Case note
ABB motors and drives save up to 80 percent energy at top modern combined heat and power plant

ABB motors and drives save up to 80 percent of the energy used by the Riskulla combined heat and power plant in Mölndal municipality in southwest Sweden. Precise control of all processes with ABB's System 800xA automation system contributes further to yield an efficiency level over 90 percent, even at times of low output.

About the Riskulla plant

Riskulla is a top-modern bio-fueled combined heat and power plant that provides Mölndal municipality with district heating and power. To meet future requirements, the customer, Mölndal Energi, wanted a plant equipped with a boiler that can be heated up with a mixture of fuels – including wet fuels such as wet branches, roots and treetops, and dry fuels such as stem wood and peat.

Plant capacity

The climate-neutral plant will produce 350 GWh district heating, which can heat 25,000 households in the municipality and annually produce 130 GWh electricity. To balance any surplus or shortfall, heat is traded with neighboring Gothenburg and electricity is traded on the Scandinavian electricity market, depending on supply and demand.

Project requirements

Since Riskulla is the dominating source of district heating in Mölndal, operational reliability is absolutely mission critical. In addition, to meet demands of efficient energy use, the system was designed to make use of all available energy sources, including surplus steam. This called for 30 percent more instrumentation and a more advanced control system than normal, which is why Mölndal Energi selected ABB's System 800xA.

ABB's System 800xA provides precise process control, allowing the plant to be operated close to its safety margins.

The 2 boiler feedwater pumps are fed by 830kW M3BP motors and ACS800 variable frequency drives. Both pump drive systems can deliver 100% of the required flow.

80 percent energy savings with ABB motors and drives

ABB has supplied motors, variable-frequency drives (VFD) and control system (System 800xA) to the plant. 60 percent of the more than 100 motors are equipped with VFDs. Although motors and drives represent less than one percent of the plant's total investment, they save up 80 percent compared to using throttle valves and guide vanes to adjust the flow of fuel, air and water.

Perfect control with System 800xA

Riskulla is a perfect example of a modern facility capable of smoothly adapting to load variations. System 800xA provides precise control of all processes, allowing the plant to be operated close to its safety margins, thus contributing to the plant's total efficiency of more than 90 percent.

Local service and support

Ready access to support was a decisive factor when Mölndal Energi selected ABB as its supplier. ABB's service center, which is part of a vast worldwide network, is located close to the plant. Mölndal Energi's service agreement with ABB includes after sales service on all ABB components.

VFD driven screw application with torque sensing for feeding fuel out of residual storage.

ABB's scope of supply

- More than 100 motors, from small up to the 1.4 MW motor for the flue gas fan
- More than 60 variable speed drives, installed on all motors requiring speed control and on all motors over 75 kW
- Driving pumps, fans, conveyors, screen shakers and crushers
- A completely integrated control system, System 800xA

Processes using ABB motors and drives

- Fuel handling
- Primary and BFB air
- Fuel feeding
- Ash removal
- Boiler feedwater pumps
- District heating pumps
- Flue gas treatment

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Summary of plant requirements

Reliability

The cost of standstill may be as high as 22 000 Euro per day. An even larger problem would be the non-availability to district heating, since Riskulla is the dominating district heating source for Mölndal municipality.

Variable output power

Given the Swedish climate situation, with dramatically varying temperatures over the year, demand for district heating is fluctuating. The plant's energy production must be adaptable to meet these variations.

High efficiency

In Sweden, high total plant efficiency is a particularly important as Swedish power plants are taxed for their own energy consumption, which normally ranges between 8 and 15 percent. Riskulla yields total efficiency over 90 percent, even at low power output.

Quick facts on Riskulla

Plant type	Combined heat and power station powered by bio fuels
Boiler type	Solid fuel boiling fluidized bed technology (BFB)
Power output	Electricity: 23 MW
	Boiler: 70 MW hot water for district heating
	Flue gas condensing: 21 MW hot water for district heating
	Total: 23 MW_e + 91 MW_{th}
Yearly energy production	Electricity: 130 GWh
	District heating: 350 GWh
Efficiency	Higher than 90%
Fuels	Dry fuels: stem wood and peat
	Wet fuels: branches, roots and tree-tops
Flue gas cleaning	Four parallel textile filters, with injection of sodium bicarbonate
Fuel handling	Fully indoors

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