

Community uses zenon for its transition to a Smart Village

Secure Fresh Water Supply for Zwischenwasser

A well-thought-out process control system based on the zenon software platform from COPA-DATA helps the Austrian community of Zwischenwasser to ensure for its citizens the supply of clean drinking water during normal and during dry phases, the community chose a smart process control system based on the zenon software platform from COPA-DATA. The extendibility of the system implemented by BATech paves the way for the community's transition to a Smart Village.



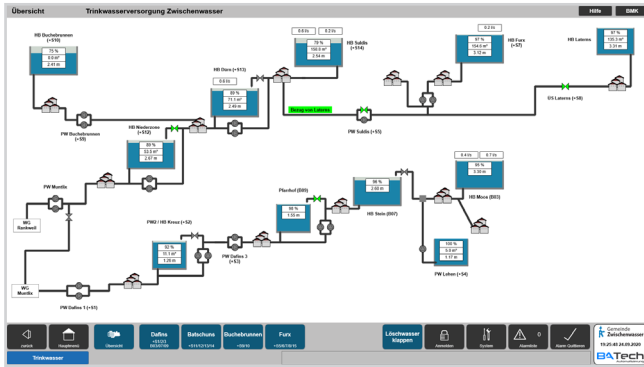
The daily per capita water consumption in Austria is about 135 liters. Although only three liters are used for drinking and cooking, consumers can safely expect pure drinking water to run from the tap. Even in the Alpine regions with their wealth of water, climate change, agricultural and other external influences mean that an unlimited supply of potable tap water is no longer a matter of course. On its way to the tap, the water needs to run several kilometers, passing through pumps, tanks, reservoirs and filters.

The Zwischenwasser community consists of three villages with nearly 3,300 inhabitants. It is situated in Vorarlberg, the westernmost federal province within

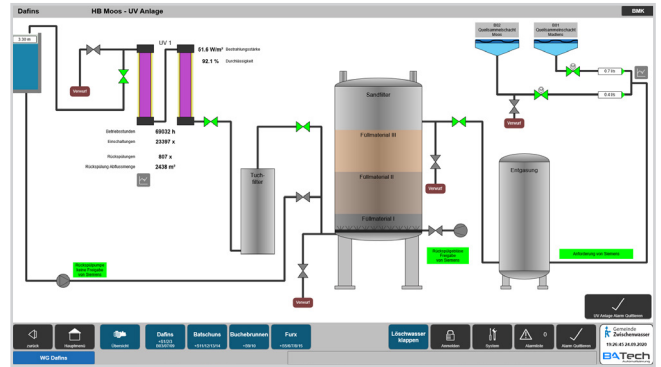
Austria. Its name literally translates as “between waters”. Despite its location on the slopes of a mountain range, there are not many suitable wells within its municipal area.

CLEAN WATER FOR 3,300 PEOPLE

The fresh water supply of the community is taken care of by five local water cooperatives sharing a supply network. This piping network is designed to level out fluctuations in the volumes supplied or needed. It includes 14 pumping stations with a total of 19 pumps, 12 high-level tanks and six UV systems.



The system gives operators access to an overview of the entire communal fresh water supply for Zwischenwasser.



The degree of detail displayed in the station overview is freely selectable.

The control systems for the individual stations had been linked to each other and to a control room in the communal utility center. While some were linked to the central management system via fiber-optic cables, most had GPRS modules for data transmission over a mobile phone network.

“Our legacy system often took several hours to update information so in case of doubt someone frequently had to go out to check locally,” says Martin Mathis, the communal utilities manager who is in charge of water supply operations in Zwischenwasser. “As the stations are situated kilometers away in exposed locations in high mountains, this posed a major operational obstacle – especially in winter.”

IN PURSUIT OF VALID INFORMATION

Fast reactions to fluctuations in supply or demand were prevented because of the insufficiently reliable data provided by the management system. This made fully automatic operations impossible. Furthermore, if on-site maintenance work was required, the technicians of the foreign manufacturer of the automation system would have to travel long distances to attend.

Although the system was less than ten years old, the five cooperatives jointly decided in favor of its complete renewal. They requested tenders for a management system that would make monitoring and maintenance work more practical and sustainable. The successful solution would

need to provide these functionalities to maintenance staff in the control room and on mobile devices, independent of location.

A COMPREHENSIVE AUTOMATION CONCEPT

The community of Zwischenwasser chose BATEch e.U. for the design and implementation of the new fresh water supply control and management system. Proprietor Daniel Bachmann boasts 15 years of experience in the field of automation. BATEch has developed ergonomic control concepts for utilities, such as biogas plants, utilizing the zenon software platform from COPA-DATA. BATEch is based in the Zwischenwasser municipality, which also eases cooperation for troubleshooting, maintenance and expansion of the system.

“Owing to zenon’s scalability, the proposed automation concept can later be expanded step by step to form a comprehensive management system covering the entire communal infrastructure,” says Daniel Bachmann, highlighting a decisive success factor of the project. “As zenon is being used successfully in Smart City applications, it already comes with a lot of the required functionality.”

As part of the solution for the community of Zwischenwasser, BATEch replaced the controls in the autonomous remote stations with modern products. Where

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MARTIN MATHIS, COMMUNAL UTILITIES MANAGER

necessary, they received upgrades and new programming for full automatic operation of pumps and valves. This also facilitates fast detection of and reaction to pipe ruptures or elevated flow rates. The level, flow and pressure sensors remained largely unchanged, but their interface equipment for external communication was replaced.

Data from the remote stations travels via VPN to the central server in Zwischenwasser’s communal utility center. There it is accumulated and processed and the individual parts of the system are coordinated using zenon. BATech utilized the open and modular system structures the software platform provides to create a tailor-made yet modular application.

SEVENTEEN STATIONS AT A GLANCE

BATech used zenon to implement an ergonomic and flexible control concept. On the screen of the workstation in the control room, operators have geographical and hydraulic views of the entire installation and all of its 17 stations. At a glance, they have an overview of the current levels in all reservoirs and the water consumption in each village. This “world view” always remains visible. By selecting an area within it, users can focus in on more detailed views right down to individual pumping stations.

This ergonomic user interface is also provided to the water officers in each of the water cooperatives. On the

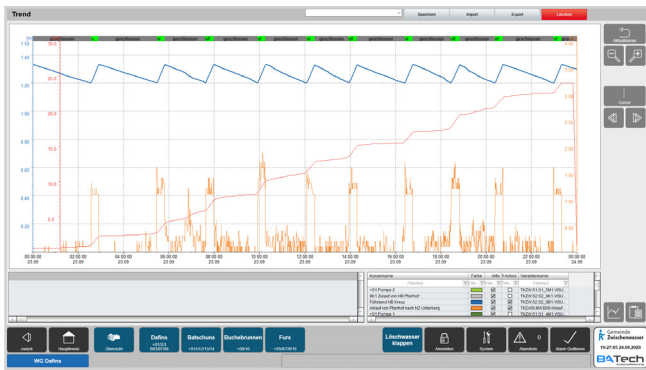
control screens at each of the reservoirs, they can get an overview of the complete system and drill down to all of its parts. Within their own domain, they have access to all options for control and manual intervention.

An important part of the operating concept is the trend analysis. It shows operators any fluctuations in water distribution within the network in a highly visual and intuitive way. This is ideal as the basis for decision-making and fast intervention. “Using zenon, BATech created a trend solution that ensures outstanding transparency,” Martin Mathis confirms. “This allows us to proactively prevent local water shortages rather than taking care of the damage after it has occurred.”

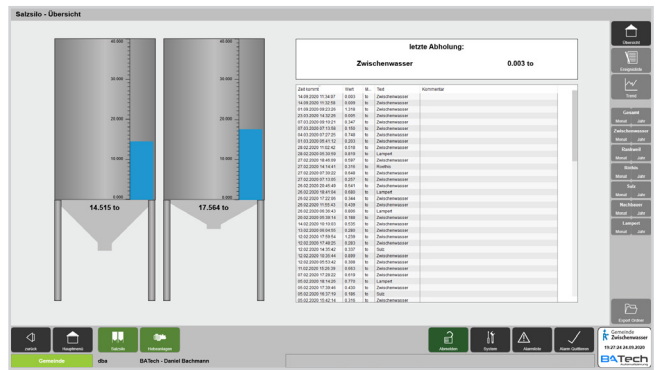
COMMUNICATIONS FOR MOBILE DEVICES

Since the new control and management system was commissioned, Zwischenwasser’s fresh water supply installations are generally operating fully automatically around the clock. The system records and archives all parameters, data and operating conditions. These can be viewed at all times. For subsequent analyses and as a basis for repair and maintenance work, the system also provides freely definable curve diagrams using data from various processes, messages, reports, protocols and alarms.

Functionalities that are standard in zenon, such as remote maintenance and Hot Reload, are used to implement



An important part of the operating concept is the trend analysis as a basis for decision making and rapid intervention



The integration of salt silos used for winter road services was the first step toward growing the automation concept into a comprehensive management system for all of Zwischenwasser’s communal infrastructure.

project adjustments during operation and facilitate friction-free maintenance. Updates can be made without system standstills. “For system operation and maintenance, our operators mainly use mobile devices to which zenon sends fault messages,” explains Martin Mathis, noting another factor that eases operations. “They can now primarily stay at home when on duty.”

BECOMING A SMART VILLAGE: SALT SILO INTEGRATION

The first step toward growing the automation concept into a comprehensive management system for all of Zwischenwasser’s communal infrastructure was the integration of salt silos used for winter road services. “As zenon comes with the right driver for the controlling PLC, this was an easy extension,” Daniel Bachmann recalls. “We created the HMI for the silo and integrated it with the management system within an afternoon.”

Zwischenwasser has been awarded a prize for implementing future-oriented communal energy and climate policies. With the zenon-based management system, the community has a foundation for a comprehensive, intelligent meshing of the entire communal infrastructure. The community is on its way to becoming not a Smart City but a Smart Village

HIGHLIGHTS:

- ▶ zenon as a communal management system at Zwischenwasser
- ▶ At-a-glance overview thanks to hydraulic and geographical Worldviews and large screen projection
- ▶ Ease of use
- ▶ Location independence
- ▶ Improved responses as a result of mobile web clients and a text message service
- ▶ Easy expansion thanks to zenon’s numerous drivers