# LARGEST AIR-WATER HEAT PUMP SYSTEM IN GERMANY



Metal Industry: SMS Hilchenbach (Germany, North Rhine-Westphalia)



Gefördert durch:

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**ENERGY FOR MORE.** 





Visualization system flow diagram of the lighthouse project power-to-heat system (2-stage heat pump, electric boiler and buffer storage tank).

### THE CUSTOMER

The SMS group is an internationally active company in the field of metallurgical and rolling mill technology and stands for future-oriented technology and outstanding service in plant and mechanical engineering for the metal industry worldwide. The company employs around 4,000 people in Germany. The main sites are located in Hilchenbach-Dahlbruch, Mönchengladbach and Düsseldorf. The Hilchenbach site is the nucleus of SMS group GmbH.

## THE CHALLENGE

At the production site in Hilchenbach-Dahlbruch, GETEC has been operating a heating plant based on fossil fuels to supply heat to the buildings since 2004. Due to its sustainability strategy, the customer is aiming to completely decarbonize its energy supply.

#### THE SOLUTION

In future, a power-to-heat system will consist of a two-stage heat pump cascade (1st stage air-to-water, 2nd stage water-towater), an electric boiler, a heat storage tank and peripherals for generating heating water.

The heat pump cascade covers the base load of the heat supply. For this purpose, energy is extracted from the ambient air via the first heat pump stage (air-to-water heat pumps) and temporarily stored at a higher temperature level in the source storage tank. The second stage, consisting of the water-to-water heat pumps, extracts the energy from this storage tank and raises the lower storage tank temperature from 65 °C to 85 °C. The intelligent control technology enables flexible and economical interaction between the heat pump, electric boiler and buffer cylinder.

During summer operation and the transitional periods, the heat pump system is operated in a sequential circuit with the electric boiler. The heat pump system takes over and charges the stratified storage tank to the required summer base load as required. The electric boiler follows the heat pump system and reheats the stratified storage tank if necessary. The electric boiler is controlled externally for participation in the balancing energy market. In winter mode, the heat pump cascade and the electric boiler operate in parallel. The heat pump system provides the base load up to a cylinder temperature of 85 °C. The electric boiler in turn reheats the stratified storage tank up to a system flow temperature of 95 °C.

With the GETEC solution, SMS group avoids  $CO_2$  emissions of around 6,000 tons per year. The project is funded by the federal government and thus supports the German government's sustainability strategy.

# SCOPE OF SUPPLY AND SERVICES

- · Project Development
- · Permitting
- · Engineering and plant installation
- · Financing
- · Operation and Maintenance
- · Energy Management
- · Subsidy management

#### PLANT DATA

Supply with:	Warm water
Energy source:	Electricity
Components:	2-stage heat pump system E-boiler 1,000 m³ buffer storage tank
Installed Capacity:	4 MW <sub>th</sub> (Heat pump) 4 MW <sub>th</sub> (E-boiler)
Parameter:	Warm water: 95 °C