EYE LIGHTING INTERNATIONAL

WIRELESS CONTROLS
WHAT, WHY, WHERE AND **WHEN SHOULD THEY BE CONSIDERED?**

E-LEARNING GUIDE

WIRELESS CONTROLS

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Exactly what is a wireless control system?

It is typically defined as a **lighting control system** that features an intelligent network based lighting control solution which incorporates communication between various system inputs and outputs as related to lighting control with the use of one or more central computing devices. These lighting control systems are generally used on both indoor and outdoor lighting of commercial, industrial, and residential spaces. Lighting control systems deliver the right amount of light specifically to the location where and when it is needed. In addition, these network systems also maximize the energy savings from the lighting system, satisfy building codes, or comply with green building and energy conservation programs. These particular lighting control systems are usually referenced in the industry as Smart Lighting. Smart lighting is technology designed for energy efficiency. This may include high efficiency fixtures and automated controls that make adjustments based on conditions such as occupancy or daylight availability.

Why a wireless control system?

The control system's goal is to reduce the energy footprint made by street lights deployed worldwide. Several statistics illustrate the magnitude of street light energy usage. A recent Department of Energy report estimates that there are 52.6 million roadway fixtures installed in the United States as of 2010, including 26.5 million streetlights and 26.1 million highway fixtures. Conventional lamps use .25kWh every hour. Assuming that lights are on an average of 12 hours/day, each lamp uses 3kWh/day, or ~1100 kWh/year. This yields ~57 billion kWh per year for the United States. Costs vary by region and country, but on average a charge of $.11/kWh is conservative. That yields ~$120 for each lamp per year, or > $6B/yr. for the United States. These saving are also more significant when looking at LED conversions.

Numbers like these indicate that saving energy (not to mention reducing light pollution) by converting to LEDs and controlling lamp output power, is a rich target for energy and cost reduction worldwide. There are several technologies that can be deployed independently or together. New energy efficient lamp types can save up to 50% power. Control systems that can dim lamp output can save up to an additional 35% power. The combination of new efficient lamp types and dimming controls can yield 67% savings in energy and cost. For lamps that do not have dimming capability, control systems can turn OFF designated lamps at low activity hours to save up to 25% power.

Where is a wireless control implemented?

As previously mentioned, wireless control systems touch virtually every aspect of our daily life. From city and freeway streetlights to indoor and outdoor parking complexes to commercial and institutional facilities and everywhere in between, you can be assured that there is a smart lighting system network there to illuminate the way. We would typically just notice this as a major safety feature, but these systems offer so much more in cost, energy and environmental efficiency.

Outdoor lighting wireless controls allow the ability to control and manage a large number of outdoor lighting fixtures in order to save and track energy savings, effectively manage and reduce maintenance costs and facilitate full asset control of all the lighting fixtures in the system. As energy costs continue to increase, taking control of outdoor lighting costs while keeping lights turned ON is the number one requirement for cities, towns, colleges, parking garages, utilities and industrial operations. In addition, if left ON for long periods of time, outdoor lights can adversely affect the environment or if not working properly can pose a citizens safety issue. Maintenance costs are also increasing, whether it is because of the need for late night patrols to identify fixture outages or to confirm repair has been completed. Just the sheer ineffectiveness of managing the monitoring and repair planning for a system of a few thousand to hundreds of thousand fixtures can be daunting and very costly if not impossible.

When do you need a wireless control?

Wireless controls should be used when there is a requirement to control fixtures to implement energy savings strategies, control maintenance costs and to report on the assets. Wireless controls can add real customer value for:

- Outdoor Lighting Fixture Manufacturers
- Site Management Operators
- Electrical/Lighting Contractors, ESCOs, and Other Site Installation and Support Companies
- Resellers and System Integrators
- Municipalities, Campuses and Other Government and Service Based Organizations.

The most common applications where wireless controls should be considered, including but not limited to:

- Street and Highway Lights
- Area Lighting
- Parking Lots
- Parking Garages
- Campus Lighting
- Industrial Lighting.

Wireless controls can be used in a wide variety of outdoor lighting fixtures. If you are looking to retrofit existing traditional outdoor lights (such as HPS, etc.), installing new LEDs or Solar-based LEDs or have a mix of fixtures, all can be considered good applications for wireless controls and should be evaluated as part of your planning process.

> *Of important note:* the ideal condition for a wireless control system is when you are retrofitting exiting fixtures to LED or installing new LED. This combined with a wireless control system provides the greatest ROI.

Shed the light…on unrealistic expectations

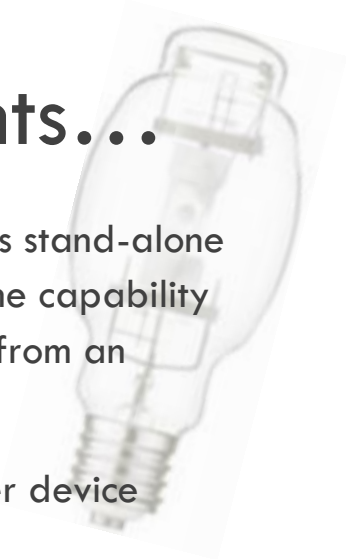
Wireless networking can be very complicated and it is very difficult to just add a product offering. The requirements for a totally integrated hardware and web based management solution requires hundreds of man years of experience and development to provide a truly reliable solution. It is important to have a solid foundation for understanding and implementing of wireless/networking solutions in other automation markets and how they may effect or overlap with technology solutions on Outdoor Lighting Controls.

The following are some common misunderstandings in the technology:

1. My RF signal can go for 5 miles
    a. ZigBee 802.15.4 has a line of sight capability of 2 miles
2. Our product is based on a standard wireless controls specification
    a. There are currently no standards for lighting control communication or diagnostics
    b. The only standard that exists is the RF standard 802.15.4
3. You can dim any light fixture
    a. The fixture must have dimmable ballast in order to support dimming

4. My product can do Utility Grade metering
    a. A system must be tested to confirm Utility Grade metering, otherwise it likely does not meet the requirements
5. Our wireless system can talk to your smart-phone
    a. Though this is technically possible, most customers do not want field personnel to have this open source capability

To EYElight the main points…



- The key advantage of a lighting control system versus stand-alone lighting controls or conventional manual switching is the capability to control a separate light source or groups of lights from an individual user interface device
- This ability to control multiple light sources from a user device allows complex lighting scenes to be created
- Lighting control systems significantly reduce energy consumption
- Extended lamp life is achieved when dimming and switching off lights when not in use
- Wireless lighting control systems offer lower installation costs and increased flexibility over areas where switches and sensors may be placed

About the Author

EYE Lighting International is a leading provider of lighting products with more than 22 years of innovation in lighting technology. EYE Lighting manufactures technically superior products featuring solid-state LED luminaires and High Intensity Discharge (HID) lamps. The products are specified by lighting designers, utilities, municipalities, and energy service companies, and are used in commercial and industrial applications and for sports and infrastructure lighting. EYE Lighting's products provide long-life, reliability, excellent color rendering, and superior quality. Every day satisfied customers use EYE-brand products to reduce energy use, save money, and meet their sustainability goals.