Press release

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MAN Energy Solutions to Deliver Additional Heat Pump Unit for Aalborg's District Heating

- **Danish city set to cut up to 210,000 tons of CO_2 emissions annually using a climate-friendly seawater heat pump plant with a heating capacity of 177 MW**
- **MAN Energy Solutions receives follow-up order for a fourth heat pump unit from Aalborg Forsyning**

Danish multi-utility company, Aalborg Forsyning, has placed a follow-up order with MAN Energy Solutions for an additional heat pump unit, increasing the overall heating capacity to 177 MW with four units. This follows the initial order submitted in 2023, significantly expanding the scope of the project. Each heat pump has a capacity of around 44 MW, making them the largest heat pump units ever to be installed in district heating plant worldwide. Collectively, the plant will supply up to 700,000 MWh of heat annually, or equivalent to one-third of Aalborg's heat production.

Situated on the northern bank of the Limfjord strait, the district heating plant will use seawater as a heat source. The heat pumps will utilize electricity from Aalborg Forsyning's renewable sources to elevate the water temperature from 1-15° Celsius up to 98°, which is the temperature used in the district heating network. This project will reduce CO_2 emissions by up to 210,000 tons annually compared to the city's coal-fired power plant, scheduled for closure in 2028.

Mikael Adler, Head of Sales and Project Management Heat Pumps at MAN Energy Solutions, stated: "This follow-up order from Aalborg Forsyning underscores their trust and confidence in our heat pump technology. We are excited to continue our collaboration on this pivotal project and are particularly pleased to support Aalborg on its path to net-zero. The integration of this fourth heat pump unit will further enhance the environmental benefits of the city's district heating network."

Jesper Høstgaard-Jensen, Technical Director at Aalborg Forsyning, added: "We are delighted to expand the overall heating capacity in collaboration with MAN Energy Solutions. These seawater heat pumps are the key part of our transition from coal-based to climate-friendly district heating, providing flexible heat at a very high temperature of up to 98°C. Additionally, it is a clear advantage that MAN's technology uses a natural refrigerant, making it well-suited for heat-pump operation at such high district-heating temperature."

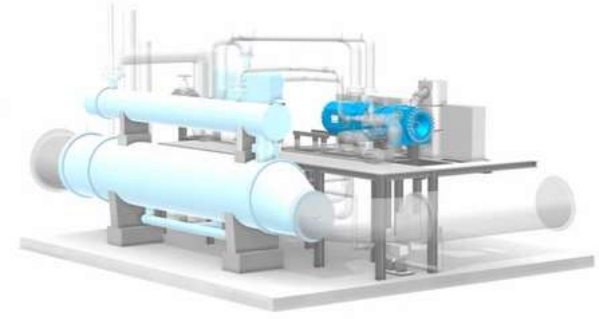
MAN Energy Solutions is executing the project in collaboration with two partners: Bilfinger is responsible for the design and construction of the mechanical systems, while ACS handles the design and implementation of the electrical infrastructure. The involvement of these partners from the very beginning of the project, along with the cooperation between MAN and Aalborg Forsyning, ensures seamless integration into the heat pump system.

Harnessing the power of thermal energy

The basic principle of heat pump technology is to use electrical energy to elevate low-temperature thermal energy to a higher, usable level. For every MWh of electrical energy invested, approximately three MWth of usable thermal energy can be generated. A key feature of MAN's solution is its use of toxicologically- and environmentally-safe CO_2 as a refrigerant for the entire system-cycle. Additionally, the solution enables fast power-balancing of the electrical grid and thus supports the integration of intermittent power generation like solar and wind.

Core elements of Aalborg's future heat pump plant are four oil-free, hermetically-sealed HOFIM® motor-compressor units, which are manufactured and tested by MAN Energy Solutions in Zurich, Switzerland. The compression unit utilises a high-speed motor and active magnetic bearings, enabling it to operate without the need for a dry gas seal system and a lube oil system. The scope of contract also encompasses a Long-Term Service Agreement with MAN PrimeServ, including PrimeServ Assist for real-time monitoring, data-analytics and diagnostics of the compressor technology.

For more information about MAN's heat-pump technology, visit:
Heat up Carbon down (man-es.com)



MAN heat pump system featuring the hermetically-sealed HOFIM® compressor at its core (© MAN Energy Solutions)

The future district-heating plant in Aalborg, Denmark, will house the world's largest seawater heat pump units by MAN Energy Solutions (© C.F. Møller Architects)

MAN Energy Solutions enables its customers to achieve sustainable value creation in the transition towards a carbon neutral future. Addressing tomorrow's challenges within the marine, energy and industrial sectors, we improve efficiency and performance at a systemic level. Leading the way in advanced engineering for more than 250 years, we provide a unique portfolio of technologies. Headquartered in Germany, MAN Energy Solutions employs some 14,000 people at over 120 sites globally. Our after-sales brand, MAN PrimeServ, offers a vast network of service centres to our customers all over the world.