



Revolution in Lighting Control

Reintroducing the Certified Lighting Controls Professional (CLCP)



NALMCO[®]

THE STANDARD FOR LIGHTING MANAGEMENT QUALITY SINCE 1953

Executive Summary

The LED lighting and control revolutions necessitate skilled professionals able to provide consultation, installation, and commissioning.

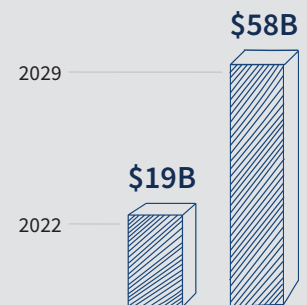
Reintroducing the Certified Lighting Controls Professional (CLCP).

The lighting industry has undergone sweeping change due to the adoption and growing maturity of LED lighting. Another revolution has been occurring in lighting control systems, which naturally pair with LED lighting. Lighting controls enable lighting to be reduced or turned off when it is not needed, primarily in order to minimize energy consumption and support occupant visual needs. New capabilities such as color control and data have also expanded utility.

The category has matured to offer a diverse range of solutions appropriate for virtually all lighting applications. Potential benefits include minimizing energy consumption and power demand, support of visual needs and occupant satisfaction, occupancy status and other datafeeding strategies such as asset tracking and space optimization, and more.

Energy Savings

Energy savings vary by control strategy and building characteristics, but the most advanced control systems have been demonstrated to deliver an average of 47 percent lighting energy savings. As a result of this utility and various market drivers, **global demand for lighting controls is expected to more than double** from \$19 billion in 2022 to \$58 billion by 2029 (Fortune Business Insights).



Traditionally, a primary driver in the adoption of lighting controls is commercial building energy codes and standards, which govern new construction and factor into green building rating systems. A second major driver is a desire by building owners to maximize energy savings and lighting utility in LED retrofits, driven in part by substantial utility rebates available nationally. Emerging drivers such as sustainability, building systems integration, the Internet of Things, and creating healthy

workspaces are impacting demand. Future drivers may include transportation electrification, which may result in the construction of costly charging infrastructure at building sites, and public penalties for excessive carbon emissions.

Problem

In the early years of the lighting controls revolution, growing demand created an education gap among lighting service providers unfamiliar with aspects of the technology. Misapplication and improper installation can result in poor performance, user complaints, and lower-than-expected energy savings.

Solution

The electrical industry responded with a series of initiatives, including the Certified Lighting Controls Professional (CLCP) designation developed by the interNational Association of Lighting Management Companies (NALMCO).



The CLCP is a certification open to the electrical industry and based on more than 50 hours of online education developed by the Lighting Controls Association (CLA), a council of the National Electrical Manufacturers Association (NEMA).



Certification demonstrates a baseline of proficiency in lighting controls technology, application, design, commissioning, and related issues such as energy codes.



The CLCP is administered by NALMCO, which has represented the lighting management industry for over 70 years.

This white paper advises commercial building owners and managers that LED lighting combined with lighting controls can deliver high energy efficiency, actionable data, and high-quality illumination. Still, the growing complexity of lighting and controls necessitates expertise ensuring appropriate design, installation, and use. To manage risk, they should seek qualified service professionals. Certification is an important qualification demonstrating proficiency in vendors providing services such as lighting upgrades.

Lighting Controls: The Revolution

Lighting controls are systems and devices that respond to an input signal by changing the power state of a lighting system. The goal is energy savings, visual needs, and/or enterprise benefits such as optimizing space utilization. The control input is manual or automatic, based on occupancy, time, daylight, or a program. The typical control output is dimming, switching, color, data, or a signal to a device such as an automatic power receptacle or another building system. Today, the ultimate in lighting control provides extreme flexibility, decision-making, information, and typically maximum energy efficiency.



Room To Grow

Due to strict prevailing energy codes, new commercial construction typically features highly detailed lighting control strategies. In existing buildings, however, adoption has been robust but inhibited by various factors in the economics of lighting upgrades.

According to the U.S. Department of Energy's 2018 Commercial Buildings Energy Consumption Survey, occupant sensors were installed in 17 percent of commercial buildings representing 46 percent of all commercial building floor space. Light-scheduling controls were installed in buildings representing approximately 35 percent of floorspace, daylight-responsive controls 7.5 percent, multilevel lighting and dimming 15 percent, building automation systems for lighting 17 percent, and automatic power receptacle control 2 percent. This suggests that a significant market for lighting controls remains to be tapped.

Technological Trends

Driven by applications and demand, the lighting controls category developed over time based on several technological trends. Wireless communication can reduce materials, supporting both a higher density of control devices and the installation of sophisticated control systems in existing building spaces.

Digital, intelligent control allows networked, programmable decision-making anywhere in the system, from individual devices to the entire lighting system. Miniaturization and falling costs in sensor technology have resulted in ready integration into luminaires (light fixtures) for simplified installation and high energy savings. Multichannel control within luminaires and new external control inputs enabled control of saturated color and shades of white light, creating novel lighting applications. And sensor data collected for energy measuring and monitoring produced new capabilities for enterprise management.

The most advanced lighting control system available today is arguably the networked lighting control system, which has been demonstrated in research by the DesignLights Consortium to generate average lighting energy savings of 47 percent. This system consists of a network of individually addressable control devices with intelligence incorporated into the luminaire, room, or building/enterprise level. Sequences of operation may be programmed during setup and largely left for autonomous operation or managed by a system operator.

At the building level, the network may feed data to a server or the cloud for measuring and monitoring, yielding insights and actions via software. The DesignLights Consortium now recognizes networked lighting controls as a listed category, resulting in the category being actively promoted in more than one-third of prescriptive commercial lighting rebate programs in the United States.

Developing Market Trends

A significant meta trend in commercial buildings is collecting data to optimize operations (Internet of Things, or IoT) and optimize building energy efficiency and responsiveness to occupants via systems integration. Lighting offers ideal real estate for IoT implementation as lighting is ubiquitous, connected to power, and can easily incorporate required data sensors.

A very significant additional potential meta-trend is decarbonization, which has two fronts. Electrification of transportation is expected to result in the commercial building sector investing in electric vehicle (EV) charging capacity, imposing a substantial cost while also imposing a substantial increase in demand for power among utilities. Another aspect of decarbonization is the introduction of municipal legislation requiring that buildings report carbon emissions, with financial penalties for excessive emissions.

The decarbonization trend may have three important effects. Utilities will be incentivized to commit more aggressively to promoting end-use energy efficiency as a means of satisfying the increasing demand for power via least-cost resource planning. If they cannot manage the expected upswing in demand, the end-use cost of power will likely increase. Building owners seeking to add EV charging capacity will be incentivized to find ways to mitigate this cost.

Due to all three effects, the economic benefit of energy efficiency (and building data) is expected to increase for the building owner, with premium options such as networked lighting controls becoming far more financially attractive. Forward-thinking organizations are investigating making these investments now to prepare and avoid risks in a future market of surging demand.

Education Gap

Accelerating demand for LED lighting and lighting controls has pressured the lighting channel to increase its capabilities, especially regarding the implementation of controls.



Consultation

Commercial building owners need expert advice on product selection. Many lighting controls, particularly networked lighting controls, are not standardized. Many configurations and feature sets are available. These configurations and features must be properly matched to the application needs and the ability of the owner to operate and maintain them. Integration issues between systems must be resolved.



Installation

Lighting controls require proper installation. Improper installation remains unfortunately common, resulting in operating problems even if the control system appears to be functional. Deviations can result in poor control performance, generating user complaints and lower-than-expected energy cost savings.



Startup/Commissioning

New lighting control systems must be calibrated and tested to ensure conformity with manufacturer instructions, the design intent, and owner project requirements. As with poor installation, a lack of commissioning can result in user complaints and lower-than-expected energy cost savings. As an indicator of commission's importance, it is required by the latest generation of commercial building energy codes, including document turnover and functional testing.



Maintenance

As with any other lighting equipment, lighting control systems must be maintained. It is recommended that the system owner perform periodic inspections and reaim, recalibrate, and reprogram sensors and controllers as needed.

The electrical industry launched two major initiatives to improve channel expertise with lighting controls:

California Advanced Lighting Controls Training Program (CALCTP)

The California Advanced Lighting Controls Training Program (CALCTP) is an ongoing program providing training in lighting controls to electrical workers and contractors. This program has been expanded to include other states, such as Illinois and Washington, and is expected to be rolled out in Canada.

Lighting Controls Association

An association of lighting manufacturers functioning as a council within NEMA, the Lighting Controls Association provides free public education about lighting control technology and application.

To date, neither of these organizations have developed a national certification signifying a high level of general expertise in lighting controls technology, application, design, and commissioning. Recognizing the growing importance of lighting controls, NALMCO developed the Certified Lighting Controls Professional (CLCP) designation.

Certified Lighting Controls Professional

Founded in 1953 as the voice of the lighting management industry, NALMCO represents nearly 150 companies and organizations, including lighting management companies providing lighting maintenance, lighting upgrades, and lighting and sign repair services.

In addition to the CLCP, NALMCO administers three certifications:

1. Certified Lighting Management Consultant (CLMC), demonstrating proficiency in lighting management
2. Certified Sustainable Lighting Consultant (CSLC), demonstrating proficiency in lighting energy management
3. Certified Senior Lighting Technician (CSLT) and Certified Apprentice Lighting Technician (CALT), demonstrating proficiency in providing lighting management services at the job site

NALMCO subsequently developed the Certified Lighting Controls Professional (CLCP) to support its membership and strengthen its services and competitiveness in a growing market for lighting controls. The CLCP is based on the education curriculum developed by the Lighting Controls Association's Education Express online education system (LightingControlsAssociation.org).

Education Express courses comprehensively cover lighting control strategies, technology, application, upgrades, energy codes, design, and commissioning.

Combined, they represent approximately more than 50 hours of learning. Courses are registered with the American Institute of Architects (AIA). Education Express is also recognized by the State of California, the National Council on Qualification of the Lighting Professions (NCQLP), CALCTP, and the DesignLights Consortium (DLC).

Each learning module tests student knowledge with an online exam. To earn the CLCP designation, the professional must successfully pass all online exams and a master exam developed by NALMCO.

Certification for a Controls World

Demand for LED lighting and lighting controls is steadily increasing. As lighting and controls become increasingly complex, commercial building owners and managers require professionals that can provide installed systems that are reliable and perform as specified.

Available to the entire electrical industry, NALMCO's CLCP designation offers assurance that a professional is highly educated about lighting controls based on a high-quality curriculum designed by the controls industry. This ensures that correct strategies are deployed in the right spaces, optimal solutions are designed, all equipment is properly installed and commissioned, and all equipment will perform as needed throughout its life.

To learn more about the lighting management industry and the CLCP, visit NALMCO.org.



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