

Shining Light on LED Lighting Sensors and Controls

Ghost written for LED lighting CEO by Kirk Neal

It's common knowledge that one of the easiest ways to save energy is to shut off lights when they are not in use. Even so, the lighting controls market accounts for a fraction of the overall lighting industry. The market is small, despite the benefits of control technology, because in the past energy consumption was not a high priority.

Additionally, frequently turning lights on and off reduces the lifetime of light bulbs by as much as three times. LED lighting, on the other hand, is changing these limitations, helping to fuel an ever more rapid growth in the controls market.

Because, LED lighting is a solid-state technology with low-voltage operation and digital capacity, it is intimately compatible with control and sensor technologies. While LED lighting can provide energy savings of 30% over fluorescents and 65% over HID fixtures, when combined with controls and sensors, LED fixtures can further reduce energy consumption without compromising lifetime. For example, the [Dole Atwater California sub-zero cold storage warehouse](#) documented a 95% reduction in energy use with [Albeo Technologies](#) LED fixtures and smart controls.

Navigating this process of sensor and controls selection can be complex. [Albeo Technologies](#) believes no one should have to navigate the complex world of controls alone, so guiding industrial and commercial lighting specifiers and building owners in the selection process is built into the business. With industrial and commercial building lighting generally accounting for 20 to 30% of a building's total energy use, controlling consumption is a great asset that can mean the difference between good energy savings and truly impressive savings that can make a serious difference to the bottom line.

Many LED suppliers try to shoehorn a customer into a particular sensor strategy, typically using the supplier's fixtures, lighting and controls. Albeo Technologies prides itself on placing the customer's needs first, and works with other vendors if needed to

optimize performance and cost. Albeo believes there is no one size fits all, having built its products so that flexible in numerous configurations and designs. Design is given the utmost consideration at Albeo, placing the customer first.

There are a few basics about LED lighting systems and controls that anyone considering or designing a commercial or industrial LED system should understand.

Types of Sensors:

Motion sensing is arguably the most valuable way to maximize energy savings, by turning lights on or off as soon as people come into or leave an area. There are multiple technologies to sense motion and system performance and cost depends largely on technology selection. Some of the current technologies on the market include:

- Passive infrared: senses body heat
- Ultrasonic: senses reflections from objects
- Sound: senses noise

Systems that combine multiple technologies into a single system provide more robust solutions, but also increase system costs. Daylight harvesting is also growing in popularity. This approach senses when natural daylight is available and automatically reduces the use of artificial lighting. When combined with occupancy sensors, a daylight harvesting strategy can provide a powerful solution for squeezing additional energy savings out of the lighting system.

Location Options:

Sensor location has a big impact on performance for both occupancy and daylight harvesting. Sensors can be mounted directly to the fixture or remotely. Remote sensors can be placed in an optimum position where there may be no fixture, but require additional wiring and power. Better performance is usually associated with a higher density of sensors, while costs favor a more dispersed solution. This dynamic can lead to a wide range of performance. Care must be taken in the design phase to ensure the correct value is delivered to the end customer.

Wired Vs. Wireless:

Once the sensor types and locations have been determined there are several interconnectivity considerations. One is the link between the sensor and the fixture, and the other is the link between the system and an energy management system.

Sensor to Fixture:

Since dimming or turning the light fixture on and off requires interaction with high voltage, the link between sensor and fixture often requires at least two parts; the low-voltage sensor signal and a power regulator. On wired systems both of these functions are often contained in a single module, while wireless systems typically uses a receiver module in the fixture linked wirelessly to the remote sensor. The remote sensor will need power, which can be a problem if AC power is not easily available and accessible. Manufacturers use batteries and other technologies to provide the remote unit with power. However, these wireless considerations can limit the value of the system for some users.

Sensor to Energy Management System:

A growing trend is to interface the lighting control system to an energy management system that provides a wide range of interactive capabilities to set-up, control, change, and monitor the LED lighting system. A wireless interface to this system greatly simplifies installation, although in some facilities hardwired options may be preferred.

LED's are a unique enabler in changing what were once plain light fixtures into intelligent platforms. This change will go beyond turning lights on and off, to adding new functions and benefits that create new value and market opportunities. We are at the very beginning of this change and exciting times lie ahead as we start to explore this new space and its possibilities.