



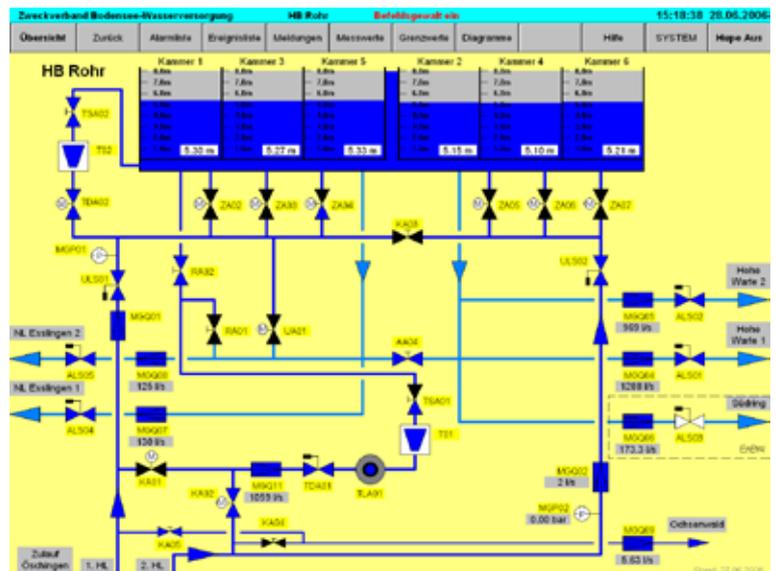
Zweckverband Bodensee-Wasserversorgung – a superb transport system

Optimum resource management with zenon: drinking water for millions

The name Bodensee-Wasserversorgung represents the highest standards of safety and quality: the association supplies water to four million people in the German state of Baden-Württemberg every day. This is done on the basis of optimally-conceived state-of-the-art transport and preparation equipment. Bodensee-Wasserversorgung use zenon for the visualization and monitoring of their technical equipment.

Zweckverband Bodensee-Wasserversorgung is the largest long-distance water provider in Germany. The association was founded in 1954, in order to meet the increasing demand for drinking water using additional water from Lake Constance. The water is taken from 60 meters below the surface and transported up approximately 310 meters to six large pumps in the preparation plant on the Sipplinger Berg (mountain). There, the water from Lake Constance, which is already good-quality water, is processed with microstrainers, ozone and filter equipment to become very high-quality water.

The supply of water is limited – careful use of this important resource is thus essential.



IMPRESSIVE PERFORMANCE

The transport and treatment equipment has a flow capacity of 7,755 liters per second. A maximum of 670,000 cubic meters can be taken from Lake Constance on any given day. Bodensee-Wasserversorgung currently provides over 125 million cubic meters of water to its association members annually. Around 1,700 kilometers of mostly large-caliber pipeline route the drinking water from the extreme north of the state of Baden-Württemberg. zenon is used to manage this process: zenon provides visualization and monitoring for the elevated water tank, the pumps and turbines as well as the gate valves that curb or limit the water in the elevated tanks. The operators can supervise and control the pipeline system and the rest of the equipment using touch panels.

ACHIEVE MORE WITH LESS EFFORT

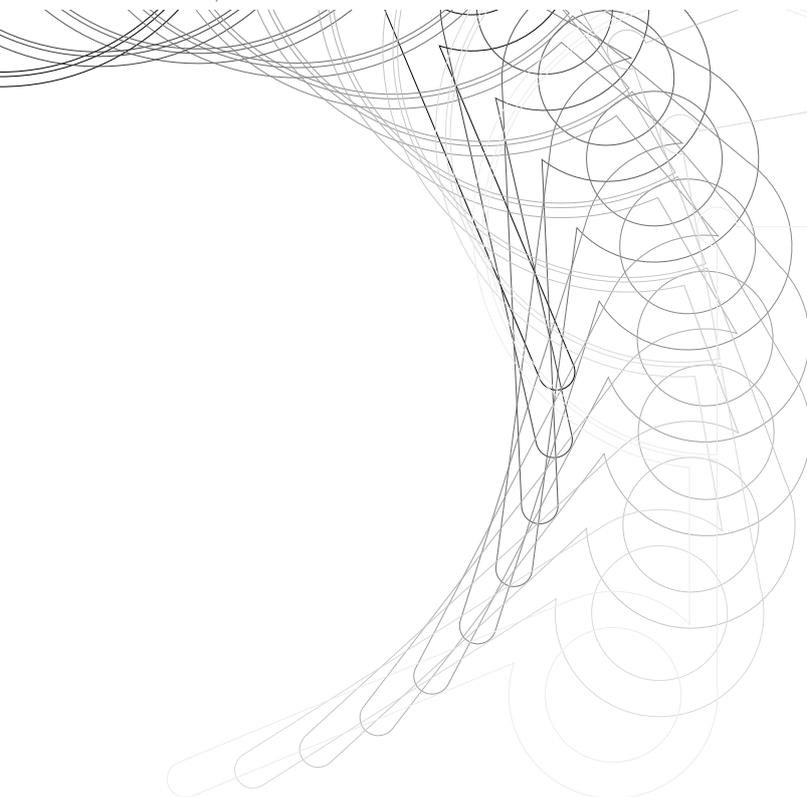
Before zenon was used, the association used 'mosaic' technology, with LEDs and analog displays for the central monitoring and control of this major plant. These reporting devices in the mosaic display panels were connected to programmable logic controllers and displayed the process states. The equipment was also operated using the mosaic panels and their illuminated push-buttons. With these display panels, it was not possible to operate the respective equipment from any location, because the mosaic screen was always installed centrally in the respective equipment. This technology was labor-intensive, both for creating screens and making any changes. Another deficiency of the previous solution: the Association's employees on site were not able to follow events during operation or problems in chronological order. Before zenon was installed, planned intervention was only possible with difficulty.

FLEXIBLE VISUALIZATION, FLEXIBLE OPERATION

As a flexible and consistent visualization system, zenon offers many advantages for the Bodensee-Wasserversorgung Operational Managers: „One of the reasons for us deciding to use zenon was that we could connect different control units with this solution. Within a plant, several touch panels now communicate with identical software with all existing control units“, explains Bernd Seher, who is in charge of automation and control technology at Zweckverband Bodensee-Wasserversorgung in Stuttgart. zenon now visualizes and controls the majority of the 29 elevated water tanks, 17 pumping stations and 20 pressure booster plants. The employees have color 12" or 15" Lauer touch panels. The Association currently uses 100 devices at over 50 sites as well as Lauer mobile devices. The Association uses ABB and Siemens-S7 control units. Open Modbus TCP is the communication protocol used by the Association, whereby the ProfibusDP field bus is also being used.

STANDARDS ENSURE EFFICIENCY AND SAFETY

The entire equipment – elevated tanks, pumps, turbines, etc. – is spread out across the whole of the German state of Baden-Württemberg, but has a uniform user interface on the touch panels at each site. „The standardized user interface and the standardized control concept guarantee time and cost savings. The expense of training employees is very low. In medium-sized and large plants, the employees always use identical devices with identical software – they can supervise and monitor the whole plant from any location in the plant“, explains Otto Staib, Department



Manager for Energy and Control Plant Technology at Zweckverband Bodensee-Wasserversorgung. The manager cites another advantage – even in the event of a problem, each control device can execute the desired function. A defective device therefore does not affect operation by causing downtime. Otto Staib: „Due to the exposed position of our equipment, we are particularly at risk from lightning strikes. For this reason, it is so important for us to be able to quickly replace a damaged unit after it has been exposed to such a high voltage – simply by plugging the memory card into a different unit.“ Safety is a major concern for Bodensee-Wasserversorgung. For this reason, the Association places its trust in the alarm management in zenon and the „Chronological Event List“, in order to monitor the status of equipment and, if necessary, to respond rapidly and appropriately. Now the people in charge of operations at BWV can precisely locate any problem – be it electrical or mechanical – inform technicians accordingly and send the correct equipment to the plant in order to rectify the problem.

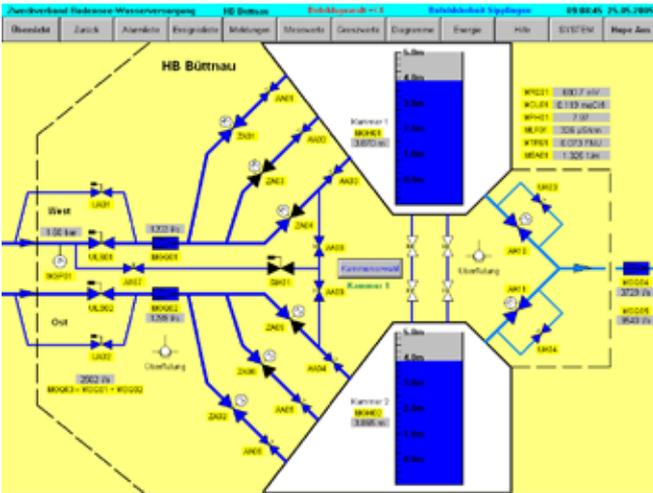
THE ROUTE OF THE WATER

Consistent and complete supply of citizens' drinking water also means that the route of the water and the throughflow need to be controlled precisely. The pressure booster pumps in the pumping

stations thus increase the throughflow. The gate valve controls can throttle the flow of water, if required. Operation Managers at Bodensee-Wasserversorgung also monitor the level in the elevated tanks with zenon: they use zenon to monitor the respective flows in and out from the tanks and the levels in the different chambers. The trend diagram contained in the basic software package now provides the values for throughflows, levels, inflows and outflows and pressure in graphical form as a curve and provides the employees with an optimum overview. But all other measured values that are obtained in the complex system are recorded by zenon, presented in a clear overview and are available for detailed analysis in the trend diagram. This includes, amongst other things, an analysis of the drinking water. Here, the chlorine content, pH values, conductivity and cloudiness of the water are monitored.

INTELLIGENT HANDLING OF ENERGY

The Association is not just a consumer of energy, it also generates energy. Turbines generate electricity from the water's energy. In doing so, zenon monitors and visualizes the energy currents, the voltage, the power, the supply frequency and the generator temperatures. This applies for both, energy from the supply network, as well as the effective power from the supply network that is the



Bodensee Wasserversorgung provides drinking water to over four million people in Baden-Württemberg. The Association uses zenon from COPA-DATA for visualization and monitoring.

electrical power that is generated from the transport of the water and the surplus pressure that arises as a result. The recovered energy is fed into the grid using medium-voltage equipment and sometimes used by the company itself.

ZENON IN THE FUTURE

zenon has established itself as the HMI solution at Bodensee-Wasserversorgung. Bernd Seher sums up: „Our standardized visualization and monitoring concept makes it possible for us to adapt or expand the solution flexibly and quickly. This saves time and money. However, we do not only benefit when configuring projects; we can also increase our efficiency using zenon whilst equipment is in operation.“ For this reason, other plants will successively be supported by HMI systems using zenon in the future as part of an equipment modernization project. The Association also intends to use zenon as a SCADA solution in other areas, such as building services. Bernd Seher continues: „The high degree of acceptance by employees and the high satisfaction with the solution supports our decision to expand the use of zenon in our organization.“

NUMBERS AND FAST FACTS

- ▶ Permitted to take 670,000 m³ of untreated water per day (an average of 7,755 l/s)
- ▶ Approximately 125 million cubic meters of drinking water taken annually
- ▶ An average daily consumption of 345,000 cubic meters of drinking water
- ▶ Supplies approximately 320 cities and municipalities; four million inhabitants in the supply area
- ▶ Pipeline system with pipeline diameter of up to 2,250 mm, pipeline pressure up to 30 bar
- ▶ Approximately 1,700 km high pressure pipelines, mostly large-caliber
- ▶ 29 water tanks with a total content of 470,600 m³
- ▶ Electrical power of the pumping stations approximately 96,000 kW
- ▶ 336 employees at 292 sites
- ▶ Annual revenues 50 million euros in 200