

Ronneby Miljö & teknik



Ronneby Miljö & Teknik AB (Ronneby Environment & Technology AB) is a municipally owned company, which is wholly-owned by the municipality of Ronneby. They manage power, heat, water, sewage, garbage collection, fiber optic networks and broadband.

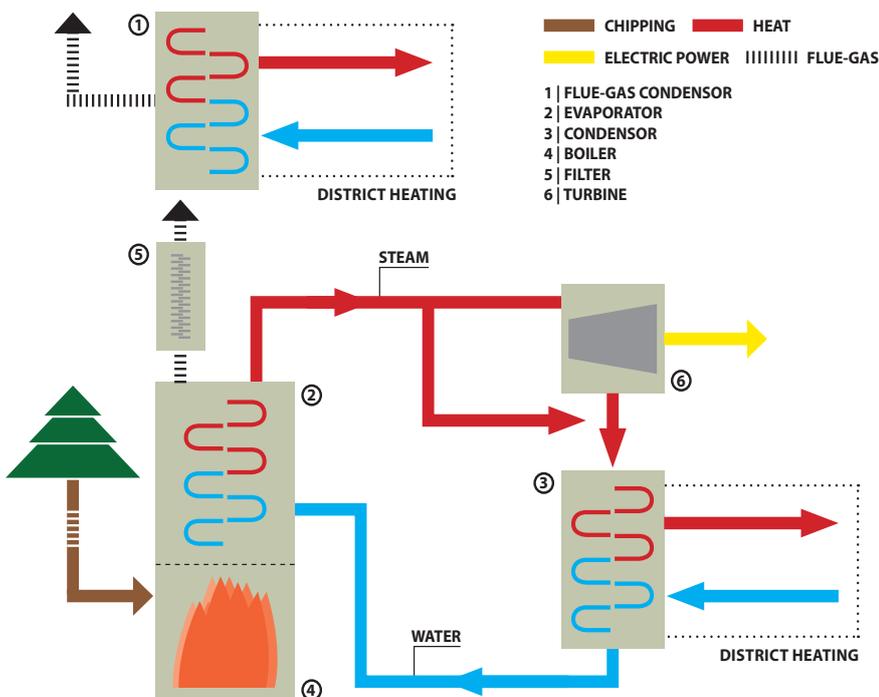
Sörbyverket in Ronneby has built a plant for wet steam, a steam turbine for electricity production at an existing district heating plant.

Compared to ordinary steam turbines, a wet steam turbine (WST) can operate at lower pressures and temperatures, with saturated steam. The wet steam turbine is a more robust but not as efficient as conventional turbines. But unlike them, the WST can handle some water particles.

The wet steam turbine is based on the same principle as a conventional steam turbine, which means that it needs to be cooled to condense and release heat.

Although the WST does not need to have superheated steam, the boiler needs to produce steam and if a wet turbine is installed in an existing plant, it is most economically advantageous if the boiler is already equipped with a steam turbine. The electrical efficiency of a wet steam turbine is up to about 15%.

PROCESS PICTURE



PLANT DATA

EFFECT

500 kW of electricity

OPERATING HOURS/YEAR

Approximately 4 900 hours

ELECTRICITY

Max 2 450 MWh / year

INVESTMENT COST

Approximately 16.8 million

THE ESTIMATED PAYBACK

Approximately 17 years (if 4 900 hours) 10 years (if 8 000 hours)

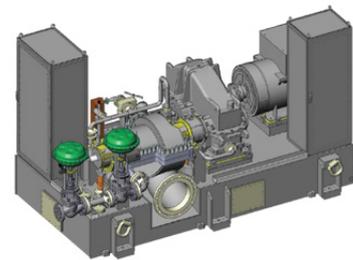
RAW MATERIAL

Wood chips, forest residues, bark, etc.

MOISTURE IN RAW

MATERIAL

35–50%



MODEL

Turbine from
M+M Turbinen-Technik



Sörbyverket

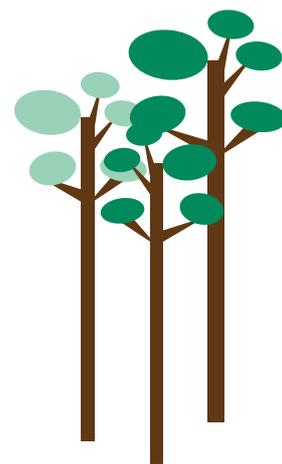
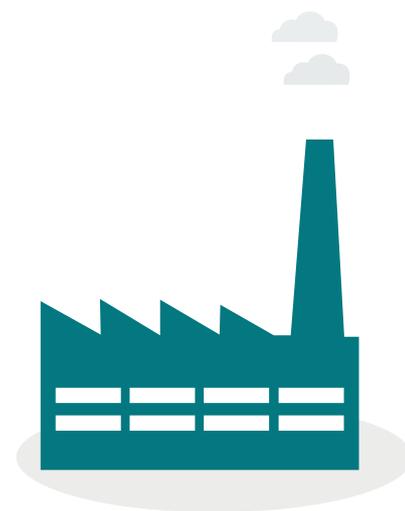
Lessons learned



To install a new technology in an old system and get the technologies to communicate and to function optimally can be difficult, especially if the supplier of the turbine focuses on generating as much electricity as possible without taking the entire system into account.

For a wet steam turbine to function optimally and with the best system efficiency for district heating deliveries, the conclusion is that a turbine that requires as much intervention in an existing plant as a wet steam turbine does, should work best if the entire system is adapted from the beginning.

The demonstration of the wet steam turbine had initial problems due to a design error, but when they were solved, the availability of the turbine was high. It would therefore be interesting to test a wet steam turbine on the same scale in a new construction of a combined heat and power plant to be able to evaluate the plant from that perspective.



Resultat

In order for the wet steam turbine to become a commercially viable technology, some conditions must be met.

For example, a higher electricity price is required, preferably in combination with a lower price for biomass.

The current tax limit on biopower also affects the profitability of installations around 50 kW.

