Case Studies

https://heatpumpingtechnologies.org/annex57/

ANNEX 57

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

Waste-to-energy CHP plant, Stuttgart-Münster, Germany

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

KEY FACTS

Type of heat pump:
river heat pump

Energy distribution System:
184 MW_{el}, 447 MW_{th},
20,5 MW_{th} heat pump

Energy Storage:
-

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

General description:
20,5 MW_{th} heat pump

Heat Source:
river water, electricity, waste, hard coal

Project:
Place: Stuttgart / Germany
Time Frame: 4/2021 - 3/2026
Owner/leader: EnBW Energie Baden-Württemberg 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 waste-to-energy CHP plant generates electricity and heat in 3 coal-fired and 3 waste-fired boilers. The heat is distributed through a nearly 275 km long network around the city. The network reaches supply temperatures up to 130°C and provides for about 17 % of Stuttgart's households.
The newly installed heat pump is a first step towards climate neutrality. The river heat pump uses the cooling water of the waste-to-heat CHP and thus the waste heat to provide district heating water up to a temperature of 90°C. The LHP has a nominal thermal power of 20,5 MW_{th}, uses a four-stage turbo compressor with an intercooler and operates with the refrigerant R-1234ze(E). In the Real-World Laboratory the integration of the LHP in den district heating network and the optimal application regarding grid friendliness and economic efficiency is being investigated.

Contact Information/Links

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