



SIEMENS



[www.siemens.com/smartgrid](http://www.siemens.com/smartgrid)

# Smart energy supply for the University Campus of Savona

University of Genoa, Italy



Info display with direct connection to the control center

## Italy's first microgrid

The University of Genoa in the northern Italian region of Liguria was founded in 1481, and today has roughly 40,000 students at various locations. As a pioneer in the area of innovative energy management, the University recently launched the "Energia 2020" project. The project's key initiatives are the development and operation of a smart polygeneration microgrid at the University Campus of Savona.

In short, the project's goals include:

- High degree of efficiency in power generation
- Optimization across different energy sources
- Better management of renewable energy sources
- Reduction in emissions
- Increased system resiliency

*"The project involves not only the construction of the Smart Polygeneration Microgrid at the Campus but also a completely eco-friendly and automated smart building ... toward the goal of creating a university that is cutting-edge in terms of energy conservation and workday comfort."*

Federico Delfino, Scientific Director of the Smart Polygeneration Microgrid project for the University of Genoa

**Answers for infrastructure and cities.**



One of three new charging stations for electric vehicles



Absorption chiller that converts turbine waste heat into cooling energy

### Challenge for the University of Genoa

The University Campus of Savona consists of several buildings for teaching, research, and student housing. A natural gas heating system with two 500-kWth boilers and an electric air-conditioning system regulated the temperature inside the buildings. The 250 to 400 kW of energy necessary to supply the campus was obtained from a direct connection to the medium-voltage grid and distributed internally via a low-voltage grid. In addition to a gas turbine for combined heat and power generation, the University depended on the main grid – and because it was managed manually, it used energy very inefficiently. The University wanted to reduce the energy demand of the campus, integrate energy from renewable sources, expand its use of combined heat and power generation, and intelligently network all components. The project is simultaneously serving as a trial program for the future redesign of the energy supply for the entire city of Savona.

### Our solution

The University of Genoa and Siemens jointly developed a smart polygeneration microgrid for the campus of Savona that was officially commissioned on February 12, 2014. Since then, the campus has largely generated enough power to satisfy its own needs with the help of several networked energy producers – with total capacity of 250 kW of electricity and 300 kW of heating. Three highly efficient gas micro-turbines supply the power, as well as the heat that is distributed across the campus via a district heating grid. An absorption chiller provides additional heating or cooling, depending on the season. In addition to the gas turbines, a solar power station with three modules and a photovoltaic plant with four solar cells are used to produce power. An electrochemical and two thermal storage systems serve as a buffer; as needed, they balance fluctuations in the power supply caused by fluctuating producers. Four electric vehicles and three charging stations have also been added on the consumption side.

Everything is connected to the control center on the campus, which ensures smart energy management of the microgrid. The Siemens microgrid management system monitors and manages the resources. To do so, the smart software draws on comprehensive generation and consumption forecasts and continuous real-time optimization so it can respond quickly and flexibly to changing conditions in power generation and consumption.

### Benefits for the University Campus of Savona

The University is benefiting from increased energy efficiency on the Savona campus and has significantly reduced its demand for purchased energy. Together, these two factors have reduced operating costs, allowing the University to finance similar projects. The use of renewable energies has set the cornerstone for a sustainable supply both economically and ecologically, and calculations show that CO<sub>2</sub> emissions will be reduced by a total of 120 metric tons per year. This project, which is unique in Italy, is serving as a model, and that is invaluable to the University. The campus, which is comparable to a multi-functional urban district, will be a success story for smart energy use. It will be a starting point for the research of new technologies and an incubator of ideas for redesigning the energy supply for the entire city of Savona. “Over the next two years, 2014-15,” Delfino said, “we hope to strengthen our beneficial university/industry collaboration with Siemens in order to further develop our Campus. We have now become an important center of competence in the area of smart grids and smart energy, and this will also have a positive educational impact on our students.”

Published by and copyright © 2014

Siemens AG  
Infrastructure & Cities Sector  
Smart Grid Division  
Gugelstr. 65  
90459 Nuremberg, Germany

For more information,  
please contact our  
Customer Support Center.  
Phone: +49 180/524 70 00  
Fax: +49 180/524 24 71  
(Charges depending on provider)

E-mail: [support.ic@siemens.com](mailto:support.ic@siemens.com)

GB 140219  
© 04.2014, Siemens AG