

Using zenon to ensure reliable electricity supply

Saudi Electricity Company: Lighting up Arabian Nights

In the thriving economy of Saudi Arabia, the Saudi Electricity Company (SEC) plays a crucial role in the generation and distribution of electricity throughout the country. With the implementation of COPA-DATA's hardware-agnostic zenon software platform, SEC's Frusyah 110/13.8 kV substation was transformed with a state-of-the-art automation solution by System House Factory for Electric Panels Co. (SEP). Implemented within a few weeks, this innovative system ensures reliable operation and simplified maintenance for a seamless power supply.

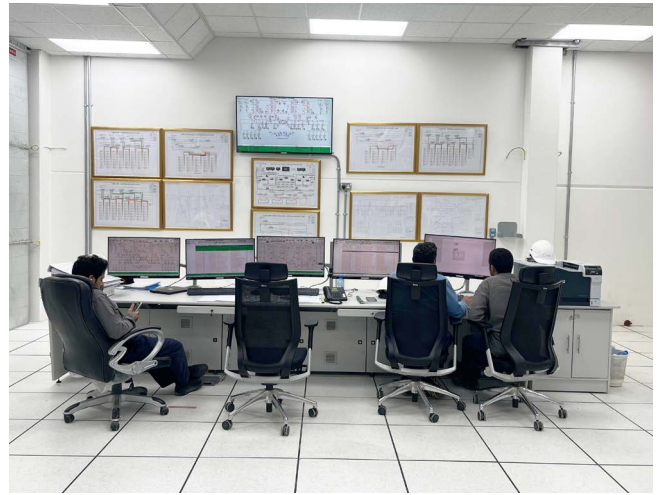


Saudi Arabia has the largest economy in the Middle East and ranks among the top 20 in the world. This positions the Kingdom, which covers most of the Arabian Peninsula, as a key member of the G20 forum. As a founding member of OPEC, Saudi Arabia has long played a central role in supplying fossil fuels to energy-hungry industrialized nations. However, in an effort to reduce dependence on oil and gas revenues and improve its own sustainability while growing rapidly, the Saudi state has embarked on a momentous modernization journey which has brought prosperity and transformative change to the nation.

One of the landmark initiatives under the ambitious Vision 2030, announced by Crown Prince Mohammed bin Salman Al-Saud in 2016, is the development of Riyadh's Murabba district. It will be the largest manmade building in the world, measuring a staggering 400m x 400m x 400m. Other visionary projects include the Qiddiya entertainment megaproject in Riyadh, several NEOM megacities along the Red Sea, and the creation of high-speed rail and metro lines.



The System House Factory for Electric Panels Co. (SEP) equipped the Frusyah 110/13.8 kV substation with a complete energy automation solution.



Work in the control room is supported by standardized human-machine interfaces on an array of monitors displaying HTML5-based zenon visualization.

“ We completed the Frusyah installation within only three months; it now acts as a prototype and a template for other SEC substations. ”

NIAZ HUSSAIN PANHWAR, BUSINESS DEVELOPMENT MANAGER, SYSTEM HOUSE FACTORY FOR ELECTRIC PANELS CO. (SEP)

MEETING THE GROWING DEMAND FOR RENEWABLE ELECTRICITY

With a rapidly growing population and ambitious development projects, the demand for electricity in Saudi Arabia is increasing at an unprecedented rate. To meet this growing demand, the Kingdom is prioritizing renewable energy generation and emphasizing the need to build extensive transmission lines and substations across the country.

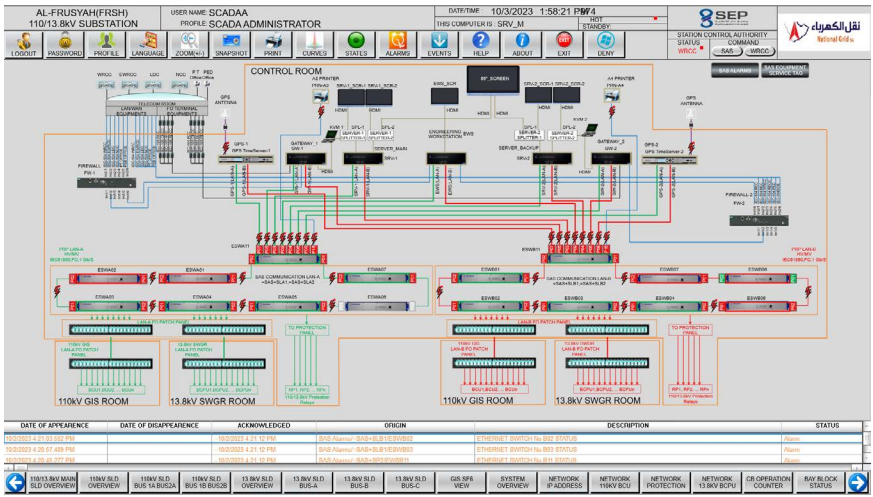
The Saudi Electricity Company (SEC) plays a central role in meeting the country’s electricity needs and is the leading provider of electrical energy. SEC was formed in 2000 through the merger of regional electricity companies, including the central, eastern, western, and southern regions, and has since undergone a process of re-localization. This restructuring resulted in the creation of four separate generation companies, separate transmission companies, and the distribution organization, National Grid Saudi Arabia (NGSA), which ensures

the efficient distribution of electricity to cities, villages, and towns throughout Saudi Arabia.

FREEDOM TO CHOOSE BEST IN CLASS

In the past, SEC had mandated the use of automation software provided by hardware vendors for its substations, creating a near-monopoly situation for particular vendors.

Niaz Hussain Panhwar is business development manager at System House Factory for Electric Panels Co. (SEP), a leading, ISO certified manufacturer of relay, control, automation and distribution panels established in 2006 with more than 300 employees. SEP offers complete energy automation solutions to power utility end users such as SEC and NGSA, providing them with state-of-the-art control and automation solutions and ensuring the highest level of interoperability through international standards such as IEC 61850, IEC 101, and IEC 104.



The substation visualization displays not only operational but also the architectural information, thereby easing troubleshooting and maintenance.

“None of the traditionally used systems were able to provide the convenient functionalities expected from modern software, such as automatic line coloring or time-stamped gateway group signals,” says Panhwar. “This also meant having to deal with various software modules for engineering, human-machine interface (HMI) and gateway solutions, which made both engineering and maintenance unnecessarily complicated.”

HARDWARE-INDEPENDENT AUTOMATION SOFTWARE

In a significant policy shift, national energy providers have opened their doors to hardware-independent automation software. Especially for substation automation solutions (SAS), they have approved the hardware-independent software platform zenon from Austrian software manufacturer COPA-DATA for use in their power transmission and distribution networks. Featuring native interfaces to more than 300 products and systems, zenon can seamlessly integrate practically all control and switching equipment relevant for the electric power industry.

zenon goes beyond pure integration and offers robust control, visualization and reporting functions. The user-friendly, low-code platform eliminates the need for complex programming skills and simplifies automation processes. With prebuilt, extensively tested projects and Smart Objects, zenon enables rapid project development for even the most complex tasks, such as substation automation. Users can create customized combinations of screens and functionalities that can be easily reused throughout the system. In addition,

updates or changes to centrally stored objects are automatically passed on to all relevant sub-projects, simplifying system-wide implementation without additional effort.

FASTER, SMARTER, MORE EFFICIENT: A SUBSTATION PILOT PROJECT

SEP has been using zenon for automation projects since 2017. One of the most significant achievements was the implementation of the Frusyah 110/13.8 kV substation near Jeddah on the Red Sea coast of Saudi Arabia. “This was the very first substation project we implemented using hardware-agnostic software for automation, control and monitoring,” Panhwar recalls. “As it was also a first for SEC, the electricity provider sent experts from all four regions to the committee for this project in the western region.”

Despite the difficult circumstances caused by the outbreak of the COVID pandemic, the good cooperation continued. SEP experts integrated the substation hardware with the zenon project in close cooperation with the SEC engineers. In addition to SEC’s national standards, these engineers had drawn up strict specifications and regional guidelines. They visited the project several times to check the progress and compliance of the work in progress. Working closely with the client in this way, SEP completed the Frusyah substation project within three months.

Both in the control room and on mobile devices, the zenon-based substation visualization displays a comprehensive range of information necessary to monitor and operate all aspects of the system. SEP’s use of zenon’s HTML5-based visualization created a standardized human-machine interface across

multiple monitors, providing not only operational details, but also architectural information. This dual functionality greatly facilitates troubleshooting and maintenance tasks.

STANDARDIZATION USING ZENON

COPA-DATA’s zenon software has proven to be the ultimate solution for meeting the stringent demands of SEC’s substation projects. While most requirements were already encompassed within zenon, the dedicated software engineers at COPA-DATA’s Salzburg headquarters went the extra mile to incorporate additional specifications into the platform’s standard. The successful implementation at the Frusyah installation not only satisfied the operator but also established a blueprint for future SEC substations.

“zenon is the only hardware-agnostic software for substation management that meets all of our requirements,” Mohammad H. Kosayfan, project manager for the Makkah and Ta’if region in SEC’s transmission projects department, confirms. “The zenon software platform therefore has our official approval for the entire nationwide network.”

FLEXIBILITY AND SPEED

SEP engineers have a wealth of experience in substation management, having successfully implemented numerous solutions using software from major hardware vendors. This expertise in system engineering enables them to evaluate and select the best software solution.

With its comprehensive feature set, zenon enhances the engineering process. zenon offers asynchronous layer coding, a parallel redundancy protocol and accurate time stamping for efficient gateway grouping. It also has an integrated soft PLC, zenon Logic, which significantly reduces configuration time. Panhwar attests, “Compared to our previous software systems, zenon has cut engineering time by more than half. In fact, the time required to configure and upload a file with 15,000 tags was reduced from a full day to just one minute.”

zenon not only reduces engineering time, it optimizes processes, increases system stability and minimizes downtime. The user-friendly nature of the software platform enables end users to maintain the system with their own staff. Consequently, SEP has made the zenon software platform its preferred choice for automation systems, both for new energy projects and retrofit applications.



Using COPA-DATA’s hardware-independent zenon software platform, System House Factory for Electric Panels Co. (SEP) has been implementing efficient and reliable substation automation solutions making it more feasible for the Saudi Electricity Company (SEC) to meet the growing demand for renewable electricity.

HIGHLIGHTS:

zenon as a high-level energy automation system at Saudi Electrical Company’s Frusyah 110/13.8 kV substation:

- ▶ Demonstrates high operational reliability
- ▶ Qualified and approved system for optimal performance
- ▶ Rapid engineering process that does not require programming skills
- ▶ Provides a high degree of autonomy in operation and maintenance tasks
- ▶ Offers a standardized user interface for enhanced user experient