CASE STUDY

Valence brand lithium-ion batteries integrated into a microgrid system reducing energy consumption and lowering energy bills in an office building application.


Acciona (experts in infrastructure of renewable energies) was tasked with the installation of a microgrid system using lithium batteries as a renewable energy supply destined to generate, store and supply an important percentage of the electric energy consumption in a commercial building application. The primary objective of the project was to reduce energy consumption and energy bills for the office building.

The system integration involved many tasks including:

- Installation of equipment: PV modules, battery storage system, backup generator, hybrid inverter
- Installation and configuration of the communication system to achieve the complete monitoring and control of the principal equipment
- Startup of the new microgrid system integration and communication system connected to the electrical distribution of the office building

The equipment chosen and implemented:

PV modules: 76 solar panels were installed on the rooftop of the building for total power of 25.46 kWp.

Battery Energy Storage: The energy storage system is housed in the underground floor in a new technical room designed for lithium ion batteries. 60 Valence U27-12XP LiFeMgPO4 batteries were placed in 2 parallel strings with 30 units in series for a total capacity of 106 kWh.

Inverter: The inverter is also housed in the underground floor which receives and adapts the PV energy to be used by the building users or to charge the batteries. It has a maximum electrical power of 30 kWe.

Auxiliary Diesel Generator: Located in the outdoor parking area is the auxiliary generator which can provide a total electrical power of 50 kWe and only works when the electrical energy generated by PV modules and the electrical energy storage system is lower than the building's electrical energy demand.

Control and Monitoring System: The installation is controlled by a PLC connected to the systems of the microgrid installation. The communication protocol also includes MODBus and digital signals to monitor the entire system.

## Specifications:

| | |
|---|---|
| Voltage | 384 V |
| Capacity | 106 kWh |
| Batteries: | 60 U27-12XP in a 30s2P configuration |
| Location | Barcelona, Spain |
| Function | Generate, store, and supply electric energy to an office building |
| Operating Since: | 2016 |

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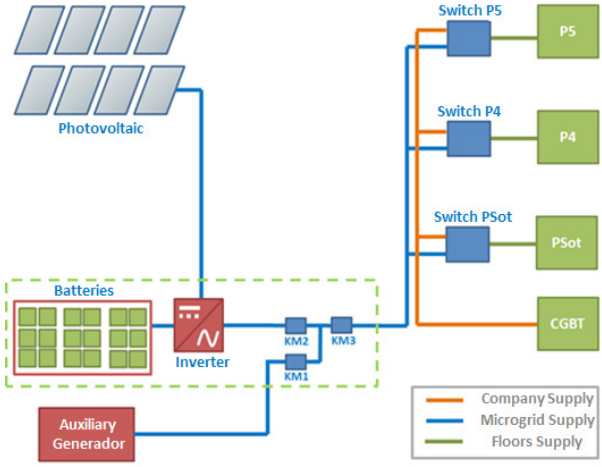
The most important factors for selecting the Valence U-Charge® batteries were discharge rate capability and high cycle life. When testing the U27-12XP, the results met or exceeded the project objectives.

Results of the Test Installation:

- 15-20% in annual cost savings of energy
- Optimization and efficiency of energy management
- Reduction of emissions & greenhouse gases in production of electricity

Low self-consumption buildings using renewable technologies like this demonstration shed a positive light on migrogrid capabilities. It validates the microgrid design for this project is scalable and can be integrated in other types of buildings, especially those with rooftop space. In addition, this project demonstrates the ability to provide electrical energy without the company grid and provides a cost-effective solution for generating free electricity.

*Information provided by Acciona.*

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