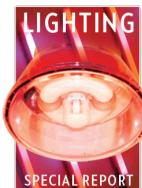


› FOCUS BY DEBBIE MCCLUNG



# Take



The economic climate is encouraging building owners to invest in energy-efficient retrofits and controls

## COMMERCIAL BUILDING OWNERS

wishing to add low-voltage control wiring to their existing space for the installation of smart lighting controls used to be severely handicapped by architectural, technological and economical logistics. Some of those obstacles haven't changed, but what has changed is the economic shift toward greater efficiency as a result of rising energy costs and the cultural shift toward simplicity, greater sustainability and environmental responsibility.

According to Brennen Matthews, Lutron Electronic Co.'s national sales manager, 70 percent of the current building stock was constructed prior to 1979, which was before many of the modern advancements in energy efficiency.

"Building owners are driving the retrofit of their existing spaces. They expect solutions to be easily adaptable, wireless, interoperable and scalable, while saving energy," Matthews said.

Industry experts say demand is increasing for simple lighting control upgrade options, both in interest and in actual projects. Bob Freshman, marketing manager for Leviton Lighting Management Systems, Leviton Manufacturing Co., believes the trend will only continue to grow.

"New construction projects have declined, but retrofit opportunities have more than made up for new construction reductions. The combination of rebates, tax credits and energy savings dramat-

ically shorten the return-on-investment time, making installation of lighting controls a very affordable option," Freshman said.

Craig DiLouie, education director for the Lighting Controls Association, said that perhaps the greatest driver is energy management. The New Buildings Institute reports that advanced lighting controls can generate up to 50 percent energy savings in existing buildings. For example, DiLouie said, a simple automatic shutoff is one of the most simple, if not the most significant and low-risk, strategies to generate energy savings.

"If [the Leadership for Energy and Environmental Design] LEED for Existing Buildings is used as a model path or actual requirement for the upgrade, this will be essential as LEED requires that buildings meet the ASHRAE 90.1 energy standard as a prerequisite to gaining points for transcending it," DiLouie said.

### All buildings are candidates

As new construction has declined, commercial building owners have put more resources into renovating existing properties. Fortunately, all commercial building types can benefit from lighting upgrades. Lighting improvements, DiLouie said, are typically driven by lamp, ballast or fixture replacement, with controls increasingly being incorporated into the solution to accelerate energy savings.

# Control

Aging systems are easily upgraded with newly available wireless controls. For contractors capable of installing lighting controls, wireless options reduce the cost and time involved with running communication wiring. A well-rounded lighting control retrofit begins with an understanding of how each individual space in a building will be used by the occupants.

"Building owners and design teams are looking for controls that enhance the visual environment, provide dynamic control and deliver information," Matthews said.

Retrofit projects can have very different constraints than new construction projects, with physical obstacles that need to be overcome using sophisticated technologies, said Jeff Park, sustainable market development manager for WattStopper/Legrand.

"Some specific space types that can really benefit from implementing occupancy sensors are private offices, open office areas and conference rooms in office buildings, as these spaces may be unoccupied for long periods of time when lighting is unnecessary. Spaces that are ideal for day-lighting control include classrooms, perimeter offices, or corridors and lobbies, where significant amounts of natural light may be available and leveraged to supplement electric lighting," Park said.

Leviton's Freshman maintains that wireless sensors offer the most cost-effective way to upgrade existing buildings. No wires need to be run, eliminating almost all of the labor costs involved in installing hardwire products in existing structures.

"Replacing existing wall switches with units that have built-in occupancy sensors and/or photocells is another method that works very well in many applications. Both methods can be employed without running new wiring and with minimal disruption to building occupants. Savings of 20 to 80 percent can be realized, depending on applications," Freshman said.

It is important, said Jim Frey, light management systems product manager at Osram Sylvania, to first upgrade lighting fixtures, ballasts and lamps to high-efficiency systems.

"Spend labor money once. If chosen well, the same labor that upgrades fixtures or ballasts can add lighting controls during the same project," Frey said.

## Upgrades are integration-friendly

In some cases, retrofits may mean adding controls for the first time. In other cases, controls may be part of a larger scope of work that involves upgrades to lighting and other building systems. If automatic lighting controls are already installed in the application, the contractor would need to determine if the existing solution satisfies the owner's requirements, DiLouie said.

"In an existing building, adding new wiring may be cost-prohibitive, encouraging contractors to consider other solutions such as radio frequency (RF) wireless and line-voltage communication. In other cases, the



## 5-STEP RETROFIT

**1. Update lighting panels:** If there are large, open, public spaces in the building with established hours of operation or periods of being unoccupied, an upgraded panelboard may be warranted. An intelligent lighting control panel that offers programmable scheduling with a two- to four-hour override is optimum.

**2. Switch to occupancy sensors:** For smaller, enclosed spaces intermittently occupied during the day that are illuminated with instant-on sources, occupancy sensors could replace toggle wall switches. If a clear line of sight exists between the switch and the primary task area, PIR sensors can present a cost-effective option. If obstacles exist, consider ultrasonic. Dual-technology sensors deliver high reliability.

**3. Consider manual-on/auto-off:** This advanced occupancy sensor technology offers flexibility and energy savings if the space is already circuited for bilevel switching. If the space requires an occupancy sensor installation in a location other than at the wall switch, consider wireless occupancy sensors powered by batteries or ambient light in the space harvested using an integral solar cell.

**4. Replace lighting fixtures:** In a workstation-specific open-office lighting layout, direct/indirect fixtures can be installed that include an integral occupancy sensor and/or, if placed in a daylight zone, a photosensor and dimmable ballast, with the control wiring located inside the fixture. If the space is a high-bay lighting application where metal halide is being replaced by fluorescent fixtures, consider fixture-integrated or mounted line-voltage occupancy sensors.

**5. Step light levels:** If the existing space is already circuited for bilevel switching, step-dimming ballasts can be installed to ensure light levels are reduced uniformly, without a checkerboard pattern. These ballasts can operate without low-voltage wiring. Most products are programmable-start T8 ballasts. Some dimming ballasts are available that communicate with lighting controls using existing line-voltage wiring.

SOURCE: CRAIG DILLOUIE, LIGHTING CONTROLS ASSOCIATION

## MANUFACTURER SOLUTIONS

**Leviton:** “LevNet RF wireless lighting controls from Leviton are a major innovation in retrofitting existing structures. They can be installed quickly and cost effectively without the need for any new wiring or changes to the building needed. Installed costs for wireless are as much as 50 percent less than wired systems, and our wireless products are all self-powered—no need for batteries or after-installation maintenance. ROI of less than two years is not uncommon using wireless lighting controls.”

—Bob Freshman, *Lighting Management Systems marketing manager*

**Lutron:** “For the EC, one of the most important developments in Lutron technology is the availability of wireless technology. The Lutron wireless occupancy sensors (Radio Powr Savr) and daylight sensors (Radio Powr Savr) reduce energy and reduce operating costs by turning off or reducing the lighting when the space is unoccupied or has other available lighting, i.e., daylight; [they] install in minutes. The Lutron lighting controls are manufactured to be interoperable, so energy savings and increased productivity can be brought to one area or floor of a building and grow from there, and the whole system will work together.”

—Brennen Matthews, *national sales manager*

**Osram Sylvania:** “We will continue to leverage our expertise in efficient lighting systems across all types of applications. We can help customers reduce operating and maintenance costs through low-cost demand-response lighting systems, daylight harvesting sensors and digitally controlled fluorescent ballasts and LED power supplies. Our diverse product portfolio includes the award-winning PowerSHED ballast and relay system, the new eLogic sensor product line, and the industry-trusted Quicktronic Powersense ballast family.”

—Jim Frey, *Light Management Systems product manager*

**WattStopper:** “WattStopper provides a wide range of lighting control products to meet the needs of every application. These include digital lighting management, lighting control panels, occupancy sensors, daylighting controls, plug load controls, and more. In addition, we offer tools to make the project easier from start to finish, such as our free online energy savings calculators and CAD resource center. Contractors will appreciate services such as toll-free tech support and free design services as well as field service for startup and commissioning.”

—Jeff Park, *sustainable market development manager*

building may feature an energy management system used for HVAC control but no lighting control system, requiring the addition of a gateway device if the systems do not use the same protocol, or that both systems utilize the same protocol, such as BACnet,” DiLouie said.

### Trends are taking shape

Another lighting control method, which DiLouie identified as possibly emerging in the near future, is demand response. This strategy requires an owner to agree to reduce electrical loads in response to a grid emergency upon utility requests. While it is highly desirable for utilities, it may not be cost-effective



Intelligent lighting control panels with programmable features can benefit large spaces with established hours of operation or periods of being unoccupied.

to implement as a stand-alone strategy in an existing building, especially when used only a few times per year.

“Some utilities and independent system operators (ISOs) are providing significant financial incentives to owners to have this capability on hand, however,” DiLouie said.

Frey suggests cost-effective, fully addressable systems will help users micromanage their lighting.

“As technology improves, lighting systems will monitor their own operation and power consumption, automatically alerting energy managers when maintenance is required. It will also become easier to get the lighting controls preinstalled into replacement lighting fixtures, reducing installation labor variability,” Frey said.

Over the next five years, technologies, such as digital room controllers, sensors, wireless commissioning tools and digital switches that are self-configuring devices, may be the next generation technologies that customers demand.

“There’s a lot of interest in flexible, scalable control solutions that can accommodate current needs as well as needs that may evolve in the future,” Park said.

---

MCCLUNG, owner of Woodland Communications, is a construction writer from Iowa. She can be reached at [mcclung@iowatelecom.net](mailto:mcclung@iowatelecom.net).