

Innergex Chile Uses N3uron to Integrate Its First Battery Energy Storage System (BESS)

Innergex is an independent renewable power producer that develops, acquires, owns and operates hydroelectric facilities, wind farms, solar farms, and energy storage facilities. Generating power from renewable sources, Innergex believes, will lead the way to a better world. As a global corporation, Innergex conducts operations in Canada, the US, France, and Chile.

Innergex is a key player in Chile’s energy transition. Its Salvador photovoltaic solar park, PV Salvador, is located in Chile’s Atacama Desert near El Salvador. This area, at an elevation of over 1,200 meters, has some of the world’s highest levels of solar irradiation.

The 138-hectare PV Salvador consists of 160,000 SunPower modules for a total of 70 MW of Direct Current or 68 MW of Alternating Current producing on average 182,200 MWh of electricity per year, enough to power more than 70,000 Chilean households with clean energy. Salvador was commissioned in 2014 and delivers its total output to the power grid, where it receives a merchant market price.

The Challenge

Innergex Chile wanted to provide PV Salvador with energy storage capabilities by integrating a Battery Energy Storage System (BESS). This would be Innergex’s first BESS project in Chile and one of the first such projects in the entire country.

Innergex Chile project management, led by Marcelo Rivas, tasked the company’s IT/OT department with communications, SCADAS/ICS, and compliance with Chile’s Independent System Operator (Coordinador Eléctrico Nacional - CEN). As Innergex Chile’s Head of IT/OT, Jorge Galindo and his team got involved in the project. Galindo managed, coordinated, and allocated roles to meet project deadlines.



The project involved achieving the following technical goals:

- Migrating the PV Salvador substation’s SCADA system to N3uron.
- Integrating new medium-voltage switchgear from BESS to the SCADA system to enable visualization and remote operation from a centralized control center.
- Aggregating all the data in Innergex’s cloud infrastructure (for storage in Snowflake) and making data available to other applications using N3uron’s [REST API Server](#) module.
- Implementing and updating the transfer, for regulatory compliance, of solar park and BESS data in real-time to CEN (via CEN’s real-time information system, known as Sistema de Información en Tiempo Real – SITR).
- Integrating the new Master Power Plant Controller (MPPC) into the N3uron SCADA.
- Connecting control of BESS with that of the existing solar plant, enabling solar plant and BESS operation in a single solution: N3uron.

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— Jorge Galindo,
Head of IT/OT at Innergex Chile

Selecting a system integrator with the right expertise

Innergex needed a system integrator with expertise in the regulatory issues of the Chilean electricity system and experience working on similar projects. It was also essential for Innergex to have a highly scalable SCADA/ICS technology solution that could be seamlessly tailored to accommodate the unique requirements of the BESS project and integrate with various systems, devices, and brands.

Innergex Chile chose system integrator Trekkor, who had deployed the existing system in the PV plant a few years earlier. Trekkor is a Spanish company with a strong background in developing projects for renewable energy plants (where they have handled projects accounting for over 2 GW of installed power) and for pharma and food & beverage industries.

Solar energy storage systems are new worldwide, and battery performance in the medium term poses a great challenge for manufacturers, owners, and asset managers. This made the project a challenge for the Innergex Chile technology team.

“They had to learn, research, and advise us in-depth, on all aspects of control, automation and communication networks to be integrated with existing infrastructure and systems — to coexist with and complement them — for optimal, efficient operation of the solar park and BESS storage system,” said Jorge Galindo.

Solving pain points

To meet project requirements, Innergex chose to implement [N3uron](#), a web-based, highly customizable IIoT and DataOps platform that bridges the gap be-

tween the industrial plant floor and third-party applications and systems, whether in the cloud or on-premise. Innergex chose N3uron over competitors because it is a system that it had already validated and tested in the solar park with positive results; that is open, with multiprotocol and multi-brand compatibility; and has a highly accessible expert team.

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The system integrator, Trekkor, also had extensive experience working with N3uron’s modular platform.

“We’ve had excellent collaboration with N3uron for many years. So we already had expertise using N3uron to deploy IIoT solutions and SCADA platforms, and in this case, we took advantage of N3uron’s high performance to manage the massive amount of data required in the BESS systems,” said Manuela Dapena Echeverría, Applications Engineer at Trekkor.

PV Salvador upgrade

The project scope encompassed an upgrade of the existing 68 MW PV Plant (PV Salvador) to incorporate a Battery Energy Storage System (BESS), boasting 116 battery containers and 4 auxiliary equipment containers. This addition augments the plant’s storage capacity by 50 MWp for 5 hours, equivalent to 250 MWh, complementing the existing 68 MW generation capacity.

The upgrade involved technically integrating the BESS into PV Salvador’s existing infrastructure. The plant was already equipped with a robust High Availability architecture, featuring two redundant N3uron nodes running the following [modules](#): Web Vision, Historian, Modbus Client, OPC UA Client, Derived Tags, and Scripting.

“In this BESS project as in previous projects in which we’ve implemented N3uron technology, N3uron has proven its ability to bridge the gap between IT and OT in a way that meets each project’s specific requirements and timeline,” said Manuela Dapena.

Integrations and centralized control

The solution encompassed:

Substation SCADA Integration: The solution included the removal of the existing Substation SCADA (Hitachi Energy MicroSCADA, formerly ABB) and seamless integration of substation protection relays and IEDs into the N3uron PV plant SCADA via [DNP3 Client](#). A new [DNP3 Server](#) module was added to facilitate real-time data exchange with CEN and ensure compliance with CEN's real-time information system (SITR) requirements.

Master PPC Integration: The Master Power Plant Controller (PPC) was successfully integrated into the system using Modbus protocol, ensuring efficient control and management of the plant's operations, including the PV plant and the new BESS.

BESS SCADA Integration: The BESS SCADA system, powered by Ignition, was seamlessly integrated with the N3uron SCADA system through OPC UA, enhancing monitoring and control capabilities. This integration enables using N3uron's powerful [Historian](#) module to store the BESS system's historical data, which is critical for manufacturers to maintain the warranty.

Remote Control Center Deployment: Innergex added a central N3uron node, deployed in the cloud and managing around 70,000 tags, to its cloud infrastructure. Not only does the node provide centralized SCADA functionality for their control center, but it also allows integration with third-party applications and services. For instance, to integrate with Snowflake, Innergex's chosen SaaS platform for data warehousing, they use N3uron's [Data Exporter](#) module. Additionally, N3uron's [REST API Server](#) module facilitates integration with other cloud services.

"N3uron's REST API Server has transformed how we access and manage data. Its simplicity and flexibility have streamlined our operations, enabling us to innovate faster and unlock new insights effortlessly," said Jorge Galindo.

This Remote Control Center infrastructure will serve as the foundation for integrating new Innergex plants, starting with San Andrés in Chile's Atacama region.

Accelerated implementation and delivery

N3uron's open design and advanced capabilities accelerated project implementation compared to the duration other products would have required.

"The main differences are that N3uron is an open, multi-protocol, adaptable, and scalable solution. Implementation and startup are very fast. End user satisfaction is superior to other solutions used, which is very important for us," said Jorge Galindo.

The Innergex BESS Project was inaugurated in October 2023 to become the first Innergex BESS in Chile and one of the first such projects in the entire country. The project represents Innergex's largest battery energy storage project to date, helping to fulfill its mission to build a better world with renewable energy.

Milestone for Chile's energy infrastructure

PV Salvador's BESS will provide the Chilean power grid with 50 MW/250 MWh (5 hours) of reliable supply. It stores the electricity generated by PV Salvador (68 MW) during the day, to be injected into the national electricity system at night, at peak demand hours. The Salvador battery project has thereby strengthened Chile's National Electric System (SEN), optimizing the country's existing transmission and distribution infrastructure. Salvador's BESS uses 985,320 cells that can store 250 MWh, equivalent to the consumption of 44,000 Chilean homes.

"The results have been very satisfactory, especially when quantified in time saved. The N3uron solution, by enabling remote centralized operation, has allowed us to save hours of operation on sites," said Jorge Galindo.

This milestone project's successful completion confirms that N3uron has all the capabilities to meet demanding BESS system requirements.

The Trekkor team itself, according to Galindo, also proved to be an asset for the project.

“The solution’s integration and development professionals have always had an excellent disposition — proposing, supporting, and advising based on their experience — which for us is and has been very gratifying and beneficial,” said Jorge Galindo.

Future Innergex projects using N3uron

Currently, Innergex is building its second utility-scale battery energy storage project: San Andrés, providing 35 MW/175 MWh (5 hours).

“We are currently working with N3uron on other similar projects, both in Chile and at the corporate level. N3uron currently has an important role at the operations level, which has made it a very valuable system at Innergex Chile,” said Jorge Galindo.