Retrofitting of the Kabulasoke PV Plant SCADA system

RIC Energy is a global company specialized in the development of photovoltaic projects, with additional experience in construction, operation, maintenance, and financial structuring. Their way of working is defined by their quest for detecting and satisfying their clients' needs. They prioritize excellence in the execution of each and every project, with a focus on continuous improvement, transparency, agility, and proximity.

Founded in 2005 in Spain, they were pioneers in the Spanish solar PV market. Their success in identifying key opportunities in new markets, as well as their speed in strategic decision making has allowed them to take part in the development of 4 GW in 4 continents. In a changing and dynamic environment, they continue to rely on the early identification of business opportunities as well as new technologies, such as battery energy storage and production of green hydrogen.

The Kabulasoke PV Plant SCADA System picture.

The Challenge

In 2018, RIC Energy signed the EPC contract with MSS Xsabo Power Limited (the project owners) for the construction of a 20 MWp photovoltaic solar power plant in Kabulasoke, located in the central district of Gomba, in Uganda. The RIC Energy team completed the critical commissioning tests on Christmas Day in 2018 and the plant began commercial operations in early 2019.

For the development and deployment of the plant monitoring and control system, RIC Energy brought on board their usual partner Deltatec, a Spanish company with over 15 years of experience in these types of projects for PV plants.

The SCADA system initially provided had fulfilled all its basic functions over those few years since the construction of the plant. However, new requirements have since arisen, especially related to scalability and mobility, which has led RIC Energy to once again get Deltatec involved in a new ambitious project. Not only will this project prioritize the retrofitting of the current SCADA solution deployed in Kabulasoke, but it will also provide a solution that is easily scalable for years to come, as well as allowing remote access to the sites from anywhere across the world, regardless of the number and type of devices used for it.

These new requirements came about since RIC Energy, who operates and maintains the plant, is building other plants in Africa, such as the 23 MWp Nkonge PV plant. This meant that they were in need of a ground-breaking digital platform that would allow them both to comply with national regulations and provide the best-in-class maintenance and operations services to their customers for the whole portfolio of plants they manage or have under development.

Flexible and Limitless

To develop the new SCADA system, Deltatec chose N3uron, the industrial application platform that they have been using since 2021 for monitoring and controlling power plants worldwide. N3uron provides fully integrated tools for developing solutions in the industrial internet of things (IIoT), human-machine interface (HMI), and SCADA.

"N3uron was a perfect fit for this project in every way. The unlimited licensing model, together with its minimum hardware requirements, removed all the cost barriers and the underlying technology platform made it really easy for us to customize the system to our customers' exact needs.

– Miguel Angel Hernando
IT & Monitoring System Manager for Deltatec.

"When selecting an IIoT platform, N3uron is always our first choice. It is flexible and limitless, without breaking the bank", said Miguel Angel Hernando, IT & Monitoring System Manager for Deltatec. *"The customer needed a simple, fast, and especially powerful solution, that's why we chose N3uron"*.

The project scope encompassed collecting tens of thousands of tags corresponding to inverters, string boxes, power meters, the power plant controller (PPC), weather stations and many other devices and systems. Of course, some of the data needed to be exchanged in real time and according to well-defined time slots with the grid operator, UETCL, in order to provide the necessary information for the grid management, as well as automating the reception and execution of instructions received from the UETCL's control center.

Some of the basic customer expectations that the new SCADA system would need to fulfill include providing a major improvement in terms of visibility, robustness, and richness of data in order to operate the plant in the best way possible. On the other hand, the system would also have to provide tools that allow complex calculations to be carried out, as well as forecasting power production.

In order to comply with the project requirements, the system proposed by Deltatec included the following N3uron modules; Modbus Client, DNP Client, SQL Client, Derived Tags, Data Exporter, Historian, Notifier, and Web Vision. Modbus and DNP3 are used to communicate with field devices, SQL and Data Exporter allow data to be exchanged with third party applications through a MySQL database and an SFTP Server respectively, whereas Derived Tags provides the necessary functionalities to make calculations and data aggregation.

For José Luis Moya, CEO of RIC Energy, *"technology providers such as Deltatec have enabled projects to take a technological leap forward by offering a digital platform with the best services for the maintenance and operation of our plants in Africa, where we have some 50 MW under development"*.

Access for Anywhere

Despite the fact that the site is maintained by local O&M personnel, another major project requirement was to monitor and operate the plant remotely. *"N3uron has helped RIC Energy to make available all the information that the company needs and allow access to this information from virtually anywhere,"* said Hernando. *"Given the remote location of the plant, it's worth noting that operators can now monitor the conditions and main parameters of the plant at any time. The aggregation of all data in one platform has been another major improvement as it allows our customers to receive notifications and diagnose any issues that may occur very quickly."*

"N3uron's pure web technology turns any terminal with a web browser into a client. A web browser is available on almost every device and that's all N3uron needs for visualization. This makes the rollout of clients and application updates child's play"

Easy and Fast

According to Hernando, *"N3uron is a groundbreaking platform when compared to other solutions on the market. One of the reasons for this is the speed at which we can develop applications. RIC Energy rolls out sites very quickly and N3uron will allow us to accommodate that very easily and will also allow us to be very flexible and develop tailored applications for whatever needs they may have in the future"*.

In order to speed up the deployment of the new solution and set the foundations for the new standard, Deltatec has made extensive use of templates. Templates offer the ability to leverage object-oriented data design principles and allow users to dramatically re-

duce the amount of time invested in creating and deploying a new project.

"By defining and using templates, you can generate instances of complex data structures. Any change to the template is then inherited by all instances, saving loads of time when making routine changes", said **Hernando**.

The plans for the short term include deploying a central node directly connected to the Kabulasoke plant through a N3uron Link, which will settle the foundations for a consistent and standardized platform that will allow new nodes to be added as new projects are developed.

One of the many great benefits that this architecture will offer to RIC Energy in the future will be the ability for them to quickly generate reports aggregating all the data coming from their sites, see the entire portfolio at a glance, and identify any potential issues.