

Automated Controls Can Save Energy.
by Craig Dilouie.

Facilities managers undertaking retrofit of lighting systems in recent years have often focused on reducing wattage through electronic ballasts, efficient lamps, and reflectors. The real cost of energy, however, is not wattage, but its use over time — the billed kilowatt-hour. Turning off light fixtures when they are not needed represents one of the most effective — but least often practiced — means of saving energy, with savings running as high as 80 percent in some offices, according to the Electric Power Research Institute. This is not surprising, considering that an estimated 40 percent of office workers leave their lights on day and night, including weekends.

A solution is tapping the potential of advanced lighting controls the automatic, often “smart”, light switch.

All lighting systems have a control component to provide on-off and/or dimming capabilities. Technological advancement in the past decade, most notably in electronics and computerization, has resulted in centralization, integration, and increased capabilities in the lighting control function. Newer products include occupancy sensors, photocells, and lighting management systems. Their proper application can result in significant energy savings, which can be increased by combining the use of new controls with other retrofits to reduce wattage. Of these, lighting management systems (LMS), also called automatic on-offtime scheduling systems, can offer the most sophisticated capabilities while generating up to 35 percent energy savings.

INTELLIGENT LIGHTING.

LMS use a microprocessor to act as the programmable “brain” of a facility’s lighting system. Based on a preset schedule, it turns the lights on or off in a number of zones throughout the facility, the most valuable function being to turn off the lights after normal operating hours. Thus, LMS are more desirable if occupancy is predictable (although the software can be programmed to incorporate holidays, leap year, and other factors).

LMS can be combined with other advanced controls, such as occupancy sensors, photocells, and dimmable electronic ballasts, to provide discretionary control during the day in storage rooms, lavatories, private offices, and similar areas when they are not in use. LMS also can be integrated with energy management, building security, HVAC, and fire protection systems. Under the Title 24 energy code, all new buildings in California more than 3,000 sq.ft. must be equipped with an automatic on-offtime scheduling system.

OVERRIDES GIVE CONTROL.

Since many FMs consider themselves first and foremost to be in a customer-service role, ensuring that all occupants of the building are comfortable and productive, they must address how the early birds or night owls can work without being in the dark. A built-in override can solve that problem.

When the lights are about to be turned off by the LMS, they will flicker or dim to provide a warning signal. Occupants still in the space can then override central control via the wall switch, hand-held remote controls, or the telephone.

LMS can be programmed to “sweep” the area at intervals during the night to ensure the lights are eventually extinguished.

ENERGY SAVINGS & COST.

Energy savings, simply put, are projected based on estimating the difference between the amount of energy consumed when the lights are on all the time versus the amount of energy consumed when they're on only when needed. LMS can provide a monthly report on energy consumption aggregately, by lighting zone, and by lighting circuit. Properly applied, the use of this technology has been documented at monitored installations to generate anywhere from a 10 to 35 percent energy savings.

If maximum energy savings are desired, relays can be added to create a larger number of branch lighting zones to be controlled. In doing so, less waste will result when an occupant overrides the system for only his use.

To further maximize energy savings, additional control strategies, such as occupancy sensors and photocells, can be added in building areas where occupancy is not predictable, such as storage rooms, private offices, and conference rooms.

LMS have four cost components, the first of which is the cost of the unit itself. The number of zones to be controlled impacts cost, as each zone requires a relay. It should be determined whether additional control wiring will be needed. And depending on what override method is chosen, a network of low-voltage wiring, override switches, and/or relays may be required.

This article was previously published in the November 1995 issue of Facilities Design and Management.

First published November in the BOA Magazine, 1998