Heat pump
reference case

Energy
Industries

Aalborg Forsyning

Aalborg is transforming its energy infrastructure with one of the world's largest seawater-based heat pump installations. Supplied by Everllence, the 177 MW system will replace coal-fired generation and provide one third of the Danish city's district heating – powered by renewable electricity and natural CO_2 refrigerant.

Everllence

Key facts

- End customer: Aalborg Forsyning (Denmark)
- Application: District heating for 120,000 households
- Scope of delivery: Four heat pump units with HOFIM compressors
- Refrigerant: CO_2 (R744)
- Heat source: Seawater at 1–15 °C
- Heat sink: Water up to 98 °C
- Heat output: 177 MW
- COP: 3–3.5
- CO_2 savings: 210,000 t p.a.

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Project background

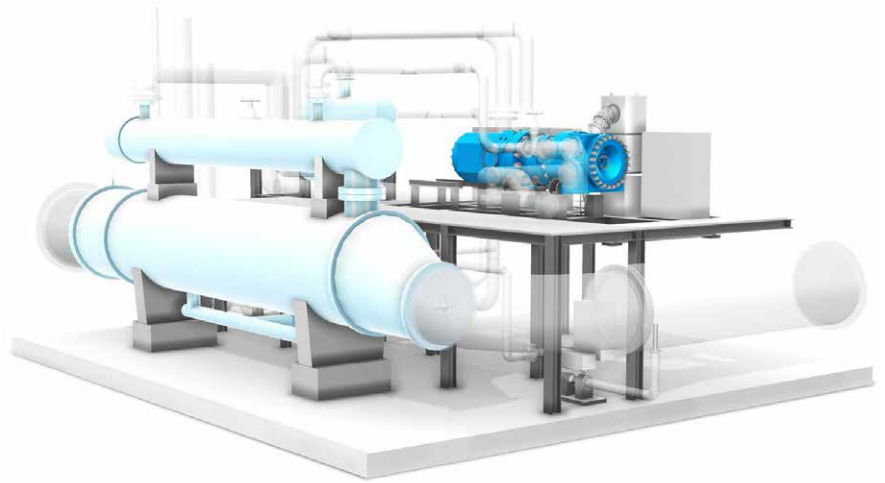
To support Denmark's climate targets and phase out coal by 2028, Aalborg Forsyning is implementing a large-scale decarbonization project. Central to this effort is a future heat pump plant developed in collaboration with Everllence. Once fully operational, the facility will permanently replace fossil-fueled heat production and cover one third of the city's total district heating demand. Designed to deliver high-temperature heat and long-term efficiency, the project plays a key role in Aalborg's urban energy transition.

System integration & application

Located at the Limfjord strait, the heat pump plant uses seawater as a renewable heat source and CO_2 (R744) as the working fluid. The system lifts the temperature from 1–15 °C up to 98 °C to meet district heating standards. Designed for flexible operation and powered by green electricity, the heat pump units can quickly react to changing heat demands while supporting grid stability through sector coupling. The use of natural refrigerants ensures safe, climate-friendly performance at industrial scale.

Operational impact & scalability

With four units delivering a total heating capacity of 177 MW, the system will supply up to 700,000 MWh of clean heat annually – enough for over 120,000 residents. The installation is expected to cut CO_2 emissions by up to 210,000 tons per year, replacing Aalborg's coal-based heat supply. Oil-free HOFIM® compressors with high-speed motors and magnetic bearings ensure high system availability and minimal maintenance. As a large-scale, seawater-based solution, the project serves as a scalable model for sustainable district heating across Europe.



Seawater heat pump system by Everllence for Aalborg's district heating plant.

Technical highlights

Heat source	Seawater at 1–15 °C
Heat sink temperature	Up to 98 °C
Total heating capacity	1 77 MW (4 units with ~44 MW)
Annual heat output	Up to 700,000 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 renewable sources
COP	~3.0–3.5 (estimated)
Annual CO_2 savings	Up to 210,000 tons

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