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# Power plant produces more electricity with ABB variable speed drives

A Swedish energy company has increased the amount of energy it can sell by 35 GWh/year thanks to the installation of ABB medium voltage drives.

Mälarenergi AB is a city-owned electric power and district heating provider based in Västerås, Sweden. Because of issues affecting the industry such as EU directives, electricity certificates and the Kyoto protocol, Mälarenergi was looking for ways to be more environmentally friendly and more efficient in the production of electricity and heat.

The more effectively the plant is able to convert the fuel's thermal energy – either to electricity or to heat – the higher the efficiency of the plant. In recent years the focus has been on increased electricity production.

Mälarenergi had been using resistors connected to slip-ring motors to control the speed and hence the flow in the district heating pumps. The heat from the resistors was used in the production of district heat. This method of using the heat created by the losses is comparable to using electricity to produce district heating, an expensive method with today's high electricity costs.

To improve this situation, the company invited ABB to perform an energy appraisal, which revealed that a lot of energy could be saved by upgrading the pump and fan applications with the latest variable speed control technology.

ABB replaced the resistors and slip-ring motors on the district heating pumps with variable speed drive systems, including drives, high efficiency motors and transformers.

The total system involves seven ACS 1000 and one ACS 6000. They control four district heating pumps (4 x 1765 kW), a boiler feed pump (5750 kW), an accumulator pump (800 kW) and a fan and a pump for a new bio-fuelled boiler.

Since the installation of the variable speed drives, the losses caused by the inefficient flow control method have been reduced considerably. Although this has reduced the production of district heat from the resistors, this has been replaced by a higher production of electrical energy in the process that generates both heat and electricity. The losses were removed from the district heating system, which increases the cooling water temperature difference across the heat exchangers in the district heating circuit. This results in an increase in saleable electricity of about 35 GWh/year.

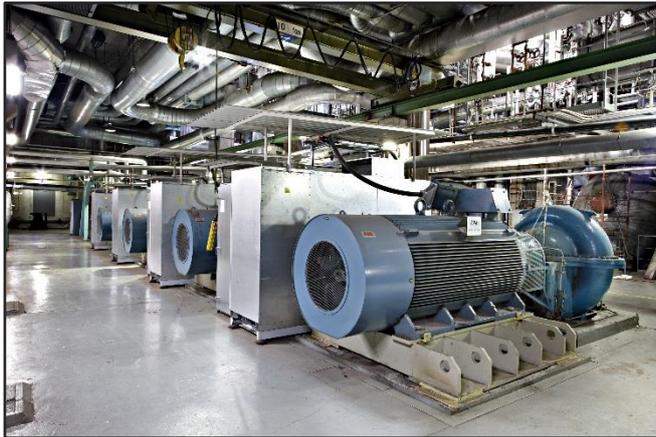
The increased plant efficiency also led to reduced CO<sub>2</sub> emissions.

Since the installation of the ACS 1000 drives, and a new control system, the differential pressure in the district heating pumps is controlled automatically. This gives more accuracy and more stability and a lower temperature of the return water, which allows a better utilization of the heat by the consumers. The new method has also led to reduced maintenance costs, as the existing motors were old and in need of major maintenance overhaul.

Sven Olof Kindstedt, System Engineer at Mälarenergi, says: "In the beginning it was difficult for us to understand how much the overall efficiency would improve with ABB's variable speed drive systems. But ABB managed to visualize this very well. Thanks to ABB's level of technical competence we have today a

more efficient operation, an improved heat rate of our plant and better balance in the district heating network.”

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**Caption:** A Swedish energy company has increased the amount of energy it can sell by 35 GWh/year thanks to the installation of ABB medium voltage drives.

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