

System 800xA

Improved water quality, faster leak detection and major energy savings at Mälarenergi in Sweden



Göran Vikergård, Mälarenergi, Nils-Göran Nordqvist, FVB, and Per-Arne Ekman, ABB, observe what the tests also confirm – the inhabitants of Västerås get higher quality water as a result of using the 800xA control system.

Mälarenergi is an energy company active in the Mälardalen region of central Sweden. The company is owned by the City of Västerås, which is Sweden's sixth most populated city with around 138,000 inhabitants. Mälarenergi's primary mission in the region is to provide electric power, district heating/cooling, broadband, sewage and watersolutions.

Mälarenergi now has full control over both water production and water quality thanks to a new control and monitoring system from ABB. The system also prevents energy thieves from stealing the profits.

Installation during full operation

The water supply network has a total length of 600 km and every second, Mälarenergi purifies 450 liters of water and pumps it to kitchens, bathrooms and garden houses around Västerås. The wastewater then proceeds to Mälarenergi's treatment plant before returning to the environment.

The control and monitoring system now used by Mälarenergi is based on ABB's 800xA, which is one of the most versatile and reliable systems available today.

"When we started looking at acquiring a new control and monitoring system, the old one was really on its last leg. It was vulnerable to breakdown and difficult to manage, and after careful analysis we decided to replace the entire system," says Göran Vikergård, responsible for tap water production at Mälarenergi.

“We keep track of the entire water treatment process from water supply via the pumping stations and on to the water purification plant,” says Göran Vikergård.

The whole installation was carried out while maintaining full operation – Mälarenergi could not simply switch off Västerås’ water supply. For this reason, the energy consultants at FVB who designed and delivered the new system created a very detailed action plan.

“As expected, the whole replacement process went according to plan. One of the great advantages of AC 800M is the ability to simulate and test software codes to ensure that everything works as planned before closing an old system,” says Per-Arne Ekman, account manager at ABB.

AC 800M controllers with one common communication language

Mälarenergi currently has one of the most advanced facilities that can be achieved with current technology. Different software that communicates in different languages has been replaced with a single software that speaks one common language.

“This means that we can keep track of the entire water treatment process from water supply via the pumping stations and on to the water purification plant. Instead of spending time on maintenance and being dependent on stocks of old spare parts, we can now concentrate on fine-tuning the installation and providing even better and more consistent water quality,” says Göran Vikergård.

Catching energy thieves

The project also focused on improving energy efficiency and catching energy thieves along the 600-km long supply network.

“A huge amount of pumping is needed to drive all the water through the network, and electricity is a major cost,” says Pernilla Widén, head of Mälarenergi’s water treatment plant.

Mälarenergi purifies 450 liters of water every second and pumps it to kitchens, bathrooms and garden houses around Västerås.



Previously, the pumps were either on or off. Today they are constantly in action, but at exactly the right speed. “We have a range of pump sizes, and the monitoring system, together with variable speed drives, ensures that the right pumps always work at the right speed,” she adds.

Variable speed pumps not only save electricity costs but also maintenance costs since they are subjected to less wear. Mälarenergi expects to save approximately \$30,000 per pump each year, and the whole investment will pay for itself in as little as two or three years.

Faster leak detection increases revenues

Before the upgrade the water supply network lost more than 30 percent of its water due to leakage; now the ability to detect water leaks has rapidly improved, as Göran Vikergård explains:

“A 600-km long water-tight seal is almost impossible to achieve; we always have to live with some leaks. Now that we have new water meters and pressure gauges throughout the whole grid, we can locate leaks more quickly and act accordingly. Previously, about one third of the water we produced disappeared, which meant that we could not charge for it. Now or goal is 20 percent.”

Improved water quality

Mälarenergi’s investment has also improved water quality. “We can, for example, minimize the use of additives. By having complete insight into the amount of additives used, we can constantly optimize the process to achieve the best water quality. This not only saves us money, but is obviously also better for the environment,” adds Göran Vikergård.

More effective operations

The second step of the upgrade is to switch from the former operator environment to 800xA. Mälarenergi gains in terms of visibility, efficiency and collaboration.

It is possible to employ different alarm limits and use these in order to intervene before the situation becomes critical. Operators are able to prioritize and work more actively with issue prevention. This is the key to important savings linked to leak detection.

Another advantage is easy visualization of trends as well as logging more objects directly in the operator environment, which gives a better overview of the situation in the process. Long-term storage takes place in the PGIM (Power Generation Information Manager), which facilitates support at every level in the organization. Important data is readily available throughout the organization, and improved quality and efficiency are achieved through collaboration.

The project in brief

Västerås and its surrounding areas consume 42 million liters of water every day, year-round. Thanks to a new AC 800M control and monitoring system from ABB, the production facilities at Mälarenergi now have full control over water quality and can also keep a strict eye on energy consumption as well as more rapidly detect water leaks.

Benefits

- Improved water quality while reducing the use of additives.
- Rapid detection of water leaks.
- The monitoring system together with new variable speed drives ensures that the water pumps always work at the right speed, which results in energy consumption savings and less wear on the pump.

Mälarenergi

Mälarenergi is responsible for many aspects that are not only taken for granted, but that are essential for our society and each individual's everyday life. For example, we count on there being water in the tap, electrical power in the wall outlet and heat in the house. The company also manages the ramp to Vasteras' digital highway.

ABB's supply

- 14 AC 800M controller.
- S 800 I/O for 1 500 signals.
- Fiber communication between AC 800M and three static frequency converters ACS 800.

Mälarenergi's water treatment plant has two operator work stations and one engineering station. There is a 55-inch screen in the control room that displays trends to give an accessible and quick overview. All of the computers are placed in a separate room to reduce noise and heat in the control room and ensure a good working environment.



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