Case Studies

https://heatpumpingtechnologies.org/annex57/

ANNEX 57

Flexibility by implementation of heat pumps in multi-vector energy systems and thermal networks

District heating plant Neukölln, Berlin-Neukölln, Germany

"Large-scale heat pumps in district heating networks – installation, operation, monitoring and system integration"

KEY FACTS

Type of heat pump:
waste heat heat pump

Energy distribution System:
11,4 MW_{el}, 192 MW_{th},
1,2 MW_{th} heat pump

Energy Storage:
heating storage (10.000 m^3)

Control for the flexible heat pump operation:
Heuristic control: optimization for minute reserve on the electricity market

General description:
1,2 MW_{th} heat pump

Heat Source:
natural gas, heating oil, wood, hard coal, electricity

Project:
Place: Berlin / Germany
Time Frame: 4/2021 - 3/2026
Owner/leader: Fernheizwerk Neukölln AG
R&D-project partners:
AGFW; Fraunhofer ISE; IER Stuttgart

Funding
Federal Ministry for Economic Affairs and Climate Protection (BMWK) due to an enactment of the German Bundestag under grant number 03EWR008A.

Summary of the project:

The Neukölln district heating plant provides heat and electricity using a range of fuels: Natural gas, fuel oil, wood and hard coal are burned in 7 large boiler plants and 8 CHP units. Heat is stored in a 10.000 m^3 reservoir, providing a thermal capacity of around 300 MWh_{th}. The district heating network is 120 km long and supplies approximately 440 GWh_{th} per year at a supply temperature of up to 115°C.
The newly installed heat pump uses the waste heat from the CHP charge-air coolers. The LHP has a thermal nominal power of 1,2 MW_{th}, employs a reciprocating compressor and ammonia as a refrigerant. It converts hot water at a temperature of about 50 °C to 85 °C hot water to increase the return flow of the district heating network.
In the Real-World Laboratory the integration of the LHP in the district heating network and the optimal application regarding grid friendliness and economic efficiency is being investigated.

Contact Information/Links

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https://www.ise.fraunhofer.de/de/forschungsprojekte/reallabor-grosswaermepumpen.html