

Master thesis Heat recovery from vacuum brazing furnaces

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Summary of “Heat recovery from vacuum brazing furnaces”

The thesis investigates the waste heat potential of Alfa Laval’s vacuum brazing furnaces in Ronneby and alternative ways of integrating the furnaces waste heat to the buildings HVAC system on site.

Alfa Laval in Ronneby uses vacuum brazing furnaces in its manufacturing process. These furnaces demand water cooling, and today the cooling energy is not recovered. The cooling temperature of the water is kept relatively low due to the risk of hot surfaces and personal safety, but also because of specifications from the furnace manufacturer. This thesis aimed to study how to raise the temperature of the cooling water in and out from the vacuum brazing furnace, and by that increase the temperature quality, which makes it easier to recover. By increasing the temperature quality of the cooling water, additional technology such as heat pumps wouldn't be necessary. Heat pumps use electricity to transfer heat between a hot and a cold space. However, the furnaces are believed to have the potential for high enough temperatures themselves, which could save all the installation and operating costs of those pumps. Different ways of integrating the recovered heat to the building's HVAC system on site at Alfa Laval Ronneby were also studied.

The main challenge was the low temperature qualities associated with the cooling water, which posed an obstacle to efficient waste heat recovery. Tests and analyses performed in the thesis are therefore mainly aimed at raising the temperature quality of the cooling water. During

the mapping of the current cooling systems used for the furnaces, it became clear that the suggested cooling system changes were necessary if an increase of the cooling water temperature would be possible in a safe and controlled way.

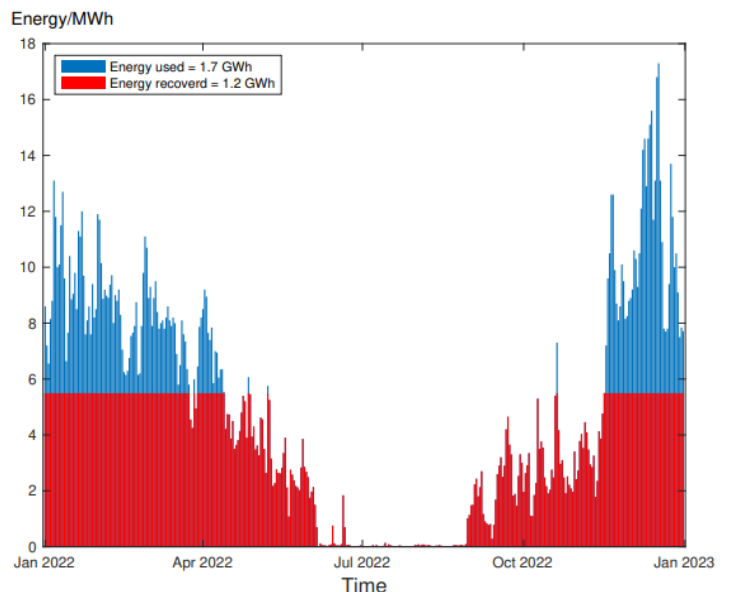


Figure 1: Potential energy recovery from 3 furnaces, each bar representing 1 day

When considering for example three furnaces that were studied, the suggested solutions and implementations have the potential to replace 1.2 GWh of purchased district heating energy yearly, seen in Figure 1. That would account for 71% of Alfa Laval's current total district heating usage.