

Teaching Building Heating Systems to Respond to the Weather

Challenge & Solutions

Buildings account for 40 percent of energy consumption in the EU and generate 36 percent of Europe's greenhouse gases. Because the replacement rate of existing buildings is only about 2 percent a year, there is an urgent need for affordable, easily adopted solutions to improve energy efficiency in both new and refurbished buildings. Most current building energy-management systems (BEMS) are behind the technology curve in responsiveness. Air-conditioning systems adjust room temperature based on data monitored by thermometers – following changes in weather. This means they lose time and waste energy heating and cooling rooms, because the power needed to adjust the temperature is greater than maintaining the target temperature. Meanwhile, room occupants seeking to recover comfortable temperatures tend to overreact when they reach for the temperature-control panels, wasting more energy.

The SolarSensNet (SSN) system developed in this project cuts building energy consumption for heating and cooling by up to 8 percent. By combining Alitec's innovative sensors that significantly lower the cost of solar-irradiation monitoring with interior and exterior metering points, the system enables BEMS to maintain room comfort even during rapidly changing weather conditions. The system performs distributed solar-irradiation and temperature monitoring, and provides BEMS with measured data about the amount of energy needed to cool and warm buildings. This wireless sensor network also enables the active optimization and fine-tuning of heating-and-cooling energy use in large buildings, while guaranteeing comfort to occupants.



EuroCPS Support

Finepower GmbH, the project's design center, and Infineon provided full technical support and training needed to adopt and implement Infineon's XMC microcontroller technology, which is dedicated to power conversion, factory-and-building automation and other applications, in SolarSensNet.

Digital Skills

Alitec: Patented solar-irradiation sensors, power-and-communication platform complementing the sensing nodes, user interface and mesh network design and set up.

Finepower (networking partner) and **Infineon** (platform provider): Experience and expertise with the XMC platform.

Impact / What's next

With commercial launch expected in 2018, the SolarSensNet system promises an immediate tool to improve building energy efficiency, lower energy bills and reduce greenhouse-gas emissions. Sales are projected to exceed 1M€ by 2020, through partnerships with system integrators and adoption of the technology by BEMS developers and manufacturers. Alitec has more than doubled its staff to support product development and market launch, and expects to grow headcount by 30 percent in the first three years following launch. SSN also accelerates the arrival of real-time, automated building thermal management. Alitec's highly innovative irradiation sensors also enable a significant reduction in the cost of solar-irradiation monitoring. While current costs for this technology limit its adoption almost exclusively to photovoltaic applications, SolarSensNet will make it affordable in individual buildings. To achieve this, Alitec changed its power supply from grid-connection to solar-panel powered. It also improved its remote communication system from wired connection to radio transmission.

Company

Alitec is an R&D company located in Pisa, Tuscany, devoted to the development of environmental technologies and solutions for the renewable-energy sector (IT) - www.alitec.eu/

10 employees

Partners:

Finepower, Infineon

power

infineon

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