Regesta Compact PLC: Communication solution for he leading energy company in Spain.

The Regesta Compact PLC is a specially designed industrial-grade PLC Gateway router that brings today's most advanced corporate IP network protocols to the world of Smart Grids and Telemetry. This device is the ideal solution for the remote management, supervision and automation systems of energy companies.

Teldat®

Regesta Compact PLC: Communication solution for the leading energy company in Spain.

Client Summary

With a track record spanning over 170 years, today the client has established itself as an international leader in the energy sector. It produces and supplies electricity to more than 100 million people in the countries in which it operates. Its Spanish subsidiary is the leading energy company in Spain and is present in Portugal, France, Italy and Germany. It is also the third largest wind power producer in the United States and the leading private electricity producer in Mexico. The company has undergone a major transformation over the last 15 years and continues with its commitment to a digital transformation and innovation program – which will see some €1 billion invested by Iberdrola between 2018 and 2022.

Challenge	Solution	Why Teldat
▶ Refurbish of the remaining transformation centers to incorporate secure reliable communication capabilities in the transformation centers.	▶ The Teldat Gateway Regesta Compact PLC, whose main purpose is to interconnect PLC Prime-based smart meters with electricity provider Telemetry Services through IP networks.	▶ High-level features and functionalities that met the client's technical requirements - both hardware and software.

Challenge

In recent years, the client has begun an ambitious initiative aimed at carrying out a technological transformation in the field of smart grids. This project resulted from a change in regulations requiring older electricity meters to be replaced with a new electronic device that enables hourly discrimination and remote management; that is, it provides the ability to read customer meters and change contract conditions without having to send someone to the customer's site.

In order to meet these objectives, the client has developed an intensive plan to modernize 97.7% of its Spanish meter park and adapt almost all of its transformation centers by the end of 2018. With the Spanish electricity scenario in mind, this adaptation has been implemented in two phases. In the first phase, 80% of the company's meters were replaced, with the focus on densely-populated areas where there was a greater concentration of meters.

The second phase, which corresponds to the current challenge, consisted of refurbishing the remaining transformation centers, located in rural areas or with few associated meters, such as in power plant, source or light transformation centers.

This required setting up robust devices that could incorporate secure reliable communication capabilities in the transformation centers. Thus, the devices had to be able to manage communications with smart meters installed at consumer sites, gathering data and sending it to advanced measurement systems (AMI).

The second scenario, where most of the transformation centers are located in remote unattended sites, posed another challenge – that of security. One of the project's main objectives was to find a solution that could both enhance data integrity and transport, as well as strengthen security in the client's own network, preventing intruders from using these devices to access the client's own network. Due to the nature of the transformation centers, the device needed to be very small – of a similar size to the electric meters. This would allow it to be installed in small transformation centers, on aerial poles and even in the same location as the electric meter itself.
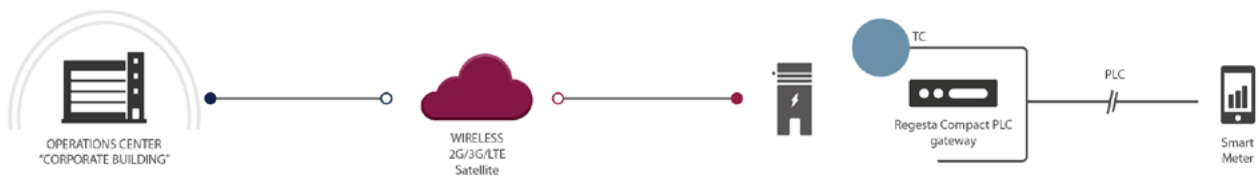
Solution

Innovative solutions were provided by Teldat to resolve the adaptation of the transformation centers – for both the first and second phases of the project. Focusing on the second scenario, Teldat proposed installing the Regesta Compact PLC device, ideal for these types of low-concentration scenarios.

The Gateway Regesta Compact PLC router is a telecommunications device whose main purpose is to interconnect PLC Prime-based smart meters with electricity provider Telemetry Services through IP networks. The device incorporates PRIME Node (Base or Service) features and LAN or WAN connectivity, which can be through an Ethernet port or via a 3G radio module.

To ensure maximum wireless communications security, the router combines the traffic flow (IP or SCADA) for each service in a VPN tunnel. VPN servers take each VPN tunnel and transmit it to the corresponding monitoring station through the appropriate central IP subnetwork and VLAN segment. The Regesta Compact PLC proactively monitors the wireless connection and the VPN tunnel. When the router detects some degradation in performance or a tunnel down, it automatically switches to the backup network and VPN tunnel, thereby maintaining communications with the remote site at all times.

The device includes the entire Teldat Internetworking Code (C.I.T.) stack functionalities, which is what gives the Regesta Compact PLC gateways the intelligence necessary to efficiently implement highly secure, scalable and permanently available broadband-based communications services. The device also has all the certifications – EMC, insulation, immunity, electrical, climatic and mechanical – to ensure it works correctly and safely in electrical environments. It has a ruggedized hardware specially designed to suit unattended installations, together with an extended operating temperature range (-20 ºC to 70 ºC). The device has a 3G embedded interface and Dual-SIM to automatically backup communications.

In this second phase of the project, the customer decided to simplify the structure used in the transformation centers by introducing a new and innovative solution. Until that time, smart meters were connected via PLC to a telemetry concentrator, which in turn was connected to a router to provide the necessary communications.

This scenario was resolved and simplified by using virtual telemetry concentrators in the cloud and replacing the routers with PLC Gateways. The PLC interface of these gateway devices is dedicated to the connection with the meters, thereby enabling DLMS traffic to flow between the meters and the Virtual Concentrator. The data are encrypted and sent securely to the client's central services where Tunnel Terminating Devices – responsible for deciphering information transmitted over Operator networks (3G networks) – are installed.

Results

By installing the Regesta Compact-PLC, the client has been able to achieve the following results:
• Maintenance of high levels of security and certification in substation devices, without jeopardizing data integrity or network performance.
• Improved reliability thanks to the centralized software solution (virtual concentrator), which allows for better redundancy options, fewer devices in remote locations and, therefore, less likelihood of failures. The nature of the architecture allows the solution to scale, as the number of meters per transformation center can be increased as required.
• Reduction in costs by eliminating the need to install two hardware devices in remote locations, minimizing the security risks associated with storing customer information in unattended centers (by eliminating the Telemetry Concentrator device), and also reducing installation and maintenance costs.

Why Teldat?

Teldat and its Regesta Compact PLC team stood out from the other suppliers and devices due to:
• High-level features and functionalities that met the client's technical requirements – both hardware and software.
• The device is currently approved by Prime Alliance and supports all network topology discovery and meter firmware update functionalities, which were and are required in projects/scenarios of this type.
• Inclusion of the complete Teldat Operating System stack, which provides security, management capabilities and flexible network connections.
• The client had a satisfactory experience with Teldat during the instalment of a large number of Teldat Regesta-PRO ER devices in the first phase of the project.

FLEXIBLE
COMMUNICATION SOLUTIONS
THAT GROW WITH YOU.

Regesta Compact PLC

PLC gateway for efficient, cost-effective telemetry deployments.

- ▶ Múltiples WAN (2G/3G/LTE, Ethernet).

- ▶ SCADA (Modbus, IEC-101/102, gateway IEC-104).

- ▶ PLC interface (base node up to 750 smart meters).

- ▶ Extended temperature range (-10 ºC to 60 ºC).

- ▶ Complies with electrical safety regulations & EMC.

- ▶ DMVPNs, VLANs and QoS for critical services.

- ▶ Dual-SIM redundancy (optional double module).

The Regesta Compact PLC are industrial-grade routers that provide secure and reliable IP broadband connectivity to SCADA telemetry and telecontrol networks in smart grid deployment. By configuring the built-in PLC communications interface as base node, you can communicate with smart meters without having to install any additional equipment like PLC concentrators.

The router guarantees optimal and maximum security of communications between multiple IP services. In addition, by using 2G/3G/LTE and Ethernet interfaces concurrently, the router provides maximun reliability of communications, which is guaranteed thanks to the full support of the management, monitoring and backup functionalities. The Regesta Compact PLC family incorporates state-of-the-art security technologies in communications with the most complete collection of VPN protocols and firewall techniques.