INP Reference

General Planning – Large-Scale Heat Pump for Data Center KMW

LOCATION: Mainz, Deutschland

SYSTEM/TECHNOLOGY: Large-Scale Heat Pump

SERVICES: Production monitoring, Commissioning, Project management, Quality assurance, Site management, Documentation, Pre-project planning and tendering, Basic-engineering and pre-engineering, Detail engineering, Installation supervision, Solution development / Feasibility studies

INDUSTRY BRANCH/TYPE OF PLANT: Green Energy

CLIENT: Kraftwerke Mainz-Wiesbaden AG

ACTIVITY PERIOD: 2025 to 2027 (expected)

POINTS OF CONTACT

Michael Ohmer
Leiter Energie- und WärmeVersorgung
INP Deutschland GmbH
Werkstraße 5
67354 Römerberg
Deutschland
Tel. +49 6232 6869-0
michael.ohmer@inp-e.com
www.inp-e.com

Tasks

A data center consisting of three building modules is currently being constructed on site of Kraftwerke Mainz-Wiesbaden AG (KMW) in Mainz. Common goal with this
project is to feed the waste heat generated during data center operation into the Mainz district heating network via a central large-scale heat pump system.

The large-scale heat pump plant will be implemented stepwise. In the first expansion phase, the waste heat from the first data center module will be utilized. In a second expansion phase, the additional modules will be integrated. Each data-center module can provide up to 15.6 MW of waste heat at a temperature level of approximately 28°C, enabling more than 30 MWth of thermal output to be generated via large-scale heat pumps and supplied to the district heating network.

Project description

INP get contract for general planning engineering and services, covering all service phases in accordance with the German HOAI framework — from conceptual design and detailed engineering to permitting and execution planning, implementation and construction supervision. The project represents a key milestone in the decarbonization of the heat supply in Mainz.

As general planner, INP is responsible for the holistic design of the large-scale heat pump system at the KMW site. This includes technical building and plant engineering design, as well as all interfaces to the power supply, heating storage systems, and data center infrastructure.

Key challenges are integrating of a existing building under monument protection into the planning of a new machinery building as well as precise coordination with the district heating network operator. A central goal is to ensure an average COP of at least 2.6 in order to secure funding eligibility.

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INP Services

INP provided the following services:

- Engineering of building and supporting structure for rebuild and for new construction
- Development of the technical building equipment for building and heat pump system
- Conceptual design of the large-scale heat pump technology, including selection of compressor and heat exchange systems, considering various refrigerants
  Green Energy
- Plant engineering of heat pump system including connection to the data center as heat source and integration into the existing district heating network
- Engineering of electrical power supply and switchgear systems
- Development of an integrated building and plant model (CAD/BIM, IFC, DWG)
- Engineering of outdoor facilities including underground routing, earthworks, and surface design
- Approval planning in consideration of monument protection requirements
- Interface management with parallel projects on plant site
- Preparation of the overall project schedule (MS Project), including all dependencies and continuous schedule tracking
- Execution planning, preparation and participation in the tendering process
- Construction supervision and coordination of all involved disciplines
- Overall integration planning of the main systems across all disciplines and engineering of relevant auxiliary systems for the large-scale heat pump plant
- Preparation of approval-relevant aspects based on regulatory requirements and the selected approval procedures