

## Case study

Smart Microgrid project - Ollagüe ,Chile

### Project Summary

**Location:** Ollagüe, Chile

**Customer:** Enel Green Power

**Commissioning:** October, 2014

**Application:** Smart Microgrid, Power Management System and Energy Storage

**Grid components:**

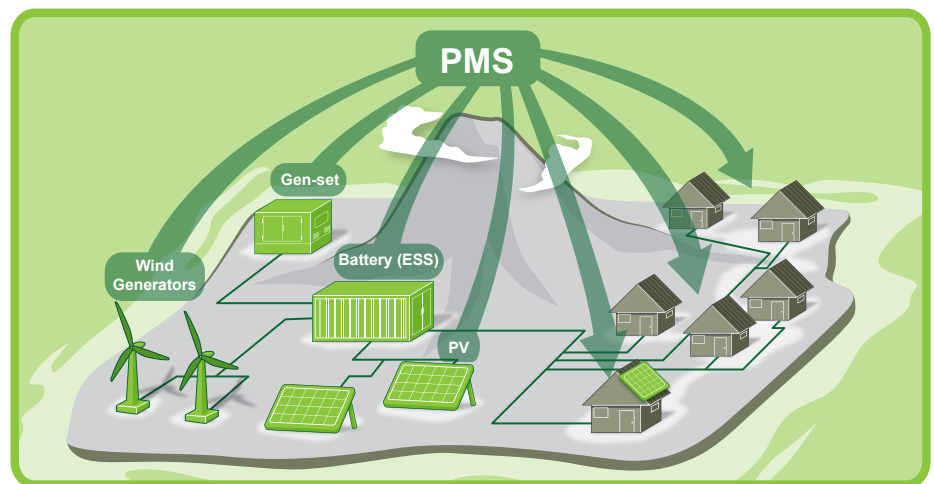
- 30 kWp wind energy
- 68 kWp x 3 photovoltaic systems
- No.1 diesel generator 250 kVA
- 520 kWh energy storage system with 250 kVA Active Front End (AFE) AC/DC converter

**Load Peak Demand:** 100 kW unbalanced

**Power Management System:**

- ARTICS Smart Energy

**Altitude:** 3660 meters



**Typically, ARTICS Smart Energy can provide the following features:**

- Power metering
- Measure and analysis of the electric distribution system
- Real-time control for loads and generators
- Emergency and protection management
- Monitoring and supervision system
- Historical data collection

Main functionalities of ARTICS Smart Energy can be individually activated, allowing the platform to adapt to the needs of end users.

This project was an excellent opportunity for Nidec ASI to showcase its electrical engineering and design capabilities, by customizing the Power Management System to integrate a high number of renewable energy sources in a smart microgrid configuration, providing power supply to the village.

### Control system - Technical features

- System protection
- Battery charge/discharge management and adjustment
- Control, monitoring and diagnostic of PCS's conversion cabinet
- Data and events acquisition and storage
- Supervision system



*Matias dreams of prosperity for his home village.*

*Nidec ASI, turning dreams into results*

**Nidec ASI**

## Project description – Operating principle

Ollagüe is a Chilean frontier village located in the Andean altiplano at 3660 meters, bordering with Bolivia.

The goal of the project was to build a hybrid power system with 205 kWp of photovoltaic generation (thin-film PV modules), a wind turbine with a rated power of 30 kW, Battery Energy Storage System (BESS) and a diesel generator (already existing), all interconnected through a system of energy management in order to create an isolated microgrid, able to provide continuous energy supply for the Ollagüe village.

The project also includes the installation of two Trinum systems at the Ollagüe school – a concentrated thermodynamic solar system with sun tracking designed to produce electricity and hot water. The plant will be “stand alone” (not connected to the national grid), including an electrochemical storage system of 520 kWh able to handle all technical requirements of the grid, providing to area inhabitants the availability of electricity 24 hours a day.

### Power Conversion System Converter technical data

	Grid Side (AC voltage)	Battery Side (DC voltage)
Voltage	400 Vac	500 ~ 670 Vdc
Power	250 kVA	752 kW
Cooling system	Air cooled	



## Scope of Supply

- Qty.1 Power Management System (PMS)
  - ARTICS Smart Energy
- Qty.1 Air-cooled containerized Power Conversion System (PCS), consisting of:
  - 1 PCS Converter (using a AC/DC converter in AFE (Active Front End) configuration and a DC/DC converter for DC bus control)
  - 1 PCS Controller

## Advanced control & simplified monitoring

