

Sustainable electricity supply in Ticino with zenon

AET ensures a future-proof power supply

The energy utility company [Azienda Elettrica Ticinese](#) operates power plants and electricity grids in the Canton of Ticino. With the help of the Swiss COPA-DATA solution partner SATOMECH AG, the utility business migrated its process control systems to the zenon software platform. As a result, it improved the efficiency of its power generation from renewable sources and made the electricity supply more secure for its customers in the canton.



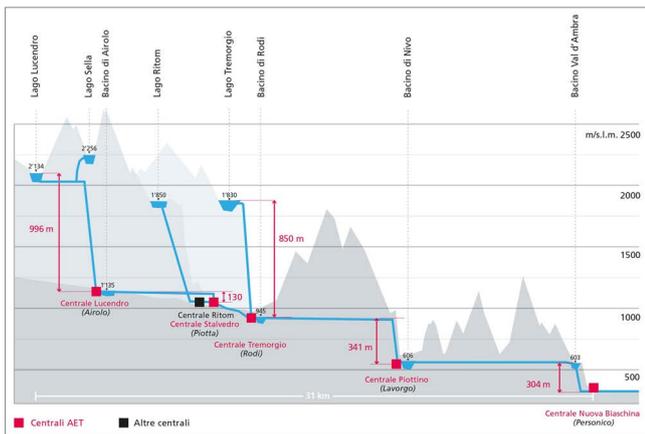
Navigating the energy revolution from fossil fuels to renewable forms of energy creates major challenges for the entire energy sector. Even in topographically favorable regions such as the Italian-speaking south of Switzerland, with its abundance of water, high gradients, and plentiful sunlight, it is by no means a given that electricity can be drawn from renewables whenever needed.

ENSURING A SUSTAINABLE POWER SUPPLY

In the Canton of Ticino, Azienda Elettrica Ticinese (AET) uses the available natural resources to generate, transmit, and distribute renewable electricity. The energy supplier

operates six power plants on a common watercourse in the Leventina Valley. The Leventina chain supplies more than a third of the hydropower generated in Ticino. Additionally, AET operates several photovoltaic systems and a wind farm, either independently or in partnership. In 2021, the utility company produced a total of 945 Gwh of power.

With its own regional medium-voltage and high-voltage grid for 150 kV, 50 kV and 16 kV, which consists of 22 substations for 380 kV, 220 kV, 150 kV and 50 kV and 116 transformer cabins, the company, founded in 1958, ensures that the electrical power arrives where it is needed in the right form. In addition, as a network operator and wholesaler, it supplies



AET makes ideal use of the watercourse of the Leventina chain, where it generates one third of the hydropower supply in Ticino.

the municipal electricity providers throughout Ticino. AET is responsible for the operation, maintenance, and refurbishment of the regional networks for customers such as Swissgrid, ASTRA, and SBB, the Swiss Federal Railway. It also operates a network of charging stations for e-cars along the A2 highway.

AET's electricity trading activities are not limited to Switzerland. They also include Italy, France, Germany, and Austria. The energy company has numerous investments abroad. It employs approximately 300 employees and, in 2021, generated an operating revenue of CHF 790 million.

HIGH LEVEL OF AUTOMATION

AET's power plants and transport networks have long been equipped with management, process control, and visualization systems. These systems are supported by inhouse automation departments.

Until recently, the control center at the company headquarters in Monte Carasso ran SICAM® 230 software. This solution worked and users were content with it. However, the software was discontinued by its original supplier. The company no longer provides technical support for this system. As a result, it was no longer possible to ensure the software was up to date with the latest security standards.

Because the core of SICAM-230 is the zenon software platform from COPA-DATA, it made sense to switch to zenon. zenon was already in use as a process engineering and control system at AET. The power plants and the substations were already equipped with the versatile software platform developed by the hardware-agnostic, independent software manufacturer



AET's in-house process control technology department, working with SATOMEK AG, successfully migrated the central process control technology to zenon.

from Salzburg. As a result, AET had already reached a high degree of automation and excellent efficiency and resilience.

STANDARDIZATION WITH ZENON

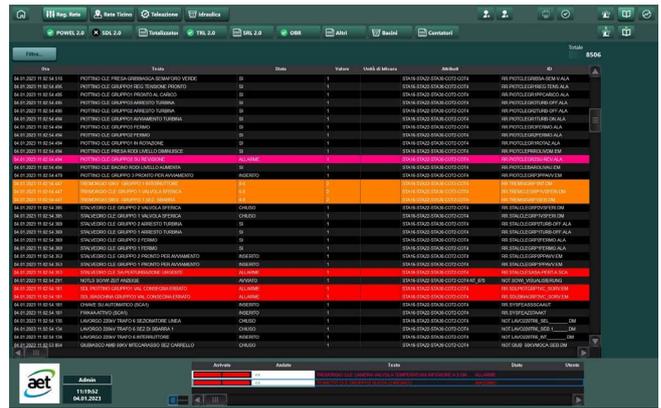
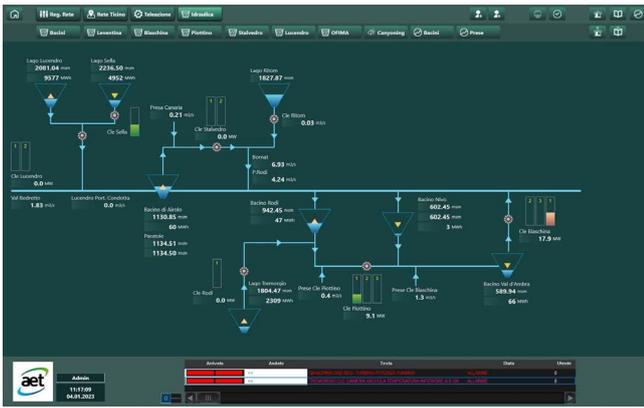
"We were confident that the migration to zenon would be easy and produce good results," states Patrick Barlocchi. He has been with the company for years and is responsible for the distribution management systems (DMS) at AET. "Nevertheless, we looked into a few alternatives."

The deciding factors in favor of zenon were the benefits of standardizing all of AET's management, process control, and visualization systems and the ability to draw on the know-how of the engineers already familiar with the SICAM® 230 engineering environment. This enabled AET to carry out the job largely using its own resources.

Nevertheless, the energy supplier obtained valuable support from SATOMEK AG, the zenon distributor in Switzerland. In addition, the employees involved in the migration completed a training program (in Italian) directly with COPA-DATA.

LOW-RISK SOFTWARE MIGRATION

The aim of the project was to standardize the control systems for equipment across all power plants, substations and control centers, while also updating the software to the latest standards of security and operating system support. Long-term trends and comparisons play a major role in energy supply, so it was important to be able to use historical data. The choice of zenon made this possible. Plus, because zenon was already the core of the legacy software being replaced, there was no need to re-certify the equipment.



The control center screens were upgraded to the latest standards while the operating philosophy remains unchanged. For this purpose, experts from COPA-DATA created customer-specific templates.

The integration of the existing process data, alarms, and the Sequence of Events log provides a comprehensive information history, stretching back to before the switch-over date.

The Energy Edition of the zenon software platform was used. Its drivers are IEC60870-compliant and support an open communication standard for infrastructure automation. This included the integration of the remote terminal units (RTUs) for power transmission. The turbine and voltage regulators in the power plants and the safety equipment in the substations were connected via the zenon driver in line with the IEC 61850 standard for safety and control technology in electrical switchgear for medium and high voltage technology. To monitor and control network elements, such as routers and switches, the engineers used the SNMP drivers available in zenon.

operation with extensive simulations and a test run. Only after these were completed successfully did the go-live take place.

A bidirectional connection with the existing SQL database was implemented for data exchange within the company. The project also included migration to the latest operating system. Although the operating philosophy remained unchanged, the control center images were also brought up to the latest standards.

The migration project was implemented in stages during 2020 and 2021. Access restrictions as a result of the COVID-19 pandemic posed a challenge. Virtually the entire project was delivered remotely, from the video conference meetings to the presentation, simulation, installation and testing of the software, and, finally, the migration operation itself.

AET sought support from the Professional Services team at COPA-DATA. They created a full set of customer-specific templates. The templates were consistent across all areas and were extensively tested by the software manufacturer. They helped the customer navigate the change to state-of-the-art ergonomics with a high level of operating reliability.

“Thanks to the existing know-how in our engineering team and the professional support from SATOMEK and COPA-DATA, we were able to meet all the challenges in the allotted time,” states Patrick Barlocchi. “Because our employees in engineering and operations did not have to learn a completely new system, the costs of the migration remained at a manageable level.”

MIGRATION WITHOUT INTERRUPTION OF OPERATIONS

INCREASED RESILIENCE AND FUTURE SECURITY

A critical requirement for AET was to change control systems without interrupting operation. For this reason, the project was created outside of the target system. This enabled parallel

The project was not limited to the standardization and modernization of the control systems. A redundant second control center was set up in one of the substations. In case of problems in the control center, this enables continued operation with full functionality and thus increases the resilience of AET power supply systems.

The control center’s cut-over marks the provisional end of the full project to migrate all of AET’s control systems to zenon. AET is now running an open, scalable system that meets IEC 62443 security standards. The internal automation department considers it a major benefit that the software platform,

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PATRICK BARLOCCHI,
RESPONSIBLE FOR THE DISTRIBUTION MANAGEMENT SYSTEMS AT AET

including important drivers, was developed by COPA-DATA and is always kept up to date by the software manufacturer.

At the same time, the integration of existing process data, alarms, and the Sequence of Events operating log provides the company with a comprehensive history of information that stretches back to before the cut-over date.

“With zenon, we run state-of-the-art process control technology and always cohere with the latest security standards,” states Patrick Barlocchi. “This ensures we are ready for the future and are open to further integration of equipment for renewable technologies.”

ABOUT SATOMECH AG

SATOMECH AG is a commercial company dealing with automation systems. The zenon distributor, based in Cham, provides its customers in Switzerland and Liechtenstein with highly qualified support, consulting, instruction, and training. It has an extensive warehouse in Switzerland. Sales manager Elger Gledhill was responsible for the project with AET. For further information, visit: www.satomech.ch

HIGHLIGHTS:

zenon as process control system for Azienda Elettrica Ticinese power plants:

- ▶ System migration from SICAM® 230 to zenon Energy Edition without downtime
- ▶ A single, standardized user interface
- ▶ Cost-effective migration leveraging existing know-how
- ▶ Seamless historical information thanks to data transfer from legacy system
- ▶ Strengthened resilience with redundant control center
- ▶ Increased future security through ongoing software updates and enhancements from the developer