

Intelligent heating control cuts energy costs in hospitals

The German MediClin group is achieving annual savings of around 15,000 Euros on its heating bills following the installation of an energy management system based on wireless sensors from EnOcean in its nationwide clinics. EnOcean sensors operate without wires or batteries, greatly simplifying the installation and minimising the subsequent maintenance required. For MediClin, this will mean an exceptionally quick payback on the installation and essentially no running costs to offset against the energy savings.



Introduction

Today, more than 40 percent of primary energy is consumed in buildings, most of it for lighting and heating purposes. This kind of consumption needs to be reduced to lessen the burden on the environment. High energy costs are also a reason for urgent action, which is why the whole subject is increasingly becoming a political issue. For example, the current German energy saving directive now prescribes an energy performance certificate for "major refurbishment". Furthermore, as of 1st July 2008 the energy pass will be introduced, intended as an incentive for renovation and modernisation aimed at cutting energy consumption, initially in the case of residential buildings¹. However, current political developments indicate that it will be expanded to other categories of building.

Situation analysis at MediClin

Compared to private households, the energy efficiency problem can be especially critical in public facilities and businesses. Within a household's four walls the fact that everyone pays for their own energy is powerful motivation for cost and consumption awareness. This kind of motivation is lacking in

¹ Equivalent to the UK's "Part L Conservation of Fuel and Power"

schools, hospitals and residential homes, for instance, where windows can be left open while radiators are turned up, and other similar situations. Such was the case with MediClin, one of the largest providers of private health services in Germany.

An analysis of the running costs of 30 MediClin hospital facilities showed that heating accounted for two percent of overall costs. This relation indicated that it was worthwhile taking advantage of every possible opportunity to save.

Facility manager Franz Ebert decided to take a personal look at the energy losses that result in a ventilating and heating scenario. He found that substantial savings were indeed possible, but realised at the same time that MediClin could only accept a solution that was a low-cost investment. This ruled out conventional solutions, involving either large-scale cabling or high maintenance costs. The cabling raises the cost of the investment, and the maintenance effort gnaws away at the intended savings.

The smart wireless way

MediClin decided to opt for wireless sensor technology from EnOcean, especially for its ability to automatically shut-off a radiator when a window is opened. In this scenario, EnOcean's STM 250 wireless window contact is coupled with the radiator valve. The window contact is wirelessly connected to an Oventrop DynaTemp 100/16 router which is wired to the radiator valve so the system consequently closes if a window is left open.

EnOcean's STM 250 is a solar-powered, service-free magnetic contact wireless module. Its energy accumulator enables it to operate for a number of days in complete darkness. By means of an integrated reed contact, the module monitors the presence of a magnet attached to the side, immediately signalling any change in status. Plus, about every 15 minutes, a periodic sign-of-life signal is emitted. As an alternative to such window contacts there are now also window handles with EnOcean technology available. These draw their energy from the turning of the handle, and control a radiator valve according to the position of a window.

The wireless signal used by EnOcean technology is in the 868 MHz frequency band. It takes less than one millisecond to transmit, making it about a hundred times shorter than a conventional signal. This avoids data collisions and, to further enhance transmission reliability, the original data telegram is repeated twice within 30 milliseconds by a random principle. Such a method means that hundreds of wireless switches and sensors can be easily installed within very tight confines and operated in parallel without disturbing one another. If you were to take 200 wireless sensors sending a signal once a minute for example, there could only be a data collision on every ten thousandth transmission.

Implementation at MediClin

Müritz was the first MediClin clinic to be fitted with the system. One wireless receiver was centrally positioned to create the best possible connection to all 16 rooms along with minimal investment in used products. Installation contractors used EnOcean's EPM 100 wireless test set, a simple and reliable solution to determine the correct positioning of window contacts and receivers. Wireless repeaters were added to ensure propagation over longer stretches or in the presence of obstacles like concrete walls. The solar-powered EnOcean window contacts were stuck to the window frames. The wiring of the new radiator valves to the DynaTemp 100/16 router went smoothly and, to allow central control, the installation was linked to the clinic's LAN network.

The final step was the connection of the window contacts with the radiator valves. The wireless sensors were assigned by their 32 bit ID. This was achieved by putting the system into a teach mode and then actuating the window sensors. The whole process ended with a test of the system and its individual components.

Results

Facility manager Ebert conducted a full-scale comparative test of two heating subroutes, one with and one without window contacts. It demonstrated savings of approximately 800 kWh per room and annum or, to put it another

way, about 100 litres of heating oil, 70 Euros or 270 kg CO₂. Being installed in over 200 rooms, MediClin achieves an annual saving of around 15,000 Euros.

EnOcean's wireless solution also reduced the installation effort to a minimum. The rooms were back in use after a very short time. The Müritz clinic can expect a return on its investment in less than three years. Another three clinics have moved over to EnOcean technology in the meantime.

A welcome and by no means insignificant side-effect of EnOcean wireless sensor technology, in addition to the lower burden on the environment through less consumption of energy, is that it reduces the generation of problem waste in the form of spent batteries.

The application spectrum of EnOcean technology spans virtually every aspect of building automation. The technology is establishing itself as a standard, creating a foundation for biological construction systems, and presenting the key to smart green buildings.

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About EnOcean

EnOcean GmbH, established in 2001 and headquartered in Oberhaching near Munich, develops innovative, self-powered wireless sensor technology. The company manufactures and markets service-free and flexible wireless sensor solutions for use in buildings and industrial installations. The products are based on a combination of miniaturised power converters and reliable wireless transmission. More than 300,000 of the company's wireless components are already in use.

True to the corporate maxim "Green, Smart, Wireless", EnOcean produces innovative technologies that enable the creation of environment-friendly, flexible and service-free solutions for smart green buildings, residential, commercial and industrial, through wireless transmission and energy harvesting. Existing systems are easily expanded through compatibility with newly developed solutions.



EnOcean GmbH employs more than 35 people in Germany and the USA, and cooperates with well-known manufacturers of system solutions for building and industrial installations engineering worldwide. EnOcean has won numerous awards, only recently the "Batimat Innovation Award in Bronze" at Batimat 2007, as well as the "Best innovation in green product and services" award of the Working Buildings Week Innovation Awards 2007, the "Building Product Innovation Award" at the 100% Design London Awards 2007, the "BuildingGreen's 2007 Top-10 Green Building Products" and the title "Technology Pioneer 2006" of the World Economic Forum.

For more information visit www.enoceanshop.co.uk

