Electricity 2017 חשמל
The Intelligent Energy Revolution

The International Annual Convention of SEEEI
November 7 – 11, 2017 | Eilat, Israel

הכינוס השנתי הבינלאומי ה-18
7-11 בנובמבר, 2017 | אילת

תאורה מבוקרת - Connected Lighting

אלכס יארמולינסקי, אור עד מהנדסים
נועם גונן, אלתם עין השופט, **אלכס גולדין**, גולדין לייט

תאורה מבוקרת – Connected Lighting

1. **מבוא** – סקירה על התפתחויות אחרונות בעולם למערכות בקרת תאורה.
אלכס יארמולינסקי, מהנדס חשמל, אור עד מהנדסים

2. **שיטות חדשניות לבקרת תאורה, אנרגיה דרך קווי תקשורת POE, תאורת חוץ ותאורת פנים.**
נועם גונן, מהנדס חשמל, אלתם עין השופט.

3. **הבטחת מידע ואתגרים חדשים בעולם בקרת תאורה.**
אלכס יארמולינסקי, מהנדס חשמל, אור עד מהנדסים

4. **דיון עם משתתפים בסדנא.**
מנחה – **אלכס יארמולינסקי**
משתתפים:
נועם גונן, מהנדס חשמל, אלתם-עין השופט.
אלכס גולדין, מהנדס תאורה, גולדין לייט שרותי הנדסת תאורה.

Massimiliano Valli, Regent Lighting, Switzerland

connected lighting events

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Connected Lighting in Retail Conference 2017

connectedlightingandretailconference.com/

Join the smart **lighting** revolution in retail! Learn how **connected lighting** can interact with customers; Learn the best technologies to make it happen; How to ...

Connected Lighting Systems Meeting | Department of Energy

https://energy.gov/eere/ssl/events/connected-lighting-systems-meeting

DOE's inaugural **Connected Lighting** Systems Meeting will gather top experts from the **lighting**, semiconductor, and IT industries to share perspectives and lay ...

2017 Connected Lighting Systems Workshop | Department of Energy

https://energy.gov/eere/ssl/2017-connected-lighting-systems-workshop

DOE's annual **Connected Lighting** Systems Workshop gathers top experts in the **lighting** and IT industries for cross-cutting ... Collaboration is essential if the full benefits of **connected lighting** systems are to be realized. ... Networking **Event**.

Smart Lighting 2017 – Conference & Expo

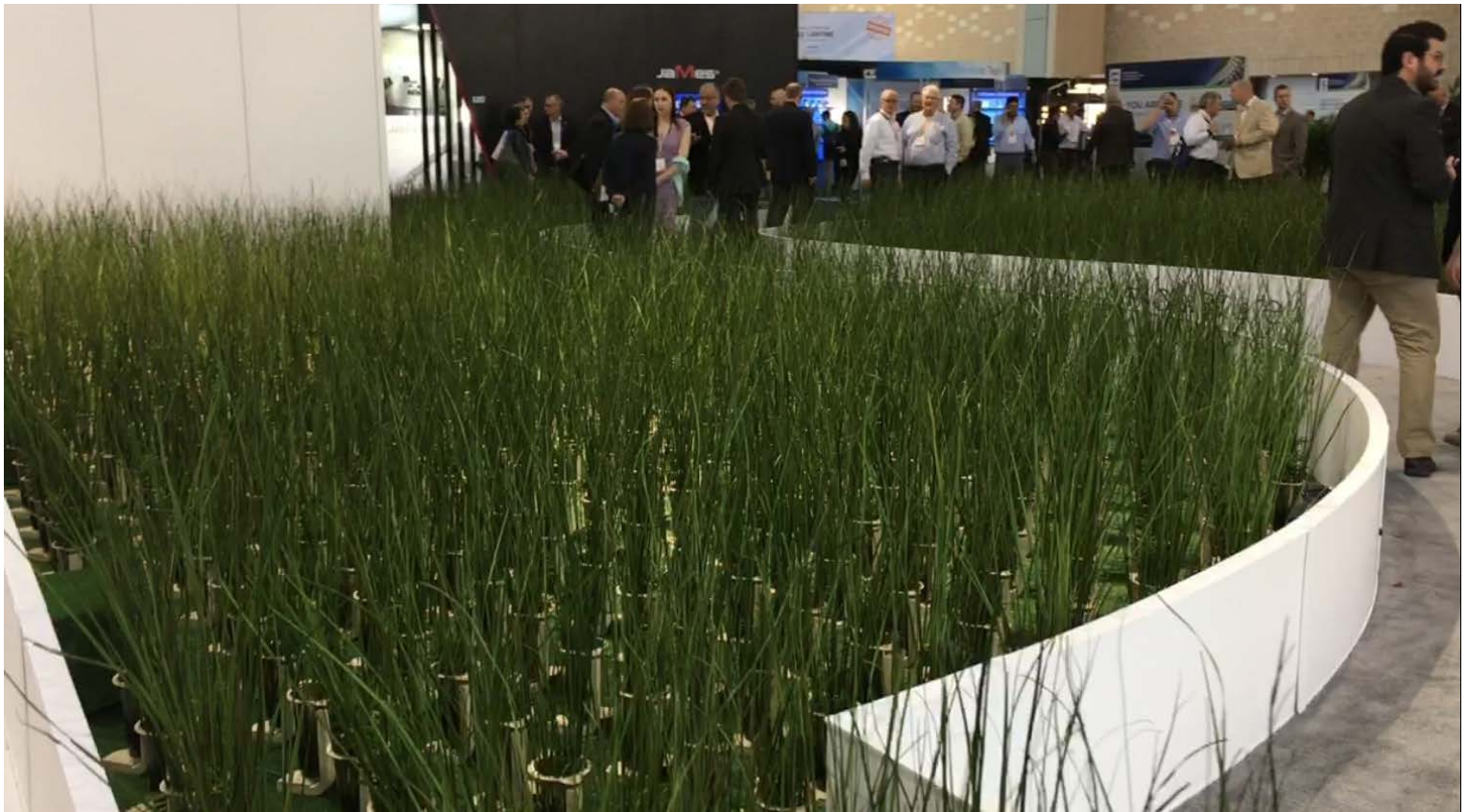
www.smartlighting.org/

Global strategy development, networking and business development **event**. .... expo will be focused on human centric & **connected lighting** with presentations on ...

LIGHTFAIR ® International 2017 Was Largest Trade Show to Date and Broke Philadelphia Registration Record

LIGHTFAIR ® International (LFI ®) set all-new records at the Pennsylvania Convention Center May 7-11 with the largest trade show floor and largest Philadelphia registration highlighting its 2017 performance.

The trade show encompassed 277,600 net square feet housing 592 exhibitors, including 59 first-time exhibiting companies and 127 manufacturers headquartered outside the U.S. Exhibitors presented the lighting and design industry's latest innovations and newest concepts from the world's leading manufacturers. Two brand-new pavilions—Intelligent Lighting and IoT—displayed cutting-edge products and solutions showcased in product presentations featuring technology and connectivity innovations.



LIGHTFAIR INTERNATIONAL
The future. Illuminated.

Connectivity Is The Key

Growth in controls may hinge on the proliferation of connected lighting

In its latest LED energy savings forecast, the U.S. Department of Energy estimated LED lighting's penetration at 6 percent of the installed lighting base in 2015, doubling from 2013. Energy Savings Forecast of Solid-State Lighting in General Illumination Applications forecasted market share will increase to 30 percent within five years, nearly 60 percent by 2025 and 86 percent by 2035. This represents a 55 percent reduction in national lighting energy consumption.

Savings may be higher—up to 75 percent—if DOE's more ambitious goals are achieved, notably through adoption of connected lighting. Connected lighting means networked intelligent LED-based control systems with integrated sensors and controllers.

CONTROL (R)EVOLUTION

Traditional controls include standalone solutions such as switches and occupancy/vacancy sensors, and lighting control panels such as low-voltage relay panels. They are relatively simple to install but require individual calibration, are limited to control of switch-legs, and layering multiple control strategies on the same load can result in complex wiring.

Two more advanced options are luminaire-and room-based control systems. Luminaire-based systems integrate occupancy and/or light sensors into luminaires. They provide individual luminaire control for good energy savings and responsiveness but do not connect, integrate with other building systems or provide data. Room-based control systems bring together a package of lighting controllers and input devices to provide plug-and-play installation and instant energy code compliance through preconfigured sequences of operation. Some systems permit connectivity and scalability from room to building.

Connecting the lighting—the next step in this (r)evolution—enables communication to the luminaires, notably programming, and from the luminaires, notably performance data, expanding flexibility, capabilities and energy savings potential. Luminaires may be individually addressed or grouped within the network for

Connected Lighting Systems

Connected Lighting Systems

The replacement of today's lighting infrastructure with LED products offers the potential for future connected lighting systems (CLS) that could become a data-collection platform that enables greater energy savings in buildings and cities. Such connected lighting systems can not only drastically improve the energy performance of lighting and other building systems, but also enable a wide array of services, benefits, and revenue streams that would enhance the value of lighting systems.

As SSL technology matures, maximizing the energy savings from connected SSL systems will become increasingly dependent on successful integration into the built environment. That's why the DOE SSL Program is working closely with industry to identify and collaboratively address the technology development needs of CLS. In 2015, DOE launched a Connected Lighting Systems Initiative, which works closely with industry and targets six focus areas:

1. **Energy reporting**: Data-driven energy management can significantly reduce energy consumption, but effective test methods are needed to characterize measurement accuracy.
2. **Interoperability**: System performance is dependent on the ability of devices to work together, and common platforms and protocols are needed to enable the exchange of usable data between lighting systems, other systems, the internet, and cloud services.
3. **System configuration complexity**: Systems that are overly complicated and time-consuming to configure have historically delivered less than ideal performance.
4. **Cybersecurity**: Increased connectivity introduces cybersecurity risks that are new to the lighting industry and that must be addressed if next-level energy savings are to be fully realized.
5. **Key new features**: Emerging CLS features (e.g., resource and process optimization, health and productivity gains, new revenue streams) may offer benefits with value that matches or exceeds those derived from improved lighting and energy performance.
6. **Stakeholder collaboration**: Broad-based collaboration among the lighting, semiconductor, computing, and information technologies (IT) industries is essential to realizing the full potential of CLS.

Lighting Controls

Search for qualified lighting products by model, brand name, manufacturer

Advanced Search

Lighting Controls
Download the QPL
Qualify a System
System Definitions
Technical Requirements

Networked Lighting Controls (NLC) Program

The DLC's Networked Lighting Controls (NLC) program is a suite of tools and resources to enable widespread adoption of Networked Lighting Controls in commercial buildings. Working in partnership with utilities, energy efficiency programs, and the lighting industry, the DLC will deploy the tools over the course of 2016 and 2017.

Networked Lighting Controls Qualified Products List

A Qualified Products List to compare networked lighting control systems and find systems eligible for utility incentives and rebates.

Download the QPL | Qualify a System

Case Studies

Case studies of networked lighting controls technologies from the DLC and our partners.

View Case Studies

Training Programs

Lighting Control Training resources from the DLC and our partners to increase understanding of advanced lighting control systems.

View Training Programs

Reports, Tools, and Resources

Research reports, calculation tools, new rebate strategies and more to support DLC Member utility programs with the adoption of networked lighting control technology.

View Reports, Tools, and Resources

Networked Lighting Control Qualified Products List v.2.001 Published 10/24/2017

For the most recent version of this list, please visit www.designlights.org

Instructions

This Excel document provides a list of Networked Lighting Control Systems that have been qualified by DLC to meet DLC's Networked Lighting Control System specifications. These systems may be eligible for utility rebates at DLC Member utilities and energy efficiency programs in the United States and Canada.

In addition to this title page, this document is organized into three Excel worksheets or "tabs":

Qualified Systems Summary List - A list of qualified control systems with summary information about the system including size/scope of system, warranty information, and any case studies available.

Qualified Systems by Capability - A list of qualified control systems with capabilities of each system.

Detailed Capability List - A list of qualified control systems with capabilities of each system and additional detailed information about each capability.

More detailed instructions for each worksheet or "tab" are provided on the worksheet itself.

Networked Lighting Control QPL: Qualified Systems Summary

Instructions

* Press ▾ to filter list by company, brand, system name, or characteristic.

Company	Brand	Name of Control Syste	Interior or Exterior?	Technical Require-ments Version	Technical support phone number	Interior Scope/Scale of System (Room, Whole Building, Portfolio/Enterprise)	Exterior Scope/scale of System (Exterior Area/Parking/Structured Parking, Roadway (highways), Streetlight (residential streets), Smart City	Product Website	System/ Hardware Component Standard Warranty	Warranty
Acuity Brands	Acuity Controls	nLight AIR	Interior	V2.0	800-535-2465	Room Level		http://www.acuitybrands.com/products/controls/nlightair	5 years	
Acuity Brands	Acuity Controls	nLight®	Interior	V1.0	800-535-2465	Room level solution; Whole building level solution; Enterprise solution		http://www.acuitybrands.com/products/controls/nlight	5 years	
Acuity Brands	Acuity Controls	XPoint Wireless	Interior	V1.0	800-535-2465	Room level solution; Whole building level solution; Enterprise solution		http://www.acuitybrands.com/products/controls/xpoint-wireless	5 Years	
Cree, Inc.	SmartCast Wireless	SmartCast Wireless	Interior	V2.0	866.924.3645	Building Level, Room Level		http://www2.cree.com/smartcast-landing-page	5 years	
Eaton	LumaWatt Pro	LumaWatt Pro	Interior	V1.0	1-800-553-3879	Room level solution; Whole building level solution; Enterprise solution		www.eaton.com/lighting/lumawattpro	5 years	
Eaton	WaveLinx	WaveLinx Wireless Connected Lighting	Interior	V2.0	800-533-3879	Building Level, Room Level		http://www.eaton.com/flash/electrical/connectedlighting/products/wavelinx/	5 years	
Enlighted Inc	Enlighted	IoT System	Interior	V2.0	1-855-874-1692	Portfolio/Enterprise Level		www.enlightedinc.com	5 years	

LUX EUROPA 2017
European Lighting Conference

Lux Europa 2017
Ljubljana, Slovenia, September 18-20, 2017

Session 33 - Lighting for human and their needs

White Hall (II+III)

Human-centric Lighting
Gašper Čož

Important aspects of serious HCL - design
Klaus Bieckmann

Investigating a dose-response curve for daytime
Samantha Peeters | Karin Smolders | Ingrid Vogels | Yvonne de Kort

Impact of spectrum and illuminance on alertness – a quasi-field study in a lecture hall
Inga Rothert | Martine Knoop | Stephan Völker

Measurement of the effect of dynamic lighting on alertness, mood and sleepiness
Maria Nilsson Tengelin | Stefan Kallberg | Per Olof Hedekvist

Session 35- Lighting for human and their needs

White Hall (II+III)

Ledification: Revisiting Quality of Light
Pieter Seuntiens

Study of overhead glare discomfort from downlight luminaires
Lou Bedocs | Peter Thorns

Receptive field mechanism and pupillary light reflex for the assessment of visual discomfort
Gertjan Hilde Scheir | Peter Hanselaer | Wouter Rita Ryckaert

Testing Colour-Matching Functions - Perception of luminous color differences of white LEDs in relation to ambient luminous color and age of observers
Bieske, Karin | Kolmer, Johannes | Stubenrauch, Nicole | Schierz, Christoph | Frohnapfel, Anja | Wilm, Alexander

Office lighting characteristics determining occupant's satisfaction and health
Juliette van Duijnhoven | Mariëlle Aarts | Alexander Rosemann | Helianthe Kort

בקרה בתאורת פנים

Title 24 Guidelines for Controlled Lighting

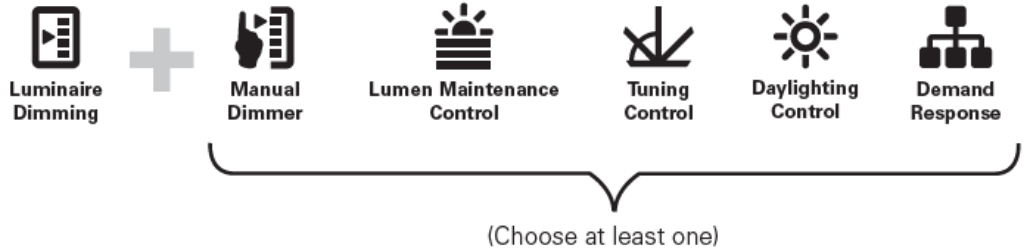
California Building Energy Efficiency Standards

Title 24 guidelines for controlled lighting

REV 09.10.2015

MULTI-LEVEL LIGHTING

- Luminaire must provide uniform dimming
- Capable of reducing power by at least one of five control functions
- When a dimming luminaire is present, a manual dimmer is recommended. Other functional options available



REFERENCE

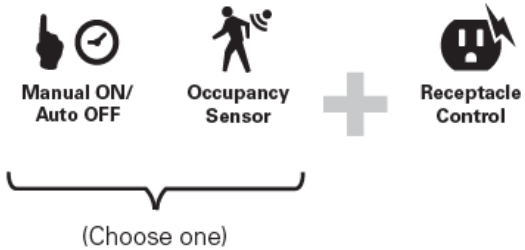
ASHRAE 90.1 2016
9.4.1.1(b)

Title 24 2016
130.1(a),(b)

IECC 2015
C405.2.2.3

SHUTOFF CONTROL

- Luminaires turned off when vacant
- 120V receptacles only, one within 6 feet of uncontrolled receptacle
- Each 5,000 sq. ft. to have shutoff controls



REFERENCE

ASHRAE 90.1 2016
9.4.1.1(g)(i), 9.4.11.1(h), 8.4.2

Title 24 2016
130.1(c).6, 130.1(c).5, 130.5(b)

IECC 2015
C405.2.1.2, C405.2.1.1, C405.2.2.1, C405.2.4

California Building Energy Efficiency Standards

Title 24 guidelines for controlled lighting

REV 09.10.2015

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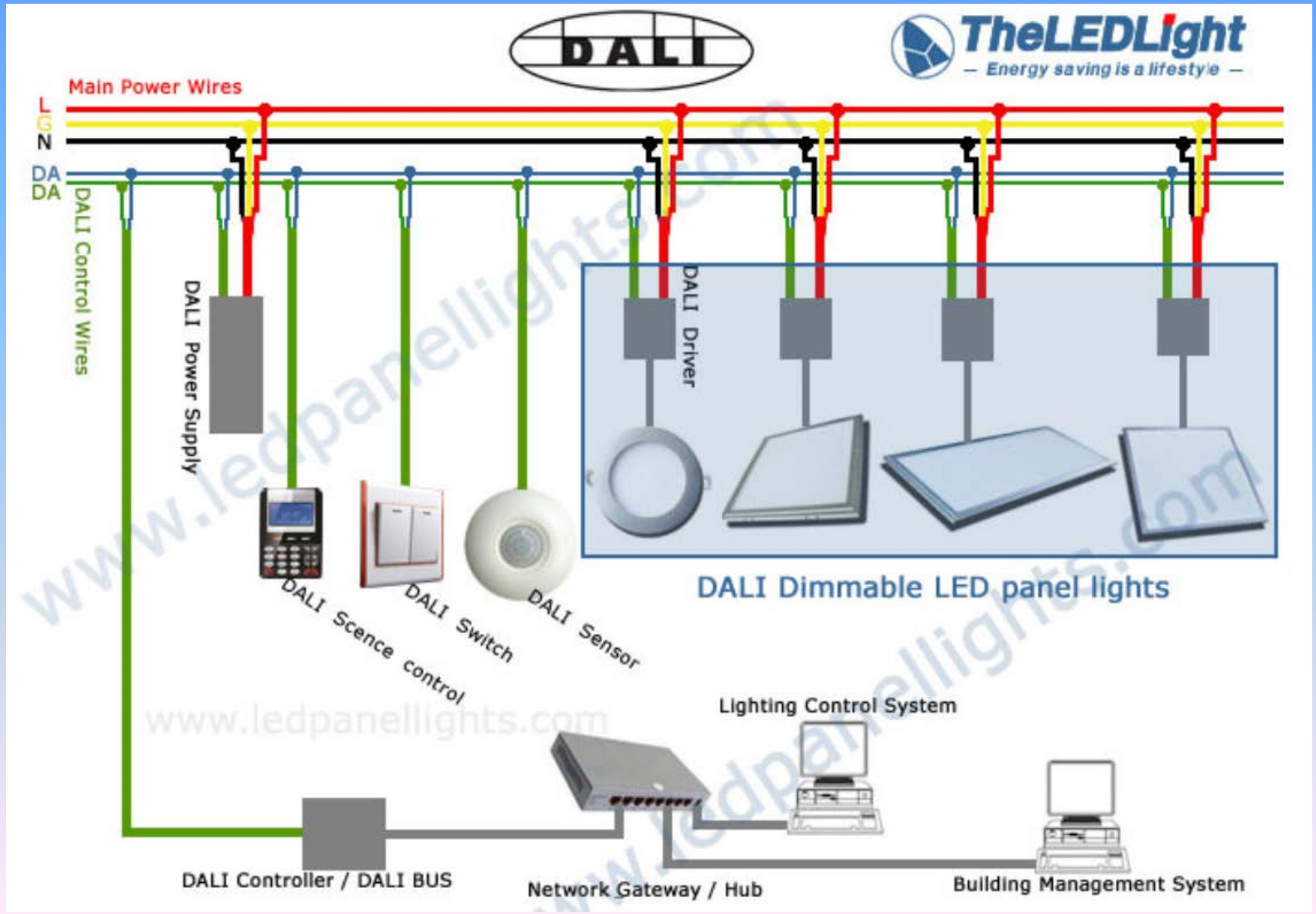
Technology

Solution - DALI



Solution - Wireless

Save energy and gain the power of information

Lighting fixture with integrated sensor
An LED light source that doubles as a data collection point

+

Wireless Gateway
Stores and transmits real-time building usage data

+

Energy Manager
Leverages building data to help you optimize your savings

+

Energy Manager Software
Use your data in Energy Manager, SPACE, AIRE and other popular building resource programs

= up to 70% SAVINGS on lighting energy costs

Simple system to solve complex needs

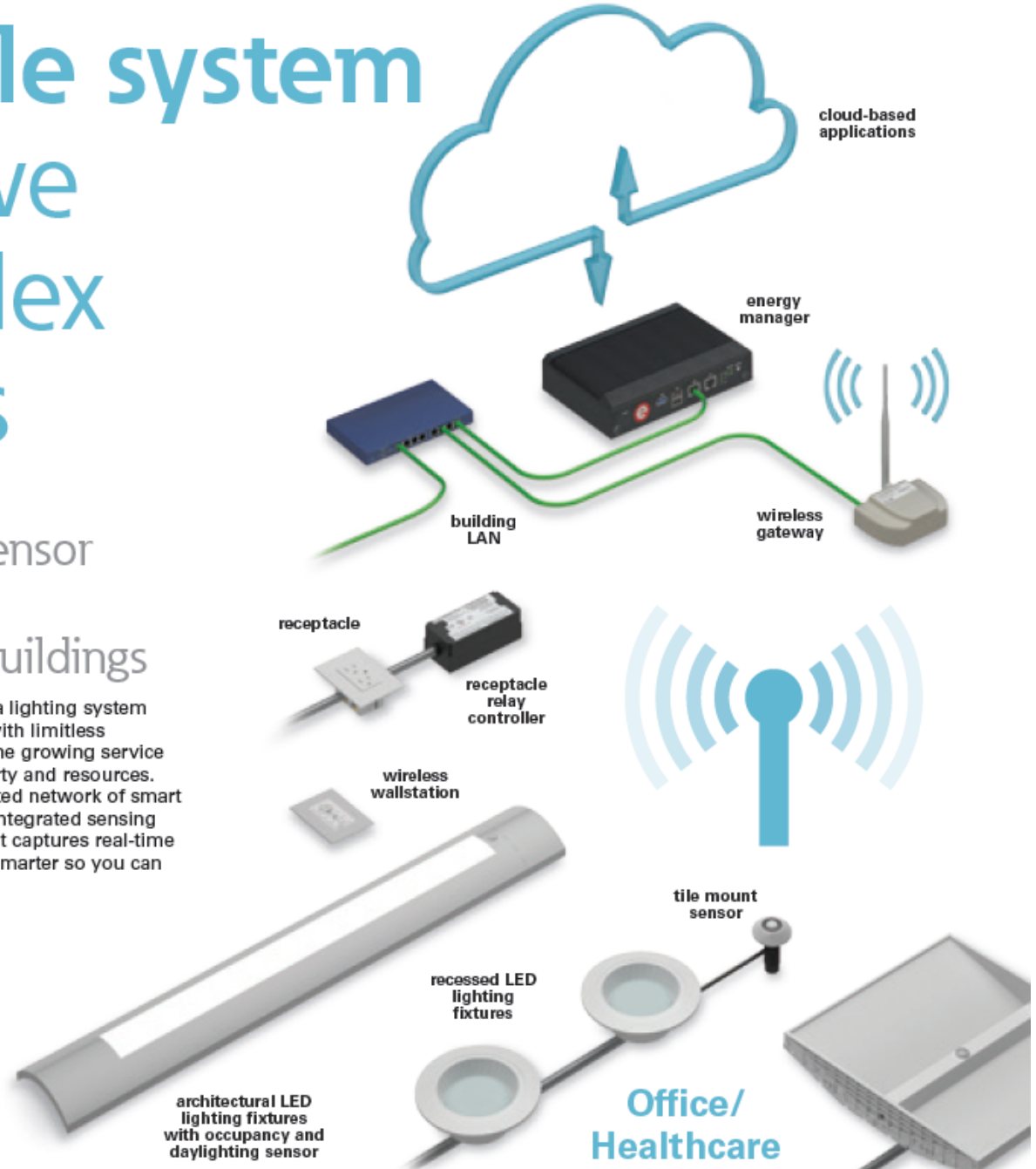
A wireless sensor platform for connected buildings

LumaWatt Pro transforms a lighting system into an IoT infrastructure with limitless potential to keep up with the growing service demands of people, property and resources. LumaWatt Pro is a distributed network of smart LED lighting fixtures with integrated sensing and beacon technology that captures real-time data; making your facility smarter so you can make smarter decisions.

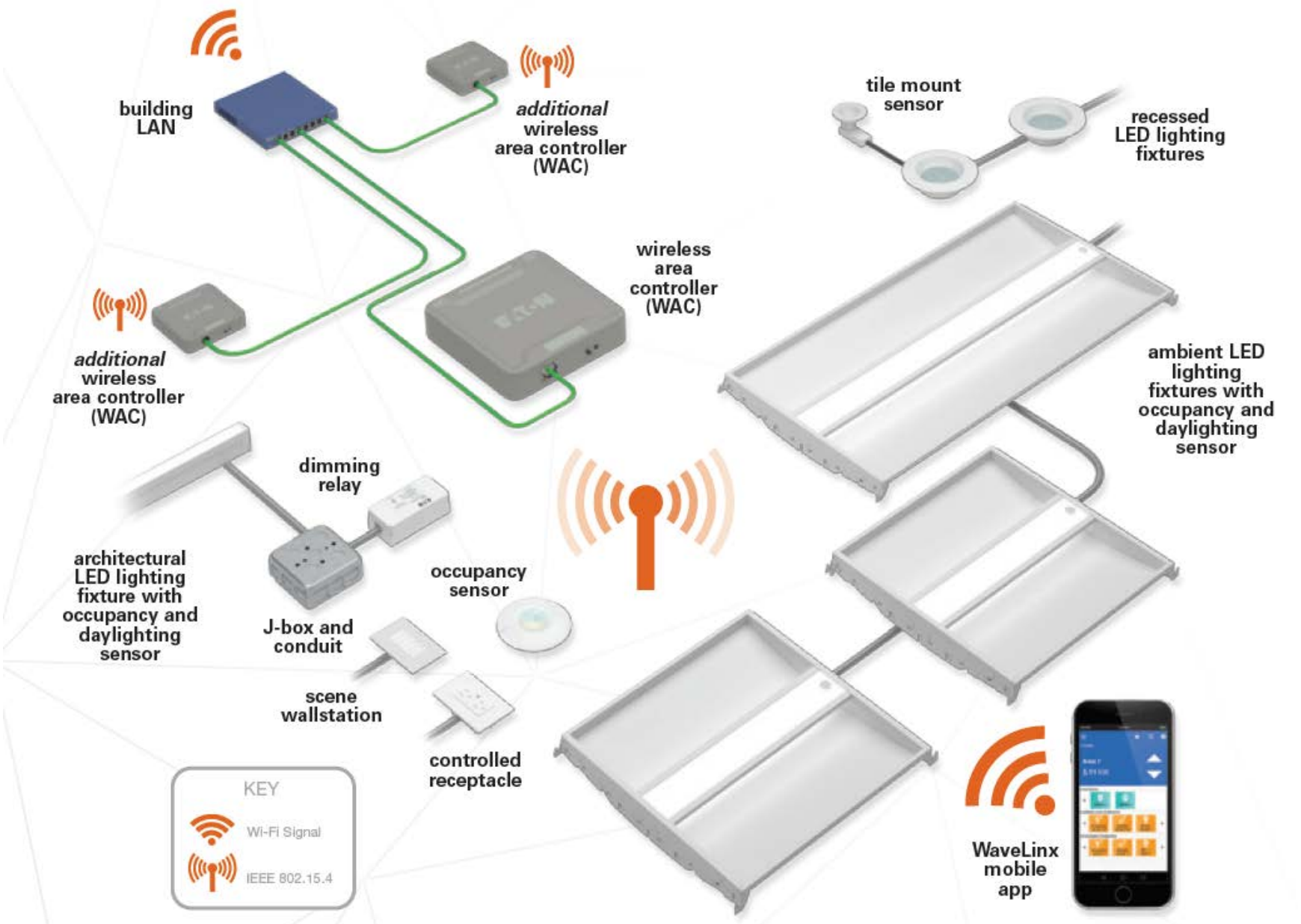
Bluetooth®

Eddystone

Works with Apple iBeacon

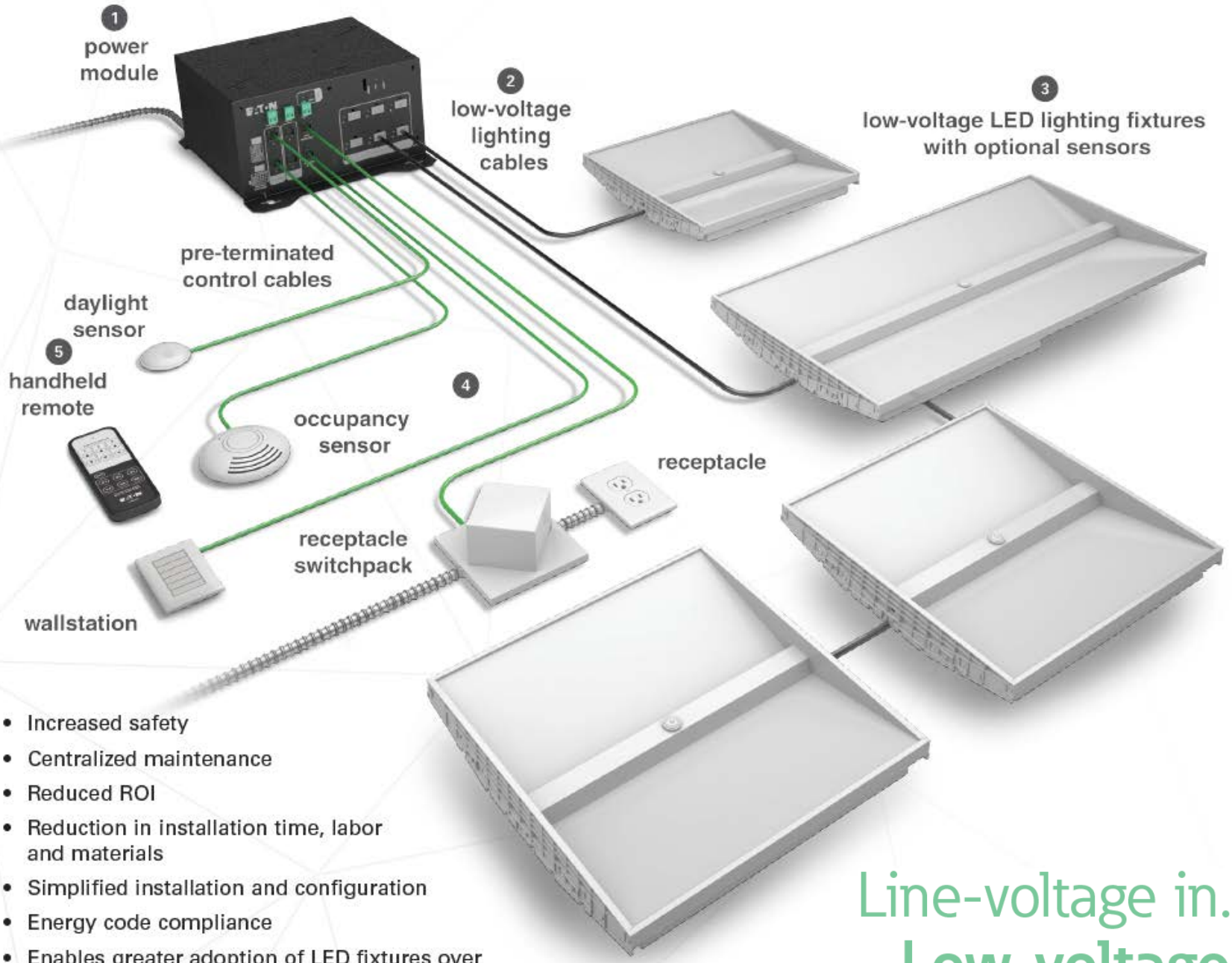


Wireless Connected Lighting System



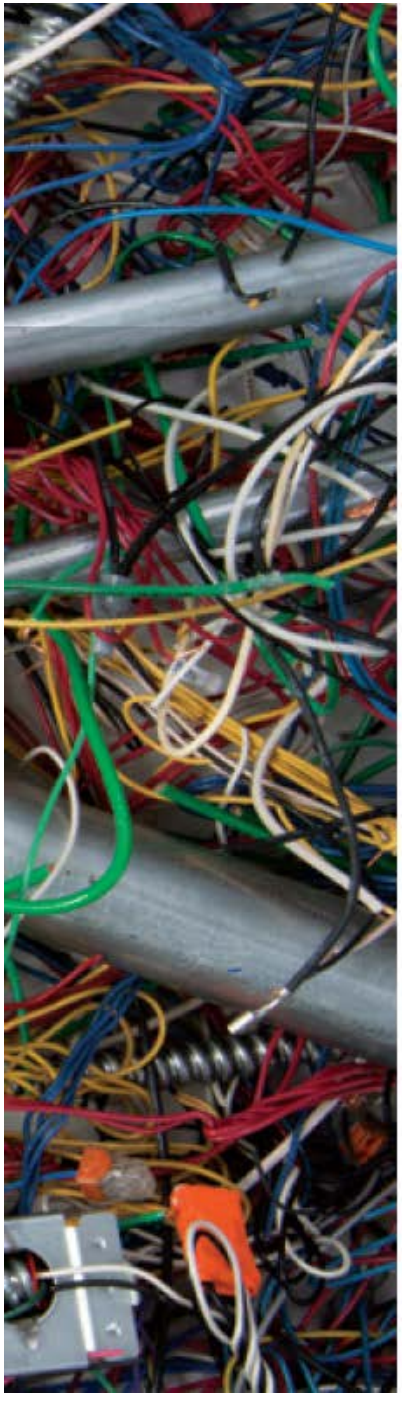
Solution – LV Power

The Distributed Low-Voltage Power System blends the benefits of both AC and DC power distribution to reduce the total installed cost of a lighting project by up to 20% while providing a completely flexible and electrically efficient solution.



- Increased safety
- Centralized maintenance
- Reduced ROI
- Reduction in installation time, labor and materials
- Simplified installation and configuration
- Energy code compliance
- Enables greater adoption of LED fixtures over fluorescent technology

Line-voltage in.
Low-voltage out.



Minimize labor and material costs

Eaton's Distributed Low-Voltage Power System has revolutionized LED lighting and controls.

It's a brilliantly simple solution – a complete system that meets the most pressing demands of the busy electrical contractor, providing low-voltage power, LED lighting, and full controls functionality out-of-the-box.

Save on labor costs

With an average of 40% reduction in man hours, DLVP reduces number of qualified electricians needed on the job site and installs 2X faster than traditional systems.

Save on materials

DLVP eliminates the need for unnecessary line-voltage materials.

No system commissioning

A contractor can configure the system with the flip of a switch, or by using a handheld remote.

Code compliance made easy

The system was designed to meet the energy code requirements of any space.

Cut ties with complexity

Low-voltage power module

Power Modules create safe low-voltage circuits to power and control LED lighting fixtures

Low-voltage lighting cable

Low-voltage lighting cables provide power and communications to DLVP LED lighting fixtures

Lighting fixture with integrated sensor

Highly efficient low-voltage addressable LED fixtures

up to **20%** **REDUCTION** in total installed system cost

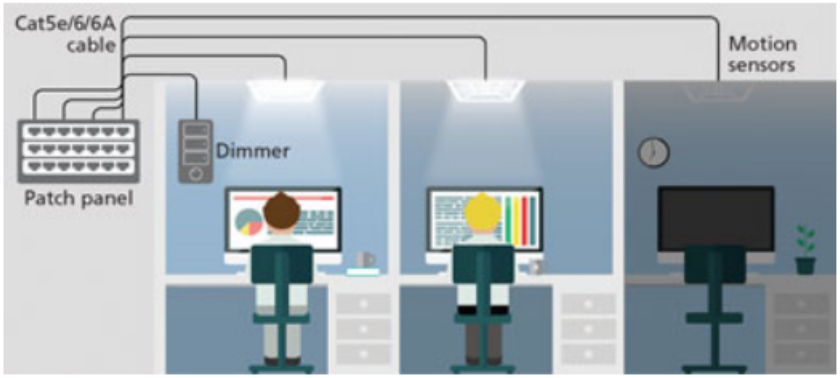
LEDs MAGAZINE

PoE technology for LED lighting delivers benefits beyond efficiency

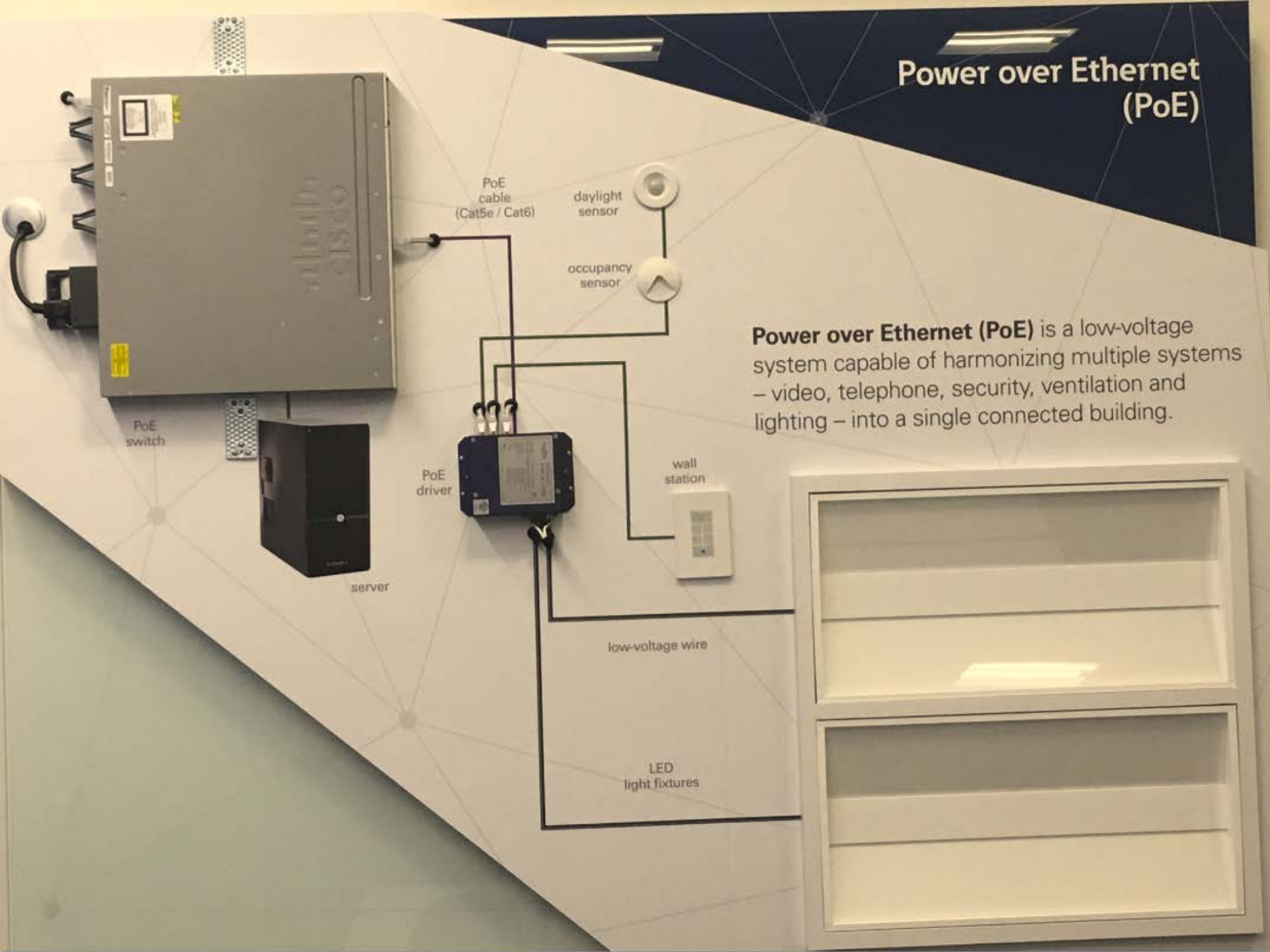
DC power with PoE technology

LEDs are inherently low-voltage DC devices. To ensure compatibility with traditional AC power, most LED drivers for lighting use an AC-to-DC converter to convert the AC mains power to a lower DC voltage. This conversion process reduces system efficiency, so designers have proposed DC-based power systems. A few studies have compared the costs for the prevalent AC system approach with a DC-powered system. One study by Carnegie Mellon University2 "found: a savings of $2,000 per year using DC instead of AC. If the LEDs were powered with solar PV power augmented with grid electricity, even bigger savings of $5,000 per year could be gained by using DC instead of AC."3

Today, you can provide the DC power to LED lamps with PoE technology, which is regulated by the IEEE 802.3 standard, originally released in 2003 and updated in 2009. This standard specifies that power and communication data be delivered across a single standard network cable (i.e., Cat5) directly to the connected devices. Power is provided via the power-sourcing equipment (PSE) located in the switch/hub. The connected device receiving the power (i.e., the LED lamp in our example) is called a powered device (PD).



Power over Ethernet (PoE)



Power over Ethernet (PoE) is a low-voltage system capable of harmonizing multiple systems – video, telephone, security, ventilation and lighting – into a single connected building.

PoE Lighting System Energy Reporting Study

What nobody tells you about Power over Ethernet

What nobody tells you about Power over Ethernet

Will your computer always talk to your lighting installation

We have to forget the idea of a light fitting at the other end of a light switch. The entire issue of PoE is that the lighting installation is now another part of the computer network. The first issue that needs to be considered is the security of the lighting. Does the computer know that the lighting installation is there? We've all experienced the loss of a printer, or the camera that doesn't register on the file manager. We can see them; they're in front of us, but the computer has chosen not to recognise them.

The first thing to ensure is that the computer system is sufficiently robust to guarantee the presence of the lighting installation.

Power outages may mean a re-boot for your lighting installation

Loss of power to a computer network may be rare and very brief, but they do happen. Interruptions to computer power and inappropriate shut-downs can result in glitches in the software. If that glitch results in the system not recognizing the lighting installation, then the corrective work will be done in the dark.

Effort needs to be put into ensuring the reliability of the power supply to ensure that system failures don't happen and, if they do, that the lighting power is recognised and restored.

Electronic noise from the lighting installation may affect the rest of the computer network

The LED lighting is now part of the computer system. That means that the lighting circuitry must operate within the requirements of the computer software. It's not good enough to buy any lighting fixtures; the lighting load must be designed to work with the rest of the network. The risks of having unwanted power issues on the network could be catastrophic.

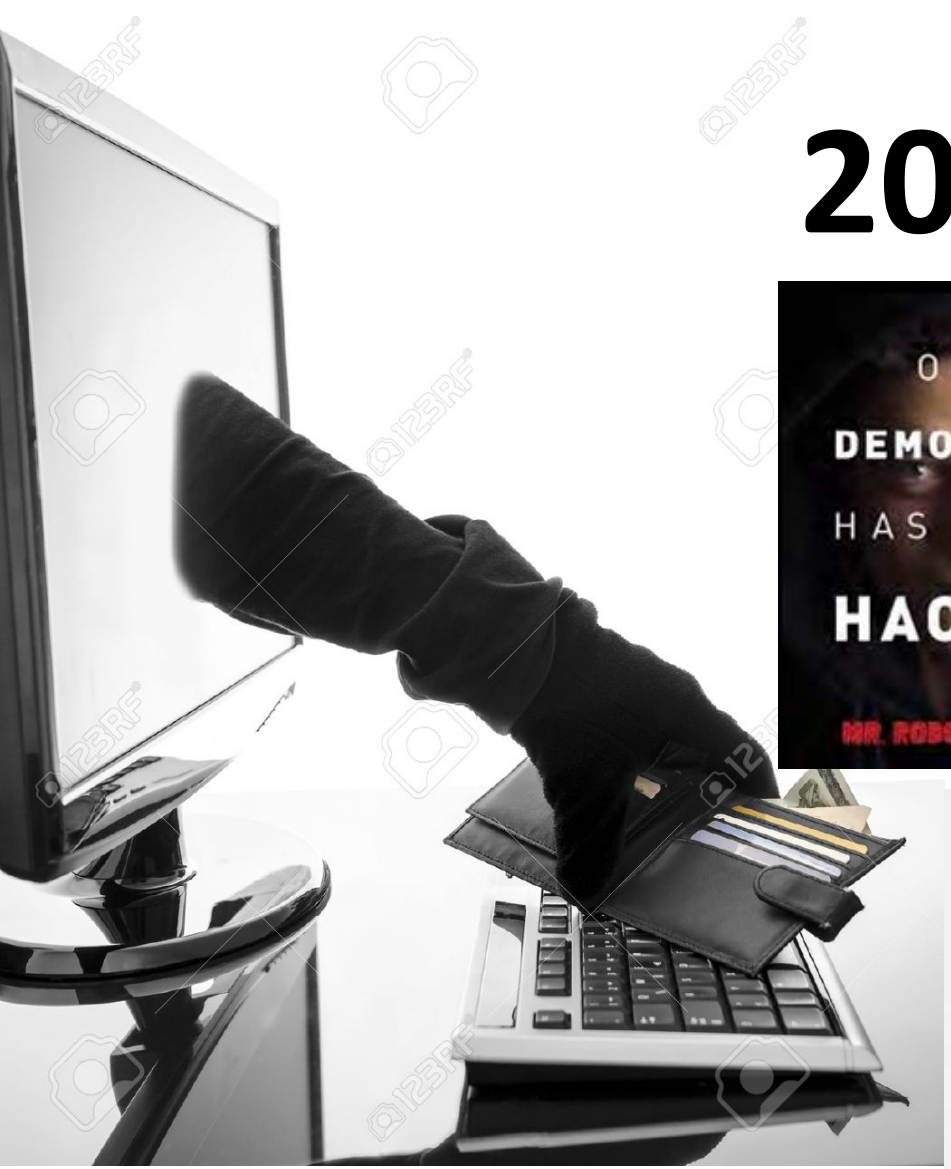
The lighting technology must match the operating parameters of the broader network.

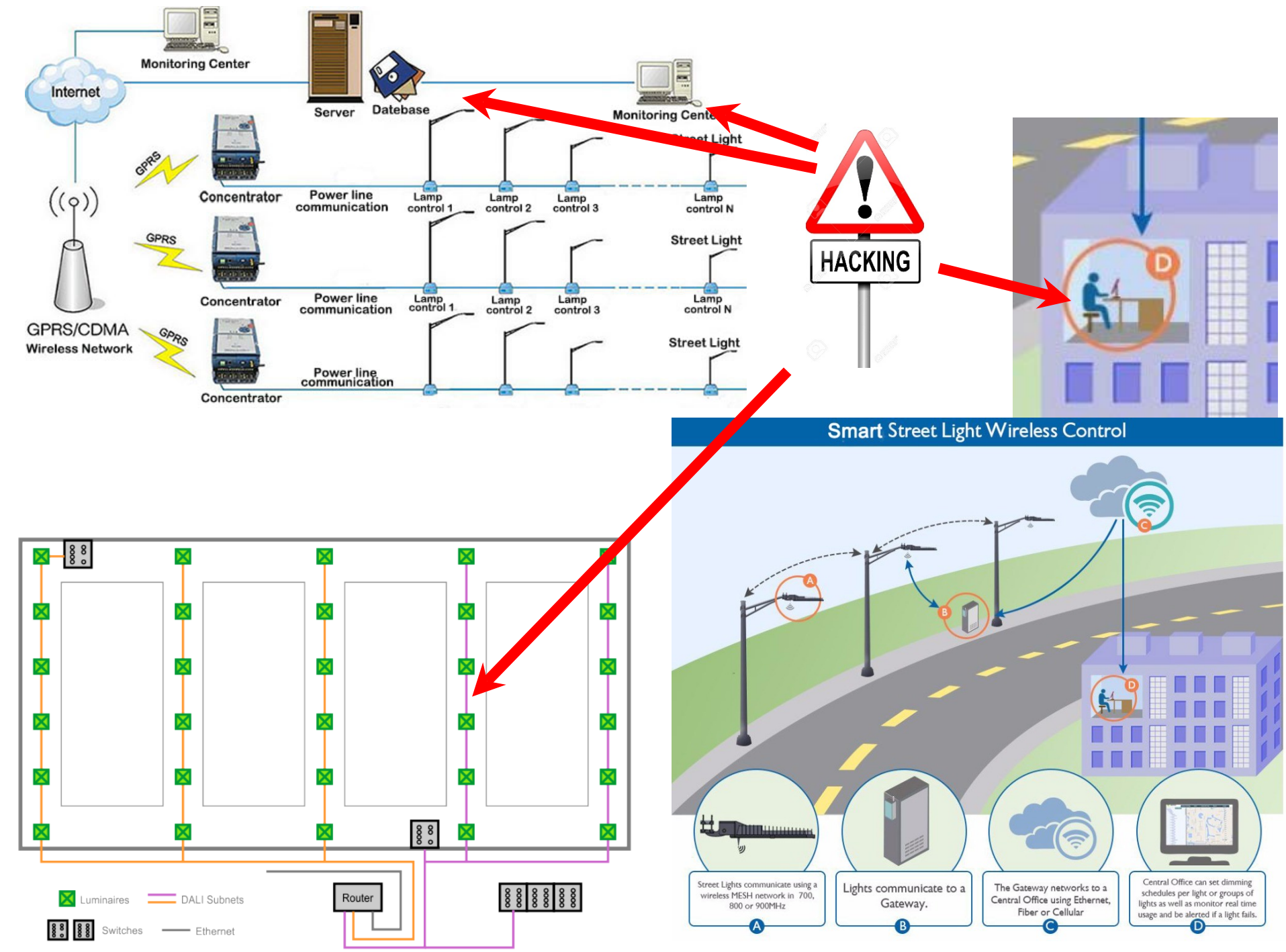
Limits on the current-carrying capacity of the data cabling will restrict the available lighting loads

At the moment, the amount of power that's being transmitted by PoE is quite small, but we're seeing LED lighting loads becoming much greater. There is a reason why 'commercial' electricity is transmitted at 240v AC; it was considered to be the optimum voltage to overcome voltage drop along lengths of cable. All cables contain some resistance to the flow of electricity and it's all a factor of electrical load and size of cable. If we reduce the supply voltage to that required by the LED, and increase the load, and increase the length of cabling, then we may end up with no light at the fixture.

This is a critical issue that comes under the heading of 'that's the way things are in this world'. Voltage drop cannot be mitigated for, it can only be designed out of the system.

2017

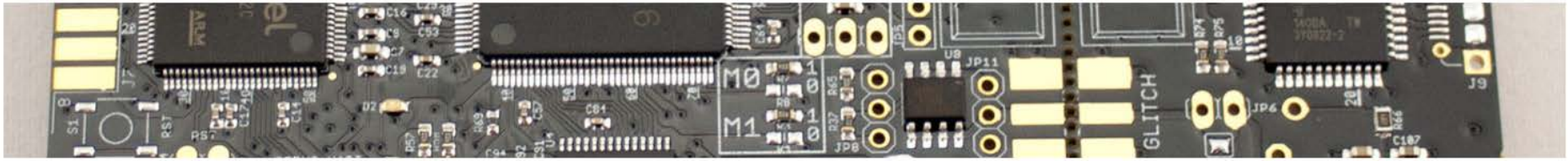



Monitoring Center
Internet
Server
Datebase
Monitoring Cente
GPRS
Concentrator
Power line communication
Lamp control 1
Lamp control 2
Lamp control 3
Lamp control N
Street Light
GPRS
Concentrator
Power line communication
Lamp control 1
Lamp control 2
Lamp control 3
Lamp control N
Street Light
GPRS/CDMA
Wireless Network
GPRS
Concentrator
Power line communication
Street Light
HACKING
Luminaires
DALI Subnets
Switches
Ethernet
Router
Smart Street Light Wireless Control
Street Lights communicate using a wireless MESH network in 700, 800 or 900MHz
A
Lights communicate to a Gateway.
B
The Gateway networks to a Central Office using Ethernet, Fiber or Cellular
C
Central Office can set dimming schedules per light or groups of lights as well as monitor real time usage and be alerted if a light fails.
D

NewAE Technology

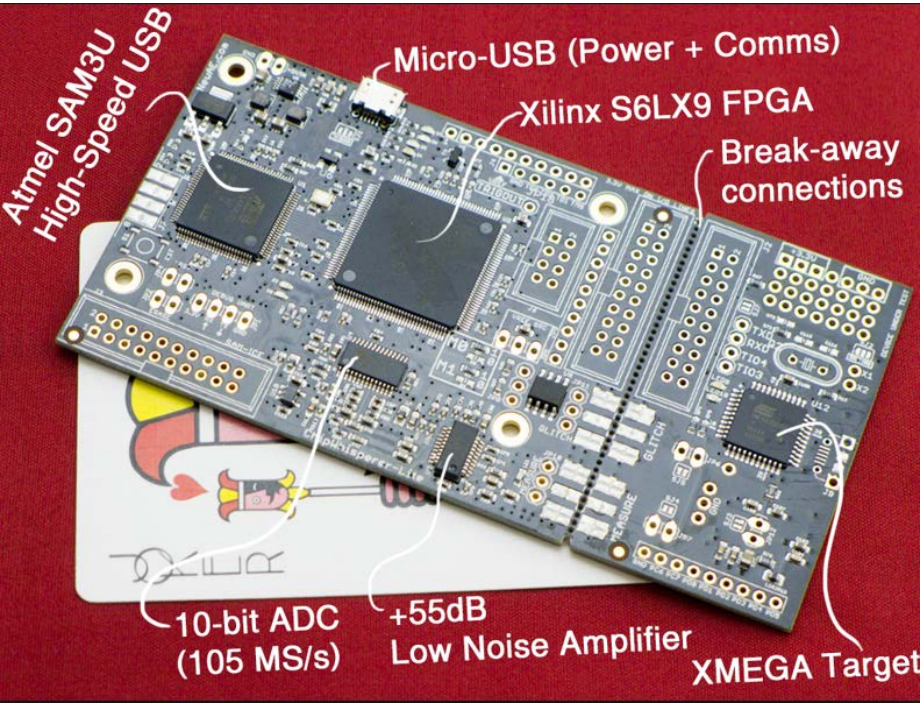
ChipWhisperer®

Home > Instruments & Tools > ChipWhisperer®



ChipWhisperer® is the ultimate toolchain for embedded hardware security research. A combination of open-source software, hardware, documentation and training gives you the ability the master hardware security problems.

The objective of the ChipWhisperer® project is nothing short of *revolutionizing the entire embedded security industry.* Every engineer/hobbyist who needs to use encryption in their design should be able to perform a side-channel attack, and understand the ramifications of such an attack on their product. The open-source nature of the ChipWhisperer® makes this possible, the objective being to engage the research community at large, while providing a low-cost reference hardware.



Colin O'Flynn
President
NewAE Technology Inc.

Strategies in Light

THE LED SHOW

Tuesday, February 28, 2017

Anaheim Convention Center, Anaheim, CA

www.strategiesinlight.com

WORKSHOP 3

IoT Wireless Security—Practical Attacks

"Connected Light Bulbs & How to Avoid the Worm"

תודה רבה !

Electricity 2017 חשמל
The Intelligent Energy Revolution