

*Complete substation control and greater efficiency with zenon*

# Greater efficiency at Elektroprenos-Elektroprijenos BiH

In recent years, Elektroprenos-Elektroprijenos BiH a.d. Banja Luka, an electric power transmission company in Bosnia and Herzegovina, has been working intensively on system improvement. Activity has focused on the reconstruction of existing sites and the construction of new substations across its territory. During 2016 and 2017, a reconstruction project at the 110/35/20 kV Kotor Varoš Substation and the construction of a new 110/20/10 kV Substation at Šipovo were implemented in the operational area of Banja Luka. Although the contracts were awarded to two different consortia, for both projects the zenon energy automation software from COPA-DATA was implemented by the system integrator Saturn Electric d.o.o. from Belgrade, Serbia.

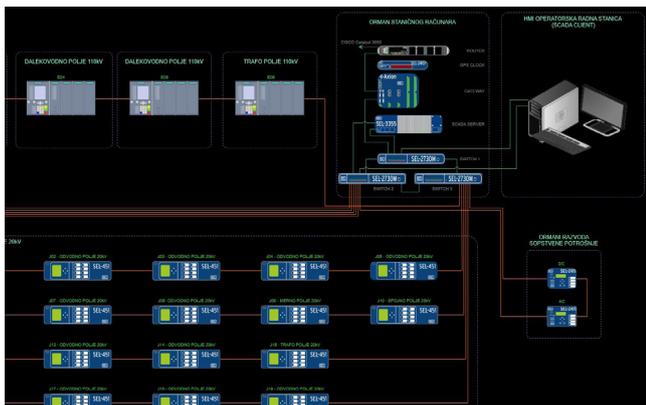


Elektroprenos-Elektroprijenos BiH a.d. Banja Luka covers four operational areas – Banja Luka, Mostar, Sarajevo and Tuzla – as well as nine field units. Over 65 years the company has built over 6,000 km of network, approx. 300 transmission lines and more than 150 substations within Bosnia and Herzegovina. Currently, over 80 million euros are being invested in this infrastructure in order to improve the electric power transmission system and services. Through the introduction of modern and more efficient systems, safe and reliable operation and user satisfaction will be achieved.

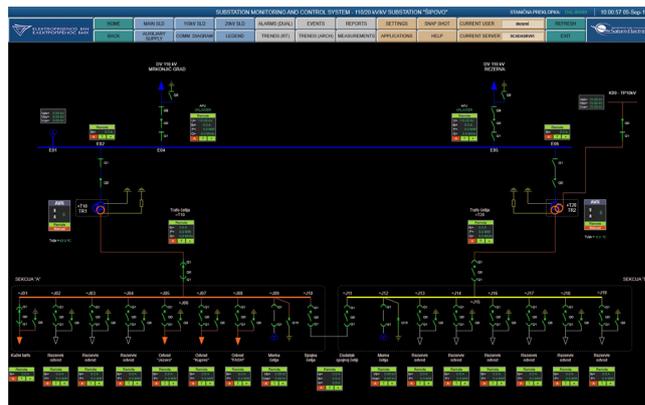
## RECONSTRUCTION OF THE KOTOR VAROŠ SUBSTATION

During 2016, a tender was announced for the reconstruction of Kotor Varoš Substation. Its equipment was more than 50 years old and completely obsolete. In addition, there was a need for expansion – for the substation itself, the two 110 kV transmission lines and the provision of double-sided power supply to this and two other connected substations.

Creating an additional risk, and pressure on the project deadline, was the fact that the existing substation had to be



Communication block schematic showing equipment status and communication links at Šipovo Substation



A single line diagram with statuses, control option and basic data measuring with ALC function

fully functional for the entire duration of the project. To meet this challenge, Elektroprenos-Elektroprijenos BiH provided a mobile substation that allowed step-by-step replacement of the worn out equipment and connection of the system into one unit.

Cooperation with the system integrator started at an early stage of the project, thus creating the basic zenon project structure in the course of construction works. This was vital in order to prepare the complete solution as precisely as possible and in accordance with all the requirements of the end user.

Thanks to this approach and zenon's functionalities, it was possible to design most of the required graphical and topological elements even before going to the field. This contributed to the system integrator's highly efficient configuration of zenon. From the completion of the project construction phase, during the delivery and installation of the equipment, the Saturn Electric team was able to connect the entire system into a functional unit within the shortest possible period. A completely new graphical environment was created, which fully met end-user expectations and corporate standards, while preserving the system functionality and appearance to which operators are accustomed. This intuitive operator interface was paired with the highest level of security and functionality.

## GREAT SUPPORT AND ONGOING EASE OF USE

Each project has its own specificities and challenges. In this, the reconstruction of Kotor Varoš Substation was no different. Here, the embedded peripheral devices (IEDs) were not displaying the time stamp data with the required level of accuracy. While this might have presented a problem for some hardware manufacturers, depending on the protocol used and synchronization method, at Kotor Varoš, the system integrator and COPA-DATA technical support engineers offered

a simple way to resolve the issue using the software. Thanks to the quick response of the COPA-DATA team and Saturn Electric, this unexpected challenge was not allowed to affect the implementation deadlines. What's more, future adaptation will be equally easy; each upgrade to the zenon software is extremely simple to manage and does not require additional engagement by the system integrator or any modification to the existing system, thanks to the COPA-DATA philosophy of simple parameterization using minimal steps.

## CONSTRUCTION OF A NEW 110/20/10 KV SUBSTATION AT ŠIPOVO

The reconstruction project at Kotor Varoš Substation enabled Saturn Electric to create a database and symbol library in zenon which are fully in line with the requirements of the end user. These are now available to be easily utilized and reused in new projects for Elektroprenos-Elektroprijenos BiH, including for the new Šipovo Substation. Like the Kotor Varoš substation, Šipovo was planned to be equipped with IEDs from various manufacturers. This did not present a problem for zenon, which offers complete compatibility with all major hardware manufacturers. The IEC 61850 and IEC 60870-5-101/104 standards, fully supported by zenon, were used for communication with IED devices in the field and to control centers. The team at the Banja Luka operating area were impressed by zenon's practical application of IEC 61850 standard for the fullest flexibility; appreciating that there is now no need to worry about which hardware manufacturer to use if a replacement or expansion is required.

## A FINAL TEST REVEALS THE SATISFACTION OF THE END USER

After the completion of construction and installation works at Kotor Varoš Substation and of the new Šipovo Substation,

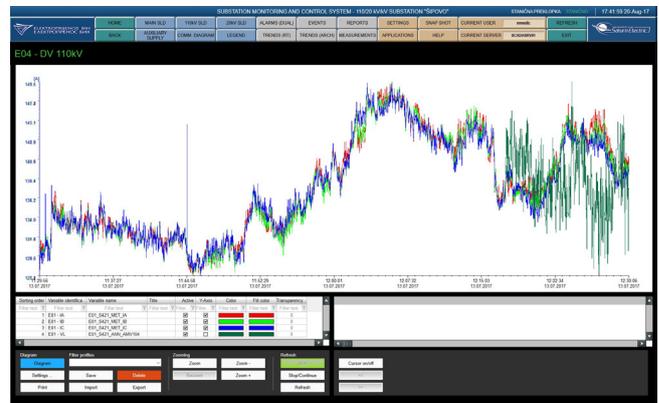
“ The system obtained after the test did not show any problem or alarm, which is one of the purest SAS solutions that we have implemented so far. The complete test of Šipovo Substation lasted only two days. ”

ZORAN BLAŽIĆ, ELEKTROPRENOS-ELEKTROPRIJENOS BIH A.D. BANJA LUKA

a final test of the Substation Automation System (SAS) was conducted prior to commissioning. The test was completed with the full equipment across three control centers. The team in Banja Luka in charge of operations stated that the ultimate goal of the test was substation commissioning without any fault or active alarm, which is rare in practice but was achieved in both projects. Thus, both projects have delivered the purest solutions so far. The Kotor Varoš Substation test lasted about six days, following which the final and fine adjustments were made to the entire system. Using this acquired experience, the full test of the Šipovo Substation was completed in just two days. Both tests were conducted in far less time than previous tests had required.

The final system delivered a conceptual solution with the highest standards and functionalities that modern technology can offer. zenon, with its compatibility, functionalities, intuitive interface and adaptability to various end-user requirements has contributed to the improvement of end-user power supply and better failure detection. This has resulted in safer operation with more modern and protected equipment, simplified control and, perhaps as the most significant factor, complete system supervision.

Since the commissioning of both systems, there has been no failure of the substation automation system. Given this reliability, the system has contributed to significant savings at an early stage of use. Since there has been no requirement for the team to perform on-site inspections there has also been a reduction of maintenance costs. In Banja Luka, they are pleased to point out that they will be glad to share the experience of working with Saturn Electric and the ergonomics of the zenon energy automation software gained from these projects with colleagues from other operational areas and other interested future users.



zenon reporting: a combined current and voltage trend diagram for Šipovo Substation

## HIGHLIGHTS:

- ▶ Simple, fast and flexible engineering and subsequent upgrades
- ▶ Out-of-the-box solutions
- ▶ Flexibility in user interface design in accordance with the end customer's requirements
- ▶ Use of IEC 61850 and IEC 60870 standard
- ▶ Independent selection of hardware in the future
- ▶ Reduced time for the substation final test
- ▶ Availability and efficiency of COPA-DATA technical support
- ▶ Expertise of the zenon certified system integrator Saturn Electric d.o.o. Belgrade