Case Study: Interlog Standardizes Solar Plant Monitoring Across Chile

Connecting 30 remote CVE solar sites under a single monitoring system

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Monitoring a solar power plant is no small task, but it's easier when everything is in one place and under your control.

Now imagine monitoring 30 plants, built by various contractors, scattered across 3,000 kilometers (1,864 miles) of remote terrain, and using a patchwork of inconsistent control systems.

For CVE® Chile, part of France-based CVE (Changing Visions of Energy) Group, that was the reality.

SCALING SOLAR POWER IN CHILE

CVE Group is an independent renewable energy producer specializing in solar power, biogas, and green hydrogen. Operating in multiple countries, including Chile, they focus on decentralized projects that generate and supply clean energy directly to local communities and businesses.

CVE entered the Chilean solar market in 2016 with a unique business model: they outsource construction and the first few years of operation of each solar site to various subcontracted companies from Spain, Italy, and Portugal.

The construction firms are responsible for building the solar sites to spec, running them for 2–3 years, and finally handing them off to CVE. Revenue from existing plants is

Ground-mounted solar photovoltaic array generating renewable electricity

Large-scale solar photovoltaic plant with ground-mounted panels in rural Chile

then used to finance the construction of the next plant. By 2019, five solar plants were already online.

INCONSISTENT CONTROLS

In 2019, when CVE Chile assumed control of those first few sites, the inconsistency in controls quickly became apparent. Each plant had different hardware, software, and communications capabilities. Some could only be operated locally with no remote access. Others had partial connectivity but used different protocols, making centralized monitoring impossible.

CVE operators couldn't easily compare site performance, had to use different troubleshooting steps at each plant, and dealt with non-interchangeable spare parts. In some cases, faults went unnoticed for hours or days until production dropped.

One of CVE Chile's local engineers suggested outside help: automation experts from Interlog Electrónica Ltda.™ in Santiago, Chile.

A TRUSTED PARTNER

Interlog Electrónica provides engineering services, training, and hands-on support to customers in industries like mining, aquaculture, food processing, water treatment, and, of course, energy production.

"CVE's business model creates rapid growth, but maintaining consistency was a challenge, particularly with control systems," says Rodrigo Flores, an Interlog engineer.

Most plants used control hardware designed only for local operation, with little to no communications. Others had control hardware with Modbus®/TCP communications, but no centralized networking infrastructure and little to no visibility of live operations data.

Field-mounted junction box on a solar panel in the photovoltaic array

"Many of the early systems were basic at best," says Flores. "They were designed just to keep things running locally, with little thought for remote monitoring or data integration, which made troubleshooting and management quite difficult."

A FOOTHOLD IN THE FIRST PLANT

Having already worked with similar challenges in industrial settings as well as being an IoT-certified OptoPartner, Interlog proposed a solution using the Opto 22 SNAP PAC system™, a reliable industrial control platform known for stable operation and flexible protocol support.

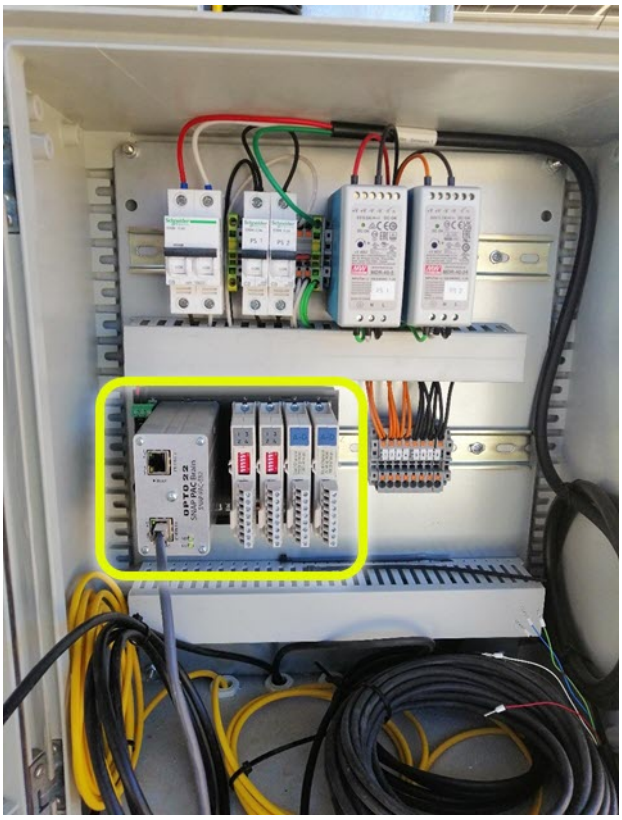
The first 9-megawatt solar plant went live with the SNAP PAC System in July 2019 and became the first in CVE's fleet with a reliable local monitoring system. The new system enabled on-site personnel to view performance data in real time and confirm the system was working as expected. It was a major step forward.

HOW DID THEY DO IT?

For the first CVE solar plant, Interlog built a local monitoring system using the Opto 22 SNAP PAC hardware and the free PAC Project™ software suite. This suite includes PAC Control™ for programming, PAC Display™ for the HMI, and PAC Manager™ for configuration and diagnostics—everything needed to set up a complete system without additional software costs or licensing fees.

The SNAP PAC controller collected data from a mix of equipment across the site:

- Analog signals from weather instruments like wind vanes, anemometers, rain gauges, and PT1000 RTD temperature sensors
- Digital inputs over RS-485 using Modbus RTU communication from pyranometers (measuring solar radiation) and dust sensors
- Ethernet-based devices like inverters, automatic circuit reclosers, and energy meters, all connected over Modbus/TCP or DNP3



The first solar plant used the Opto 22 SNAP PAC system for local monitoring.

Using PAC Control, Interlog programmed the SNAP-PAC-R1 controller to handle all signal inputs, applying the necessary scaling, logic, and communication settings. The data is sent to the CVE main offices located in Santiago. From there, information is aggregated in another SNAP PAC controller, which processes it and sends it to the CVE headquarters in France.

It was the first reliable monitoring solution in the fleet: easy to use, stable, and repeatable. It helped plant personnel catch problems early and gave Interlog a proven template for future deployments.

SCALING UP

From that point on, CVE wrote Opto 22 hardware directly into the specifications for all new solar projects in Chile, making it the standard. Interlog led the effort to keep controls consistent across sites, with each plant following the same setup and only minor adjustments for its equipment and layout.

By 2025, the standardized system had been deployed at 30 CVE solar plants across Chile—spanning from the Atacama Desert in the northern region to southern regions nearly 3,000 kilometers away. This consistency meant the CVE operators could move between sites without retraining, and spare parts were interchangeable across facilities.

"Different instruments have different communication protocols and memory maps, so we spent a lot of time mapping signals in PAC Control, and precisely tuning polling intervals to ensure data integrity. Our project standards keep the system reliable and make troubleshooting consistent across all plants," says Flores.

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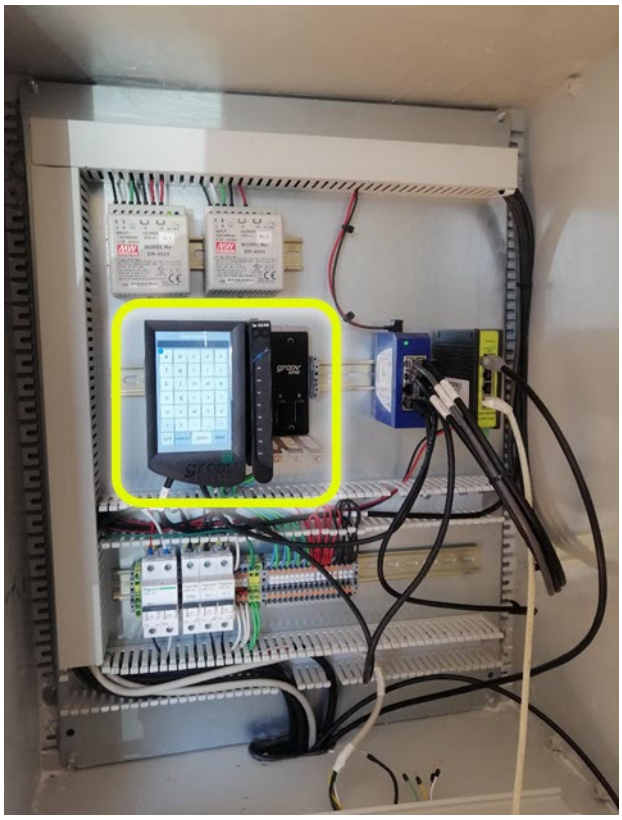


CVE Chile upgraded the control panels with the Opto 22 *groov* EPIC system.

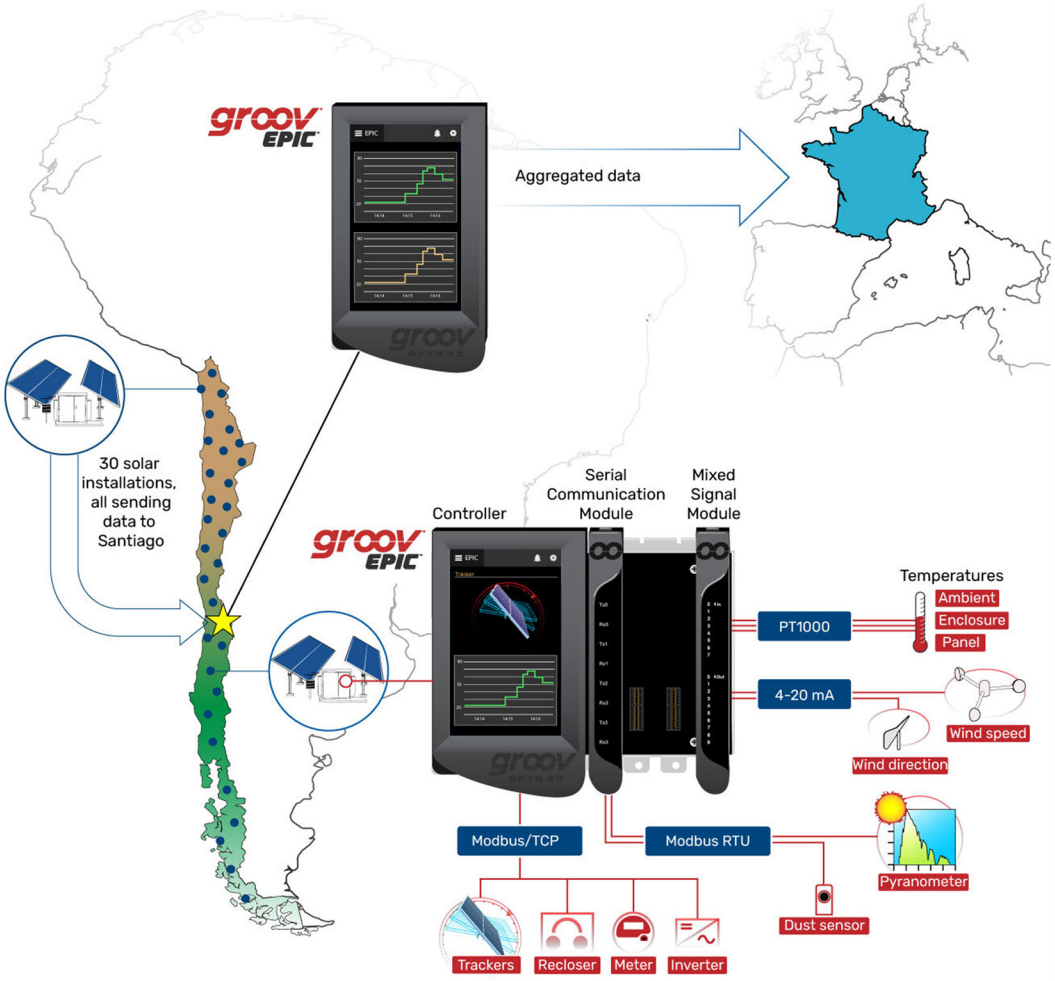
INTRODUCING EPIC

Starting in late 2022, CVE began migrating from SNAP PAC controllers to Opto 22's newer *groov* EPIC® (**E**dge **P**rogrammable **I**ndustrial **C**ontroller). EPIC combines real-time control, cybersecure networking, and visualization in a single industrial package.

As part of this migration, Interlog started using *groov* View®, an Opto 22 web-based visualization tool that runs directly on the EPIC controller. *groov* View enables authorized CVE operators to access live plant data locally or from any device with a web browser, like mobile phones and tablets, without additional servers or software.

The transition from SNAP PAC to *groov* EPIC was smooth. "Because *groov* EPIC supports the same control platform and communication protocols as SNAP PAC, we didn't have to rewrite our programs or retrain staff," says Flores.

The added processing power and modern interface tools of the EPIC, including the built-in touchscreen and the



The *groov* EPIC system architecture that gets monitoring data from Chile to France

groov Manage™ browser-based configuration, help simplify commissioning.

EPIC supports the same protocols as SNAP PAC, like Modbus/TCP and DNP3, but also adds modern IIoT protocols like OPC UA®, MQTT Sparkplug® B, and a REST API.

A key advantage of the *groov* EPIC system is its built-in security. With a configurable firewall, VPN, secure remote access, and LDAP integration, *groov* EPIC allowed CVE to simplify their architecture while strengthening their overall cybersecurity posture.

groov EPIC also runs Ignition Edge® onboard, a lightweight version of the Inductive Automation® Ignition® SCADA platform, which unlocks the potential for future enhancements, like centralized SCADA, without changing the field-level systems.

RELIABLE PERFORMANCE AND IMPACT

The original control systems at CVE solar sites operated in silos, each running independently with no centralized monitoring. If a system failed or lost data, operators often didn't know until much later, delaying responses and risking downtime. Interlog's solution changed that by providing stable, continuous monitoring and centralized data access, giving CVE operators the real-time data needed to keep plants running smoothly.

An operator dashboard built in *groov* View shows multiple data points of the power plant.

Measuring exact impact is difficult because of the fleet's size and complexity, but the system's reliability has become essential to CVE's operation. As Rodrigo Flores says, "When your data is trustworthy, you spend less time fixing problems and more time optimizing performance."

LOOKING AHEAD

CVE continues to expand its solar fleet in Chile, and every new project now includes *groov* hardware as a core part of the design. SNAP PAC controllers remain in service and continue to perform reliably, but CVE's long-term plan is to standardize on *groov* EPIC as sites grow and evolve.

Long term, there are plans underway to move from local visualization with *groov* View to a fully centralized Ignition SCADA system, giving CVE management a single view of live and historical performance data across all sites.

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- Rodrigo Flores, Interlog Electrónica

Interlog's approach gave CVE something the early systems lacked: consistency. By standardizing CVE's hardware, protocols, and practices, they turned a patchwork of sites into a unified fleet. Combined with Opto 22's long-standing commitment to backward-compatible design, CVE now has faster troubleshooting, smoother operations, and the confidence that every plant will perform as expected—today and well into the future.

As Rodrigo Flores puts it, "When you build with consistency, you build systems that last."

ABOUT CVE CHILE

CVE (Changing Visions of Energy) Chile is part of the France-based CVE Group, an independent renewable energy producer specializing in solar power, biogas, and green hydrogen. Since 2016, CVE Chile has been actively developing its solar market and building larger-scale power plants to meet growing energy demand. They can sell the energy produced directly to large industrial consumers, offering economic stability and a relationship of trust with local partners.

For more information, please visit:
https://www.cvegroup.com/en/cve-chile

ABOUT INTERLOG ELECTRÓNICA

Since 1980, OptoPartner Interlog Electrónica has been working with microprocessor-based systems for data acquisition and control applications of industrial processes. Their mission is to provide high-quality products, the latest engineering services, training, and hands-on support to their customers in industries like mining, aquaculture, food processing, water treatment, and energy production. They pride themselves on staying on top of the technological advancements, ensuring their customers get the highest rate of return on their investments.

For more information, please visit:
http://www.interlog-it.com

ABOUT OPTO 22

Opto 22 was started in 1974 by a co-inventor of the solid-state relay (SSR), who discovered a way to make SSRs more reliable.

Opto 22 has consistently built products on open standards rather than on proprietary technologies. The company developed the red-white-yellow-black color-coding system for input/output (I/O) modules and the open Optomux® protocol, and pioneered Ethernet-based I/O.

Famous worldwide for its reliable industrial I/O, the company in 2018 introduced *groov* EPIC® (edge programmable industrial controller). EPIC has an open-source Linux® OS and provides connectivity to PLCs, software, and online services, plus data handling and visualization, in addition to real-time control.

groov RIO Ethernet-based edge I/O modules, introduced in 2020, include I/O and IIoT software in a compact industrial package that goes anywhere.

All Opto 22 products are manufactured and supported in the U.S.A. Most solid-state SSRs and I/O modules are guaranteed for life.

The company is especially trusted for its continuing policy of providing free product support, free online training, and free pre-sales engineering assistance.

For more information, visit opto22.com or contact **Opto 22 Pre-Sales Engineering**:

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