Heat pump
reference case

Energy
Industries

DIN Forsyning Esbjerg

To help the coastal city of Esbjerg phase out coal and decarbonize its district heating network, DIN Forsyning partnered with Everllence to build one of the largest industrial heat pump installations in the world. The system harnesses thermal energy from the Wadden Sea and transforms it into zero-emission heat for 25,000 households – setting a benchmark for sustainable heat supply in urban coastal environments.

Everllence

Key facts

- End customer: DIN Forsyning (Denmark)
- Application: District heating for 25,000 households
- Scope of delivery: Two heat pump units with HOFIM® compressors
- Refrigerant: CO_2 (R744)
- Heat source: Seawater at 1–15 °C
- Heat sink: Water at 60–90 °C
- Heat output: Up to 65 MW
- COP: ~3.0–3.7
- CO_2 savings: 120,000 t p.a.

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Project background

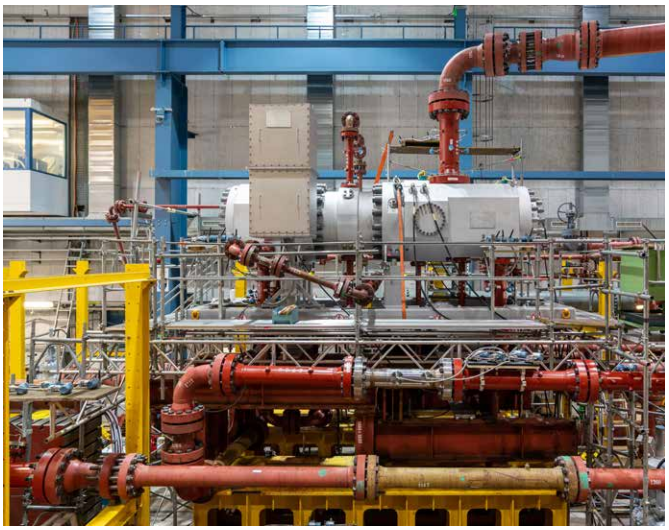
In support of Denmark's 2030 climate targets, utility company DIN Forsyning is replacing Esbjerg's coal-fired heating infrastructure with a fossil-free, seawater-based heat pump system. Supplied by Everllence, the plant features two of the world's largest industrial supercritical CO_2 heat pumps. The project is a cornerstone of the city's decarbonization strategy and showcases how green electricity and coastal resources can deliver clean district heating to thousands of homes.

System integration & application

The heat pumps extract low-temperature energy from seawater at the Esbjerg Harbor and raise it to up to 90 °C for distribution in the district heating grid. The system is fully powered by electricity from offshore wind farms and leverages oil-free HOFIM® compressors with magnetic bearings to ensure durability and efficiency. With a capacity of up to 65 MWth, the installation enables flexible operation and supports sector coupling by balancing the electricity grid and decoupling heat production from real-time consumption.

Operational impact & scalability

The system supplies 280,000 MWh of thermal energy annually, providing fossil-free heat to 25,000 households. This transition is expected to cut Esbjerg's CO_2 emissions by around 120,000 tons each year. Designed to operate in harmony with a UNESCO World Heritage Site, the heat pump installation is a pioneering model for sustainable coastal energy use and scalable heat decarbonization across Europe.



Everllence heat pump units during full-scale testing and commissioning

Technical highlights

Heat source	Seawater at 1–15 °C
Heat sink temperature	60–90 °C
Total heating capacity	Up to 65 MW (2 units)
Annual heat output	280,000 MWh
Refrigerant	CO_2 (R744), a natural and non-toxic refrigerant
Technology	Oil-free HOFIM® compressors with high-speed motors and magnetic bearings
Electrical input	Green electricity from wind power
COP	~3.0–3.7
Annual CO_2 savings	120,000 tons

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