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Ingenuity for life

Smart energy supply for the University Campus of Savona

University of Genoa, Italy

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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



Info display with direct connection to the control center

“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 work-day comfort.”

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



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. The University was dependent 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.

Our solution

The University of Genoa and Siemens jointly developed a smart polygeneration microgrid for the campus of Savona. The campus largely generates 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 thermal power. 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 controls the resources. To do so, the smart software draws on comprehensive generation and consumption forecasts and continuous real-time optimization.

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 CO₂ 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 multifunctional 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.

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