



Wireless Technology EasySens Conquers “Hohenwart Forum” Pforzheim

The refurbishment of the conference and educational institution “Hohenwart Forum” revealed that the use of automated LONWORKS® and EnOcean technologies is more economical than common measures for energy saving.

Hohenwart Forum, the modern conference and educational institution of the Evangelic Church in Pforzheim, Germany, is located in the geographical center between Stuttgart and Karlsruhe. The award-winning architecture consists of various octagonal houses forming one unit together surrounded by open and wide grassland. The forum offers plenty of room for education and meetings, proven work jobs, and experimental groups.

A continuous rise of running costs caused the Managing Director, Gerhard Hötger, to plan a comprehensive refurbishment of the guest houses. However, the well-being of guests was the centre of focus. In cooperation with Prof. Dipl.-Ing. Achim Heidemann, a comparison of costs and utilities was made in the scope of a dissertation for a diploma. The comparison forecasted a potential for energy savings of up to 58% when retrofitting the building automation and optimizing the heating circuit control.



Initial Situation

All three guest houses had the same architectural and technical construction. They consist of 27 guest rooms, distributed on the first and upper floors. All rooms have a sleeping area and a bathroom. On the first floor two service rooms are located; an engineering room for electrical installations and the boiler room.

The boiler room hosted a central heat generator for every guest house. The rooms were heated by hydraulic floor heating. Distribution was made via three separate floor heater circuit distributors in the first and upper floors.

Temperature was controlled via a mechanical time switch in combination with outdoor temperature and a reference room. Individual temperature setting was not possible which caused many guests to complain that in the winter the temperature was too high.

Most Economical Solution: LONWORKS Technology plus EnOcean

First, to complete the existing floor heating the refurbishment plan for the guest houses included additional heaters which should be installed by a heating engineering company. However, the integration planner Heidemann & Schmidt decided that it was indeed more economical to retrofit using building automation.

The concept was based on the further use of the floor heating without the need for additional heater installations. The rooms were equipped with technologies from the LONWORKS and EnOcean platforms and networked by means of the existing IT-system. The available boiler control was included in the automated solution. Furthermore, the complete room reservation system was implemented in the IT-solution. The planning was executed by HGI Heger Gebäudeautomation Ingenieuresellschaft mbH.

Comparison of Costs and Utility

Before the refurbishment was started, the energy consumption of the houses with room automation was compared to the energy consumption of the non-automated guest houses.

Thus, two reference rooms were equipped with the LONWORKS technology room automation and metrology. Each room received a room thermostat with a bus interface as well as self-powered wireless window contacts SRW01 by Thermokon Sensortechnik GmbH. In addition, an outdoor temperature sensor and electrical valve drives for the floor heating were installed.

The measuring values were collected for more than two months. A later analysis revealed an energy savings of more than 60%. The cost comparison for the retrofitting of room automation and the saved energy costs



clearly point out that the retrofitting was without any doubt worthwhile. The step-by-step retrofitting (house by house) was quickly executed including the integration of the LONWORKS and EnOcean technologies.

Demand-Responsive Control of Air Conditioning

In order to enable individual setting of the room temperature in every guest room, bathroom and floor temperature sensors with manual set point adjustment (+/- 1k) suitable for single room control and the ability to communicate were installed in all rooms. In addition, every window was equipped with wireless EasySens window contacts to avoid a waste of energy caused by wrong airing.

The status of each window is monitored by means of a wireless transmitter and a corresponding wireless SRCFTT receiver. The data are transmitted via the LONWORKS technology to the room air conditioning module. The visualization system plots the status of the windows without any time lag. The window monitoring has the following effect on the room temperature control: If the window is closed, the temperature is adjusted to the current set point. If the window is opened, the set point is toggled to an adjustable antifreeze set point after a delay of 30 minutes.

The heater circuit distributor of the floor heating was equipped with actuators and motors. Furthermore, it was set up on an Internet-based visualization system which was connected to the automation system of the available room booking system. All guest houses were equipped with calorimetric meters.

Amazing Energy Savings

The results are very impressive: It has been proven that the monthly energy savings in the winter time amount to approx. 55%. During the summer time the savings are as high as 90% (preparation of water for domestic use).

Managing Director, Gerhard Hötger, is extremely pleased with the results. "Thanks to the automated technology, comfort could be improved significantly and the well-being of our guests is increased, as well. This quality improvement is demonstrably provided for free as the investment costs are financed by the saved energy costs."

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