Ethernet-based, intelligent light controller can help save up to 80 percent of energy used in certain buildings

PC Control for intelligent lighting systems

With its intelligent solution for lighting control, Fifth Light Technology Ltd. has aimed at one of the largest sources of energy consumption: about 15 percent of all electricity produced in North America is used for the interior lighting of commercial and publicly-used buildings.

Energy savings in the lighting can amount to up to 80 percent with the implementation of Fifth Light intelligent lighting control, depending on the building.

"Maple Leaf Square," a new high rise office complex in the city center of Toronto, is equipped throughout with a web-based lighting control system from Fifth Light Technology based on Beckhoff control technology.

Fifth Light Technology Ltd., based in Oakville, Ontario, Canada, develops centrally controlled, dimmable lighting systems for office, industrial and public buildings. The company's approach consists of providing the desired lighting level in the right place at the right time while at the same time taking into account the light conditions in the surroundings, the respective energy costs and the user's preferences.

A system that enables simultaneous access for thousands of users

The Fifth Light solution connects thousands of separately controllable and dimmable lights via an open protocol communication network. This way, the users can access the lighting in their area via their preferred web device, such as VOIP telephone, iPhone or PC. What is special about this is that the simultaneous access of thousands of users is possible, for which the system makes use of the user profiles stored in a database.

Fifth Light offers a large number of energy-saving lighting devices, including a complete control system. All employed components, such as dimmable ballasts, relays and various web-based software applications, are compatible with DALI, the 'Digital Addressable Lighting Interface,' an open protocol for the control of lighting equipment. The innovative ballasts from Fifth Light are characterized by the fact that they can maintain

The lighting controller developed by Fifth Light connects thousands of separately controllable and dimmable lights via an open protocol communication network. The users can access the lighting via their preferred web device.

From left: David Peragine, project manager, and Tony Dableh, director of the Research and Development department at Fifth Light Technology

The Fifth Light system is based on a compact Beckhoff C6920 Industrial PC with Intel® Core™2 Duo processor and TwinCAT PLC automation software.

a power factor (λ) of > 0.95 and total harmonic distortion of less than 10 percent at each dimming level. In addition, they reduce the wear of the lights considerably. The extension of the life span of the lights not only provides for lower maintenance costs, but also helps to avoid waste. In addition, Fifth Light has developed several high-performance implementation tools, which simplify the installation and commissioning process.

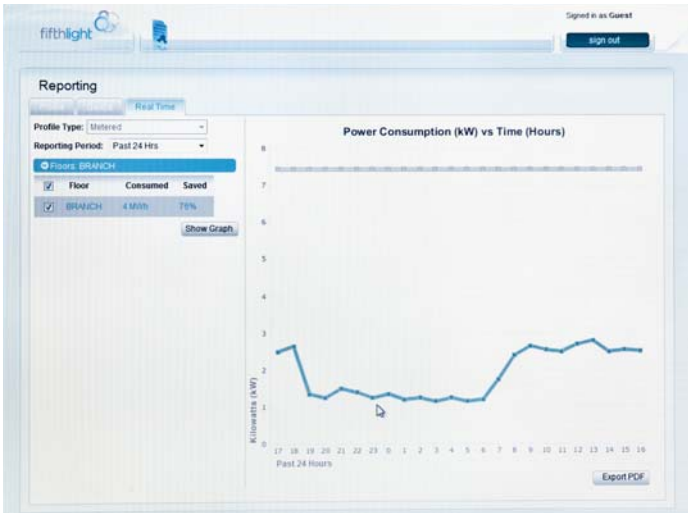
Light controller integrated into facility management

Fifth Light uses advanced energy-saving strategies, such as the photodetector-based use of daylight, user-oriented scheduling, optimization of the power factor of ballasts as well as presence recognition aided by motion sensors. The company is among the pioneers in the field of facility management functions, such as the automatic recognition of defective fluorescent tubes and the notification of service by e-mail, the aggregation of several buildings and the intelligent integration into the software of the DXF file format used by architects and engineers for building design. Fifth Light solutions are designed for complete building integration and communicate with HVAC, security and audio-visual systems.

"It has never been simpler to save energy and to improve the quality of lighting," says Tony Dableh, director of the Research and Development department at Fifth Light Technology. "We have been using a Beckhoff C6920 Industrial PC and a CP6608 Ethernet Control Panel with TwinCAT PLC automation software as the automation platform for over three years." Fifth Light uses the BK9000 Ethernet TCP/IP Bus Coupler at I/O level; the KL6811 DALI Master Terminal allows the connection of lighting-specific devices. Wireless devices and devices without batteries, such as switches and sensors, are integrated into the controller using the KL6581 EnOcean master terminal.

"The modular architecture of the Beckhoff Bus Terminal system has significantly shortened our development time," says Tony Dableh. "Due to the support for a large range of lighting equipment as well as other

The intelligent lighting controller is operated via a Beckhoff CP6608 Ethernet Control Panel.



The energy reduction can be tracked via a detailed, software-assisted calculation or on the basis of an electricity metering system.

The ballasts from Fifth Light are able to switch lamps on and off 200,000 times without deterioration.

devices, we have not had to develop our own customer-specific hardware. We can rely on the existing Beckhoff interface terminals and we only need to adapt the software application in accordance with our customers' special requirements."

Ethernet as the basis for the fast communication of several thousand data points

Ethernet as the communication system forms the basis for the processing of several thousand data points within the shortest space of time. It enables fast system feedback to both sensors and user inputs, with the simultaneous centralized processing of all data. "This is decisive in the attempt to centrally administer tens of thousands of sensors and end devices. The management of the data exchange would otherwise become a nightmare," stresses David Peragine, project manager at Fifth Light Technology. "We have to guarantee short feedback times, and with the help of real-time Ethernet communication from Beckhoff we receive the necessary data within one millisecond."

Benefit for the environment pays off

The advantages for the users of the Fifth Light lighting controller: "We can achieve energy savings of up to 80 percent in certain buildings in which our solution is implemented," estimates Tony Dableh. "Savings of 30 to 40 percent are possible, even in the most energy-efficient buildings. Regardless of the type of light fixtures used, savings can be achieved thanks to the intelligent controller and dynamic switch-on profiles." Fifth Light tracks the energy reduction via a detailed, software-assisted calculation or on the basis of an electricity metering system.

"The return on investment of our lighting system with PC-based control and I/O from Beckhoff can range from one to five years, depending on the application, the size of the building and the design type of the original lighting concept," explains Tony Dableh, and he adds: "Over 10 years, its total lifecycle cost amounts to less than a third of a conventional lighting system."

The decrease in the emission of greenhouse gases is lucrative for the building owner in two ways: carbon credits are at present a much sought-after commodity since they can be bought by less energy-efficient buildings. It is additionally a big advantage for architects and building owners if their buildings attain 'LEED Green Building Rating System™' certifications. Not only can the CO_2 emission be reduced with the Fifth Light system, it also raises the LEED classification of a building by at least one level. "The considerable financial and environment-related advantages of intelligent lighting control are thus a contribution to the world energy solution," says Tony Dableh contentedly.

Fifth Light Technology Ltd **www.fifthlight.com**
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