Energie Burgenland HP Neusiedl am See

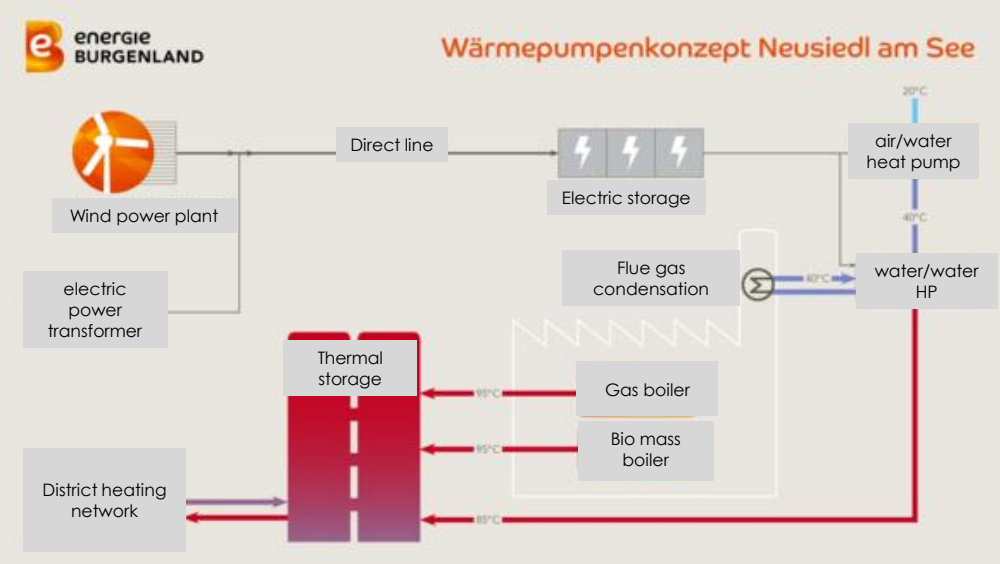


Figure 1: Heat pumps are supplied by excess wind electricity to substitute gas in the district heating network

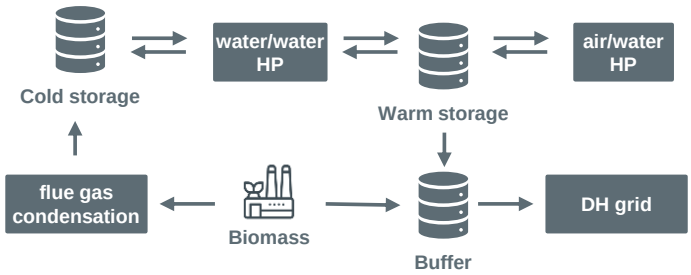
Summary of project

The project is located in Neusiedl am See, a town with increasing population size. Within this project, the existing infrastructure of a district-heating network as well as the biomass-boiler was extended by a direct line to the nearby wind park, a battery storage as well as four heat pumps.

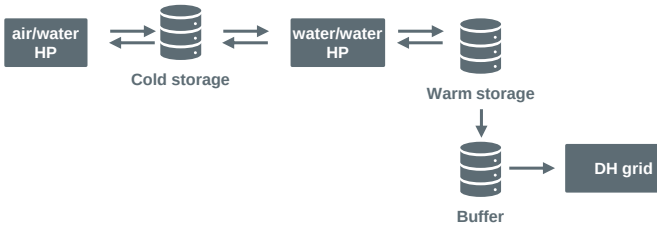
The trigger for this innovative concept was that wind capacities dropped out from the support system around 2015/2016. This provided the case to look for the most profitable use case for wind energy. Depending on the COP and the heat price, using wind electricity for heat production could provide a good upside potential.

In a first step, the wind profile was compared to the heat profile and resulted in a good fit, 80% of time where heating was on, wind was available. To cover the heat load, only a small fraction of the 32MW wind park 'Neusiedl' needs to be used. A direct electricity line of 1.5MW was built for around 2km from the transformer station to the existing biomass/gas heating plant.

In winter, the majority of the heat load is covered by biomass. When biomass is on, flue gas condensation delivers water of around 30/35°C into the cold storage. From there, 2 water-water heat pumps lift the heat level of the warm-buffer of around 60/65°C to around 65/70°C. Additionally, 2 air-water heat pumps are supplied by the warm buffer with 74°C/78°C which they lift by 4°C. Heat load in winter is between 1-4MW.



In summer, the biomass plant is not operational and the heat from flue gas condensation is replaced by air-water heat pumps which deliver heat at level of 30/35°C that was done by the flue gas condensation before. From there on, same procedure as in winter. Heat load in summer is around 0.5-1MW.



The concept ensures the use of excess electricity from the nearby wind park for heating purposes and provides therefore a unique flexibility option. This leads to significant reductions in:

- the consumption of biomass (1,200 t/a)
- natural gas (1,250 MWh/a)
- CO2 emissions by around 300 t/a
- Less transport of biomass

"This Power2Heat concept opens the door into a climate-neutral heat supply that. Such innovative concepts form the basis for decarbonization of the region."

Technical facts

- 2 water/water heat pumps, 600kW each
- 2 air/water heat pumps, 600kW each

- Cold-water storage 17m³
- Hot water storage 17m³
- Buffer storage 2x150m³

- Around 10% of heat is produced from gas, 40% from biomass and 30% from wind.

Learnings and results

The project is considered innovative as it demonstrates an integrated energy system connecting a wind park directly with heat generation through heat pumps. A challenge consists the environmental conditions regarding noise for the surrounding neighborhood.

FACTS ABOUT THE PROJECT

IoT Category: Optimize heat pump operation
Goal: Reduce costs from gas-use in heat generation and use biomass more efficiently
Beneficiary: wind park operator
Data required: wind forecasts, heat demand
Analysis method: control engineering]
Modelling requirements: N/A
Quality-of-Service: Real-time
Project participants: Energie Burgenland, Ochsner Heat Pumps, Green Energy Lab
Time schedule: 2018-2021
Technology availability: TRL 9

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