Large-scale power plant Mannheim, Mannheim-Neckarau, 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:**  
$1.958 \text{ MW}_{el}$, $1.500 \text{ MW}_{th}$, $20.5 \text{ MW}_{th}$ heat pump  
**Energy Storage:**  
district heating storage ($43.000 \text{ m}^3$, $1.500 \text{ MWh}_{th}$)  
**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, hard coal  
**Project:**  
**Place:** Mannheim / Germany  
**Time Frame:** 4/2021 - 3/2026  
**Owner/leader:** MVV Energie AG  
**R&D-project partners:** AGFW; Fraunhofer ISE; IER Stuttgart  


**Summary of the project:**

In the large-scale power plant Mannheim about 1,6 TWh heat are generated each year and distributed through a nearly 600 km long network around the city. The heat is provided by the burning of hard coal in 4 power plant blocks. Additionally the heat is stored in a storage with a thermal capacity of 250 MW$_{th}$. The network reaches supply temperatures up to 130°C and provides for about 60 % of Mannheim's households.  
The newly installed heat pump is a first step towards climate neutrality. The river heat pump uses about 5°C warm water from river Rhein to provide district heating water up to a temperature of 99°C. The LHP has a nominal thermal power output of 20,5 MW$_{th}$ uses a two-stage compressor with a flash tank 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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https://www.ise.fraunhofer.de/de/forschungsprojekte/reallabor-grosswaermepumpen.html

**funding**

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

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