

Energy Integration of Domsjö Biorefinery Cluster



June 2019
No. B 2357-S

Create new opportunities by energy saving



Within the Domsjö Biorefinery cluster in Örnsköldsvik, all the industries are cooperating regarding energy. The cluster consists of one wood pulp production facility, two bio-chemical facilities and one energy facility.

In this study, we have analysed how efficient the steam is used within the industries. Are steam of right pressure and temperature used for the right purposes? To what extent could steam be replaced by district heating? And, how big is the potential to use simultaneous heat and cold demand for energy integration? The potential has been studied both for the

industries separately, and for the cluster as one unit, a total-site analysis.

The method for energy analysis was “pinch analysis”. Through making a graphic representation of all hot and cold streams in one hot composite curve and one cold composite curve, it is possible to find the maximal overlap of the curves. The overlap represents the potential for energy integration.

It is found that steam of 7 bar(g) and 170 °C is used to supply a major part of the heat demand, sometimes even heat demands of low temperatures, down to 20 °C. Such demands would be more efficient to supply by a heat source of lower temperature. For example, district heating could be used for at least 7 MW of the heat demand, about 10 % of the total heat demand.

Furthermore, the finding is that two energy integration alternatives are particularly interesting. A new utility with temperatures 40/120 °C could be introduced, either within the total site, or only within the biggest of the industries. The practical heat recovery potential is about 15 MW for the total site, and about 10 MW at the biggest of the industries.

Both the two energy integration alternatives and the district heating alternative show good economic performance. From a climate-change perspective, the district heating alternative is particularly attractive since it leads to

increased electricity generation from renewable resources.

For all alternatives, steam capacity is released, which for example could be used for increased industrial production without investments in new steam boilers. Alternatively, the released capacity could be used to completely (or partially) offset the steam requirements of a new process plant at the Domsjö site. Also, an opportunity could be to produce more lignin for sale instead of burning the sulfate liquor in the recovery boilers.

This study has been made as part of the project named *Analysis and evaluation of energy integration in bio refinery clusters from a system perspective*, which also includes energy system modelling of an industrial site in Sundsvall.

The study was funded by the Swedish Energy Agency, Formas and the Swedish Environmental Protection Agency via the SIVL foundation together with the industries involved in the task: Domsjö Fabriker, Nouryon, SEKAB and Övik Energi.

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