Sdr. Felding. Denmark

“District heating company expands their existing biomass-based production.”

Key Facts

RD&D Status:
Large-scale demonstration

Type of heat pump:
Centralized HP with district heating-system 3,5 MW
air/water

Building description:
740 households are connected mainly Single-family houses.

Energy distribution System:
District heating, Electrical connected to the grid.

Energy Storage:
Buffer tank.

Control for the flexible heat pump operation:
Predictive control

General description:
Number of heat pumps:
2 Air/water CO₂ heat pumps
Total capacity 3,5 MW Heating
10 MW electrical boiler
Outlet/inlet temperature: 70 (85)/35

Heat Source:
Air
Storage: Water tank

Summary of the project:

The district heating company in Sdr. Felding has expanded their existing biomass-based production facilities with a large heat pump, a huge buffer tank and a 10MW electrical boiler. This visionary installation really shows the future of district heating, which will be smokefree and serve as an important player in balancing the electrical grid. It will absorb large amounts of green electricity when it is available and utilize the stored energy from the tank when the electricity supply is lower than the demand.

Expected results:

The operator expected to run the system at 70 °C, but are running it at 85 °C which increases the storage capacity by 30%. The District Heating plant can act in the ancillary service market with the Heat pump and electrical boiler in combination. And they are approved by the Danish TSO Energinet to deliver into the market both into the aFRR and mFRR regime.

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### Best Practice Examples

#### Energy supply scheme:
Fenagy has supplied 2 x H1800 air to water heat pumps including 12 flatbed evaporators and the installation is carried out by Krebs A/S. The heat pumps are equipped with the newest Fenagy ejector technology (FenEject), optimized evaporators and controlled by the Fenagy PLC with algorithms for capacity control, evaporator control, and defrost. The control system can start and stop the machines so fast that they are suitable and relevant for the rules of the regulating market game.

#### Flexibility – scheme and control strategy of the system:
The Heat Pump is tested regarding the reaction time. It has a start up time within 7 minutes, and a turn down time within 4 minutes, as shown in the graphs below. This means that it is able to act in the aFRR regime.

The heat pump and the Electrical boiler supplement each other, when it comes to deliver ancillary services the boiler can react very fast up and down, and can supplement the heat pump to reach the bid limet when the plant operator is putting offers in to the market.

The tank increases the flexibility and can store up to a weeks district heating consumption.

#### Published articles:
N/A

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### FACTS ABOUT THE PROJECT

**Place:**
Denmark/ Sdr. Felding

**Time Frame:**
Start 2022

**Project owner/leader:**
Aalborg District Heating

**Project partners:**
Owner: Aalborg District Heating,
(Design/production): Fenagy A/S,
Installation: Krebs A/S

**Contact Information/Links**
Sdr. Felding Fjernvarme
https://sfvv.dk

**Delivered by:**
Team Denmark