 (0)70 610 27 13

peter.sivengard@stockholmexergi.se



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