

Energy automation with the zenon software platform

Mobile substations for faster response

Elektrodistribucija Srbije Ltd. Belgrade is a socially responsible, market-oriented and profitable company that provides a secure supply of electricity to consumers, while continuously improving the quality of services and environmental protection. Its new mobile substations ensure a faster response in emergencies, such as floods or fire, and have proved to be of great importance during the reconstruction of existing substations within the grid.



Cooperation with the European Union on the modernization of the national power distribution system is a major development driver for Elektro distribucija Srbije. In the aftermath of the major floods of 2014 in Serbia and the surrounding region, the European Union provided much-needed financial aid to Serbia through IPA national programs and, particularly, by donating mobile substations. The donation comprised three 35/10 kV mobile substations, with an installed power of 8MVA, which were manufactured in Serbia. The general contractor for these works was GAT d.o.o. from Novi Sad, supported by Inesing SpA from Italy and with expert assistance provided by Saturn Electric d.o.o. from Belgrade.

Saturn Electric, a COPA-DATA silver partner, undertook the development and implementation of a portion of the project. It led on SCADA, RTU and the accompanying equipment. Based on its expertise and experience acquired in previous projects, and with the complexity of this project in mind, Saturn Electric decided to implement the zenon software platform from COPA-DATA. zenon is an ideal solution for satisfying the project objectives.

Technical supervision of the project was entrusted to intec GOPA-International Energy Consultants GmbH.



Single-line diagram with current statuses.



Embedded symbols and automatic line coloring.

STATE-OF-THE-ART TECHNOLOGY

The introduction of modern management and process systems to Elektrodistribucija Srbije has improved both the efficiency and the effectiveness of the entire power distribution system. With the use of systems that comply with the highest international standards, the mobile substations can meet all the requirements of the European Union in terms of construction, mechanics and installed equipment as well as the management and relay protection systems. These rely on the zenon software platform for a flexible SCADA system implemented for all three mobile substations. zenon's TÜV SÜD certificate for IEC 61850 Edition 2 standard for communication with substation equipment and TÜV SÜD certificate for IEC 62443-4-1 for a secure product development lifecycle have ensured that zenon is the right choice for such a demanding application.

OPTIMAL SYSTEM STRUCTURE

Each mobile substation comprises two trailers with an optimal equipment layout to facilitate use and adaptation to diverse working environments. One trailer is equipped with 35 kV and 10 kV distribution systems, auxiliary supply with batteries, an inverter and the control cabinet. The equipment necessary for the operation of the local management system (SCADA) as well as for communication with the upper-level control center is installed in the control cabinet. The second trailer houses a transformer (35/10.5 kV, 8MVA, ONAN), connection cables and other necessary equipment. One substation is deployed in each of the distribution areas of Kraljevo, Niš and Kragujevac. Now the employees have completed their training and the substations have been in service for quite a while, they are demonstrating the advantages of such an adaptable system.

FLEXIBILITY IN USE

Meeting user requirements in terms of flexibility of hardware and software is always a particular challenge for contractors. The unparalleled connectivity of the zenon software platform facilitates the fulfilment of such requirements and reduces the overall time needed to complete the project. It also allows for subsequent changes to be made easily and at any time. The stated requirements have been met in full. This achievement is best reflected in the demand for the use of the mobile substations in all distribution areas across Serbia and in other countries in the region. The screen display, elements and symbols of all installation lines can be adjusted and provide a visual user interface that is simple to use. Thanks to standard functionalities available in the zenon software platform, such as automatic line coloring (ALC) and the command sequencer, the user interface can be fully adjusted to suit every operator, ensuring safe and intuitive work at its best. Furthermore, the system must comply with the various equipment manufacturers and models deployed in the individual distribution areas in Serbia. Standard communication protocols in accordance with IEC 61850 and IEC 60870-5-101/104 standards provide for the simple connection of a mobile substation to the existing control system, wherever its location may be. Regardless of the complexity of the requirements, zenon has enabled an application to be created in which all actions and information can be accessed or completed in a minimum number of steps, thus making use significantly easier for operators.

ULTRA-SAFE SYSTEM MANAGEMENT

Another key requirement was for all commands to be performed in a completely safe and secure manner. The standard options

“ *First we had to deal with the damage caused by the floods and now we are focused on prevention. As our latest achievement in technology, the system will ensure Serbia will rise to the challenge of rapid emergency response.* ”

MILORAD GRČIĆ, ACTING DIRECTOR, PUBLIC ENTERPRISE ELECTRIC POWER INDUSTRY OF SERBIA.

in zenon, along with COPA-DATA's philosophy of simple parameterization instead of programming, provide for robust system configuration. The operator has maximum information visually available concerning the current status, position and functioning of the equipment under their control. It is, thus, very easy for users to gain a comprehensive overview. For example, after giving a command, an operator sees a display of the switch position and whether all conditions for switching from the current status are fulfilled. Because of the mandatory verification of the operator's identity using two-step authentication and the required confirmation of the given commands, the possibility of system abuse or an error on the part of the operator is reduced to a minimum. A system with such a configuration is a universal solution that does not demand special operator training. Rather, it facilitates simple and fast operation during emergencies and when the mobile units are used during substation reconstruction projects.

SIMPLE TRAINING AND OPERATION

Every operator who works with any of the regular systems deployed in the substations can very easily get accustomed to working and operating a mobile substation. The system has been manufactured to the highest energy standards and protocols. Additionally, employee training is only necessary for the process of connecting the mobile substation to the grid. The zenon software platform's user interface allows for easy identification of all statuses and commands. The connection to an upper-level control center is established through standard communication protocols.

MOBILE SUBSTATION SOLUTIONS WITH THE ZENON SOFTWARE PLATFORM:

- ▶ Simple, fast and flexible engineering and maintenance
- ▶ Out-of-the-box solutions
- ▶ Flexibility of user interface design
- ▶ Free choice of equipment
- ▶ Fully compliant with IEC 61850 and IEC 60870 standards
- ▶ Efficient technical support from COPA-DATA
- ▶ Expert implementation by the certified system integrator Saturn Electric d.o.o. Beograd