Successful heating

does not interfere

Future-proof heating control system reduces energy consumption by 60 percent

The Barcaccia Fountain at the Piazza di Spagna is one of the most popular tourist attractions in Rome. This is also where the Collegio San Giuseppe Istituto De Merode is located, a Catholic school within the Brothers of the Christian Schools teaching congregation. To improve the energy efficiency of the historical building complex, systems integrator CTI Sistemi was hired to renovate the heating system.

By Mirko Vincenti – Market Manager Infrastructure and Building Automation, Beckhoff Automation S.r.l.

system renovation

with historical building fabric

This was no easy task, considering the strict rules for the protection of historical monuments that do not allow interference with the building fabric. CTI came up with a solution that employs EnOcean-based wireless sensor technology, which can be integrated seamlessly with the Beckhoff PC-based control platform.

In addition to the actual school, the historical complex includes two adjacent buildings that house an auditorium, cafeteria, chapel and the friars' rooms. Three hundred cast-iron radiators are used to heat an area of roughly 5,000 square meters (53,800 square feet). With an output of almost two megawatts, the heating system circulates more than 45,000 gallons of water through the system. "To reduce our high operating costs and make the entire heating system more flexible and efficient, we decided to implement a new system with intelligent building control technology," says Friar Alessandro Cacciotti, director of Collegio San Giuseppe Istituto De Merode.

A project that must comply with many requirements

To implement the system, the school hired CTI Sistemi, a company with many years of experience in designing, installing and maintaining building technology systems. "While the fabric of the buildings had to remain untouched, the control architecture had to be flexible and open for future expansions," explains Fabrizio Camagna, general director of CTI Sistemi. To comply with these requirements, CTI decided to combine EnOcean wireless, batteryless sensor technology with a PC-based control solution from Beckhoff.

EnOcean delivers maximum flexibility without wires

"Using wireless valve actuators and sensors based on the EnOcean telegram messaging system delivers significant technological and financial benefits: high design flexibility, easy integration into existing buildings without having to run wires and reliable communication," says CTI Sistemi technician Luca Camagna.

Collegio San Giuseppe decided to install Thermokon valves, because they can be integrated seamlessly into the Beckhoff control system architecture. The radio-based, batteryless valves harvest their energy supply from the environment.

PC-based control as integrated control platform

An embedded PC CX5120 handles the monitoring and control of the entire heating system, including heating and hot water preparation, pumps and more. "The monitoring application was developed on the basis of our software platform," explains Fabrizio Camagna. "It is a building and energy management system that perfectly integrates with the Beckhoff control architecture.

In addition to conventional SCADA functions, it features a series of functional extensions for energy data management and quality monitoring that heating engineers can parameterize graphically." The system also uses compact CX9020 Embedded PCs to control the roughly 300 closed loops and all heating valves throughout the building. Since the application is web-based, it supports remote access from any PC, smartphone or tablet.

Significant efficiency improvements

The system was equipped with a real-time consumption metering system that continuously compares current readings with historical values. "After the second year, the system recorded methane consumption that was 40.5 percent below the previous year's reference value. Considering that more than 100 tons of CO_2 were not emitted into the atmosphere, we achieved a significant reduction in our carbon footprint," Fabrizio Camagna sums up the results of the heating system upgrade project.

www.beckhoff.it
www.sangiuseppedemerode.it
www.cti-sistemi.com

From left: Luca Camagna – specialized technician of CTI Sistemi, Friar Marcellino Zuccari and Friar Alessandro Cacciotti – director of the San Giuseppe De Merode College, Fabrizio Camagna – owner of CTI Sistemi – and Mirko Vincenti – Infrastructure and Building Automation Manager of Beckhoff Automation Italy

Beckhoff controller CX5120 and fieldbus components