

Case study

Energy storage system and micro-grid
Savona, Italy

Italy's first microgrid features a Nidec ASI power conversion system

Project Summary

Project: University of Genoa – Savona Campus

Client: Siemens

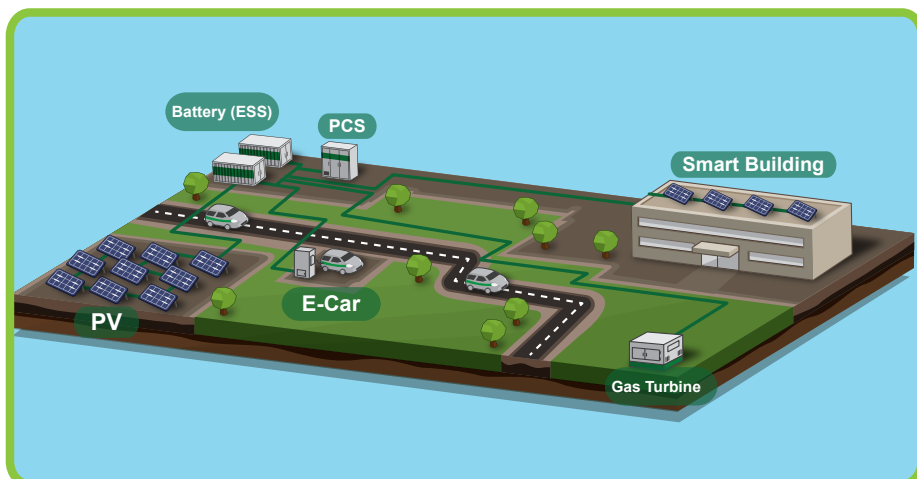
Application: Energy storage for an experimental smart micro grid

PV Power Installed: 80 kW photovoltaic plant, 32 kW energy storage, 400 KVA diesel generator

Nidec ASI's role

Nidec ASI supplied the university with a Power Conversion System (PCS) for 62 kW of energy storage, as well as a transformer for the microgrid. The PCS allows the university to store and use power generated by its solar panels to supplement other power sources. Any excess solar energy it generates is stored in on-site batteries until it is needed.

Because the PCS manages energy flow in real time, it helps ensure an uninterrupted power supply. The charging and discharging of the batteries are controlled by separate DC/DC converters, each of which is dedicated to a group of batteries with its own battery management system. The system is designed to optimize charging and discharging cycles to optimize renewable energy production.



The challenge:

To create an energy-independent college campus

It takes 250 to 400 kW of electricity to power the many buildings on the University of Genoa's University Campus of Savona. This energy has historically come from the grid, supplemented by combined heat and power generated at an onsite gas turbine. The university distributed this power across campus on its own low-voltage grid. Recognizing the inefficiency of its existing system, the university sought a new approach that would cut energy demand, expand use of combined heat and power, and increase the amount of energy produced by renewable sources. It then wished to network the components together using "smart" technology to ensure efficient energy management. In addition to making the campus energy-independent, the university leaders hoped their solution might serve as a model for the redesign of the entire city's energy supply.

The solution:

A smart microgrid, including energy storage

Working with Siemens, the University of Genoa elected to develop a smart polygeneration microgrid for the campus. The microgrid has a total capacity of 250 kW of electricity and 300 kW of heating, drawn from three high efficiency micro gas turbines and a concentrated solar power station, including a photovoltaic plant with four solar cells. A Battery Energy Storage System (BESS) and two traditional generators serve as backups, helping to balance any fluctuations in the power supply. All are connected to an on-campus control center that monitors and manages the resources, using smart software to adapt quickly to changes in power generation and consumption. When it came time to choose the right Power Conversion System for the Energy Storage System, the project engineers chose Nidec ASI as the most reliable for the job. 31.72 tonnes a year.



Mario's dream is to become an Energy Manager. The university's new microgrid system will provide him with hands on experience.

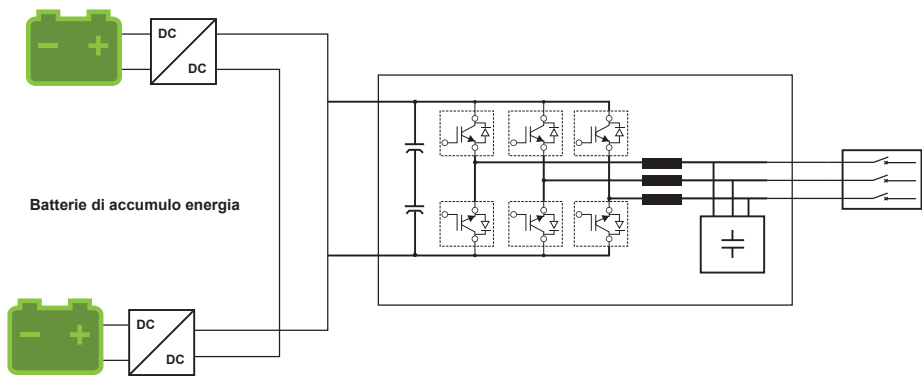
Nidec ASI, turning dreams into results

Nidec ASI

System components
supplied by Nidec ASI

- An air-cooled Power Conversion System (PCS), consisting of:
- a PCS Converter, including
 - an AC/DC converter in Active Front End configuration
 - a DC/DC converter for DC bus control
 - a PCS Controller
 - a Transformer

Power Conversion System Converter technical data		
	Grid Side (AC voltage)	Battery Side (DC voltage)
Voltage	400 V	500 V
Power	60 kVA	44 kW
Cooling System	Forced Air	



The Battery Management System (BMS) is linked to Nidec ASI's PCS which provides the control functions and monitoring tools to manage and optimize energy production.