

NEFI AHEAD - Advanced Heat Pump Demonstrator



Figure 1: NEFI AHEAD Heat Pump at Takeda pharmaceutical production site in Vienna, Austria (photo: Takeda)

Summary of demonstration case

In the NEFI project **AHEAD**, an innovative heat pump system is being demonstrated at Takeda in Vienna to generate steam at 11 bar (a)/184°C for industrial processes to increase energy efficiency and to lower CO₂ emissions.

Harald Erös, Refrigeration and Heat-Pump Engineering Lead at Takeda Manufacturing Austria AG:

„Takeda is a patient-focused company dedicated to sustainability and innovation. With AHEAD, developed in close collaboration with AIT, we are setting new standards for responsible and future-ready manufacturing — a true lighthouse project for the industry and society.”

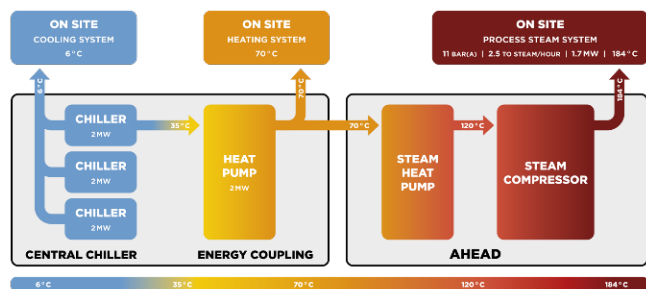


Figure 2: Takeda's energy plant

The AHEAD heat pump system is integrated at one of **Takeda's** largest pharmaceutical production sites at Lange Allee 24 in Vienna, uses hot water at 70°C provided by an existing heat pump as its source. The AHEAD heat pump system consists of a steam generating heat pump by SPH Sustainable Process Heat that produces steam at 120°C (approx. 1.9 bar(a)) and a steam compressor from Spilling to increase the temperature and pressure of the steam to 184°C and approx. 11 bar(a). The heat pump system can be expanded to temperatures of 200-260 °C without further technology development. The goal of the AHEAD heat pump system is to reduce CO₂ emissions by approx. 80%.

The steam generating heat pump in the AHEAD system from SPH delivers maximum heating capacity of 1.7 MW at a COP of approx. 4.4 and uses R600 (n-butane) as a refrigerant.

The steam compressor in the AHEAD system from Spilling has a steam capacity of 2.5 t/h.



Operating experiences

Scientific monitoring and optimisation for more than 4000 h is planned in the AHEAD project. Results are expected in 2026.

Special learnings

Results and special learnings are expected in 2026.

The AHEAD project is supported with the funds from the Austrian Climate and Energy Fund and implemented in the framework of the RTI-initiative "Flagship region Energy".

FACTS ABOUT THE CASE

Installation year: 2025

Operating hours: commissioning in 09/2025

Working fluid used: R600 (first stage) and R718 (second stage)

Compressor technology: piston compressors

System manufacturer: SPH Sustainable Process Heat (first stage: SPH, second stage: Spilling)

Sector: Pharmaceutical

Performance in design point: -

Investment cost: -

Savings: -

Estimated annual CO₂ savings: -

Link to webpage or report:

<https://www.nefi.at/en/project/ahead>

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