

SMART LIGHTING SOLUTIONS FOR HAZARDOUS AND INDUSTRIAL LOCATIONS

Appleton™ Connected LED Luminaires | Group Lighting Controls | Plantweb Insight™ Connected Lighting Application

The ROI of Digital Transformation

Improving Sustainability

Smart Lighting Solution

Group Lighting Controls

Remote Monitoring and Sustainability Analytics

Connected Lighting Application

Energy Report

Typical Applications

Learn More



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THE ROI OF DIGITAL TRANSFORMATION

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Facilities worldwide are feeling the pressure to:

- **Increase safety and efficiency** in harsh industrial and hazardous locations
- Meet Environmental, Sustainability and Governance (ESG) goals
- Implement modern networking technologies to help **cut costs** throughout their operations



Digital transformation helps to:

- **Manage data** generated by smart meters, sensors and other lightweight edge analytics devices
- Identify maintenance priorities
- Anticipate potential hazards or failures before they become a problem
- **Maintain facility safety**, reliability and compliance



LED lighting is up to **65% more energy efficient** than the traditional High Intensity Discharge (HID) or High Pressure Sodium (HPS) systems found in oil, chemical and heavy industrial processing facilities. Network connected LED lighting further **reduces costs by up to an additional 60%** due to energy-saving controls, the ability to analyze energy consumption patterns, and the improved visibility into luminaire health monitoring that reduces maintenance requirements and production downtime.



The Department of Energy[®] estimates that only 17% of the installed base of industrial high-bay/low-bay luminaires is LED. Retrofitting to LED from older lighting sources would save American industry up to \$3.6 billion annually. Taking the next step and applying **digital transformation** via connected LED lighting would save another \$1.0 billion or more, as companies conserve on energy usage and identify potential maintenance issues to **prevent costly failures before they occur**.

[®] US Department of Energy: "Adoption of Light-Emitting Diodes in Common Lighting Applications" August 2020

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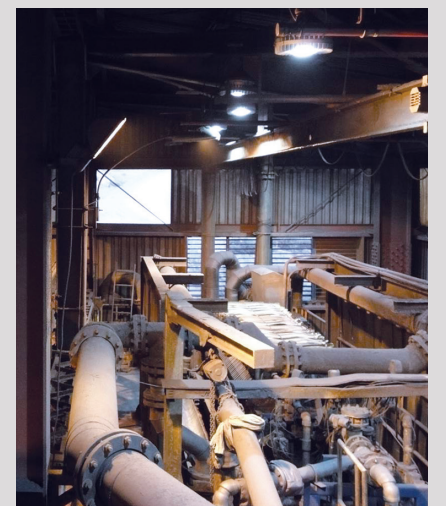
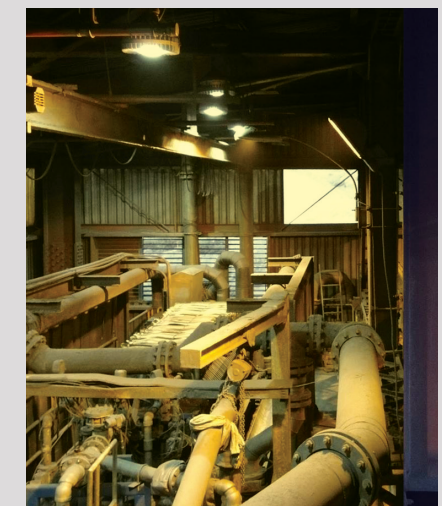
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The Cost of HID and HPS Lighting Versus LED

- HID and HPS lighting:
 - Costly to replace, maintain and dispose of
 - More expensive to run — consumes large amount of energy
 - Cannot be tailored to usage need via network
 - Provides poor light quality
 - Negative impacts on employee safety; fatigue, issues with concentration, performance, and motivation

HID Luminaires

LED Luminaires



- Quality Lighting is Important:
 - Workers receive about 85% of their information through their sense of sight
 - Decreases risk of slips, trips and falls
 - Decreased maintenance requirements contributes to increased safety



IMPROVING SUSTAINABILITY

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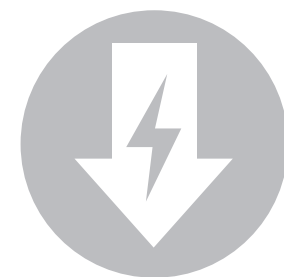


Improving sustainability and reducing carbon impact on the environment is an increasing focus for many companies, especially those in the harsh industrial and hazardous industries, as they look to lessen total energy consumption and streamline operations. One key source of energy consumption and maintenance is lighting. Transitioning to LED lighting is the first step in driving sustainability improvements through **large energy reductions**. Implementing smart lighting solutions is the next.



Appleton Group Lighting Controls by Emerson provides Plant Managers and Sustainability Officers with the ability to monitor energy usage, calculate energy analytics, access historical energy consumption graphs and other **energy and sustainability analytics**. They can calculate carbon dioxide (CO₂) emissions and review sustainability metrics around CO₂ emission savings. In addition to reporting on these efficiency gains, they can further **drive energy savings through easy-to use lighting controls** such as occupancy (motion) sensing, daylight harvesting, or scheduling.

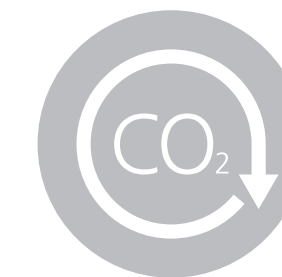
Appleton Group Lighting Controls | Customer Benefits



Reduce power consumption and add intelligent controls of the lighting within a facility or within an area of a facility.



Strengthen the existing WirelessHART™ network in the facility by adding Appleton Connected Lighting.



Capture, document and report Carbon Emission reductions across a facility.

SMART LIGHTING SOLUTION

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Gain operational insight into your facility's lighting with Appleton Group Lighting Controls and Plantweb Insight by **reducing energy consumption** and **extending fixture life**. Choose Appleton Connect LED Luminaires and dimmable LED luminaires by Emerson. The Appleton Connected LED Luminaire is designed to illuminate hazardous and harsh industrial locations with integrated motion and illuminance sensors. When paired with Emerson's Plantweb Insight Connected Lighting Application, **operators no longer need to manually estimate the energy usage** of controlled luminaires.



The data analytics software provides continuous, centralized **monitoring of connected devices** across the facility. With access to strategic analysis, map-based commissioning and analytical capabilities teams can monitor the health of devices, **recognize problems faster**, and identify areas for improvements. Custom schedules, light levels, and controls ensure plant personnel never enter a dark area, while keeping energy costs low and reducing luminaire operating time.

Implement Smart Lighting Controls



- Mercmaster™ Connect's integrated occupancy sensor turns on lights automatically and then it will dim after personnel leave the area.
- Mercmaster Connect's photo sensor adjusts the light output to maintain a consistent light level where personnel work.

Remote Health Monitoring



The Plantweb Insight Connected Lighting Application monitors the health of the system and will report when maintenance is required.

Extend Smart Lighting Controls

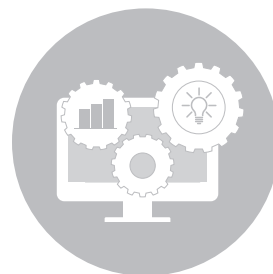


Harsh industrial and hazardous location LED luminaires with dimmable lighting output.

GROUP LIGHTING CONTROLS

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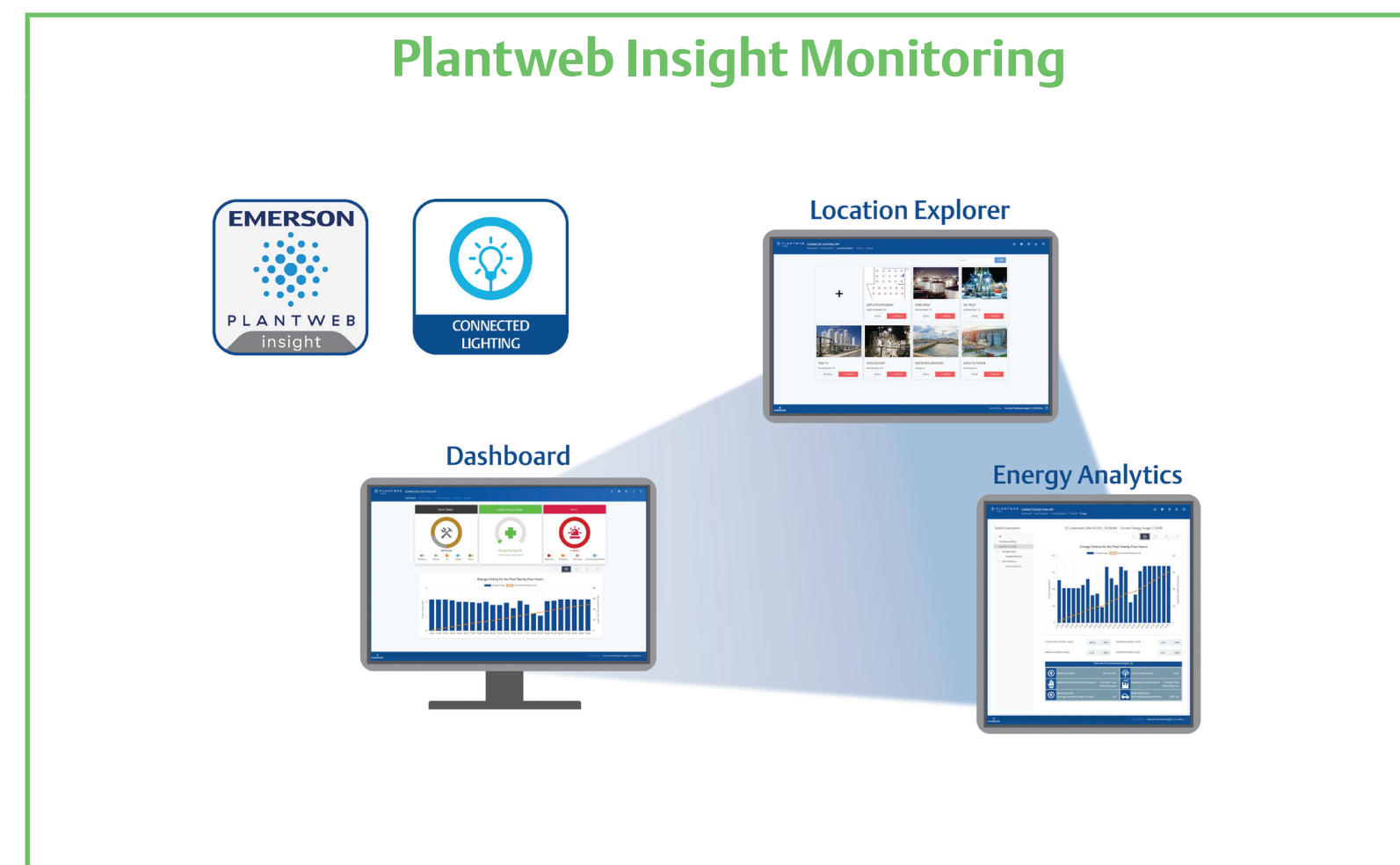
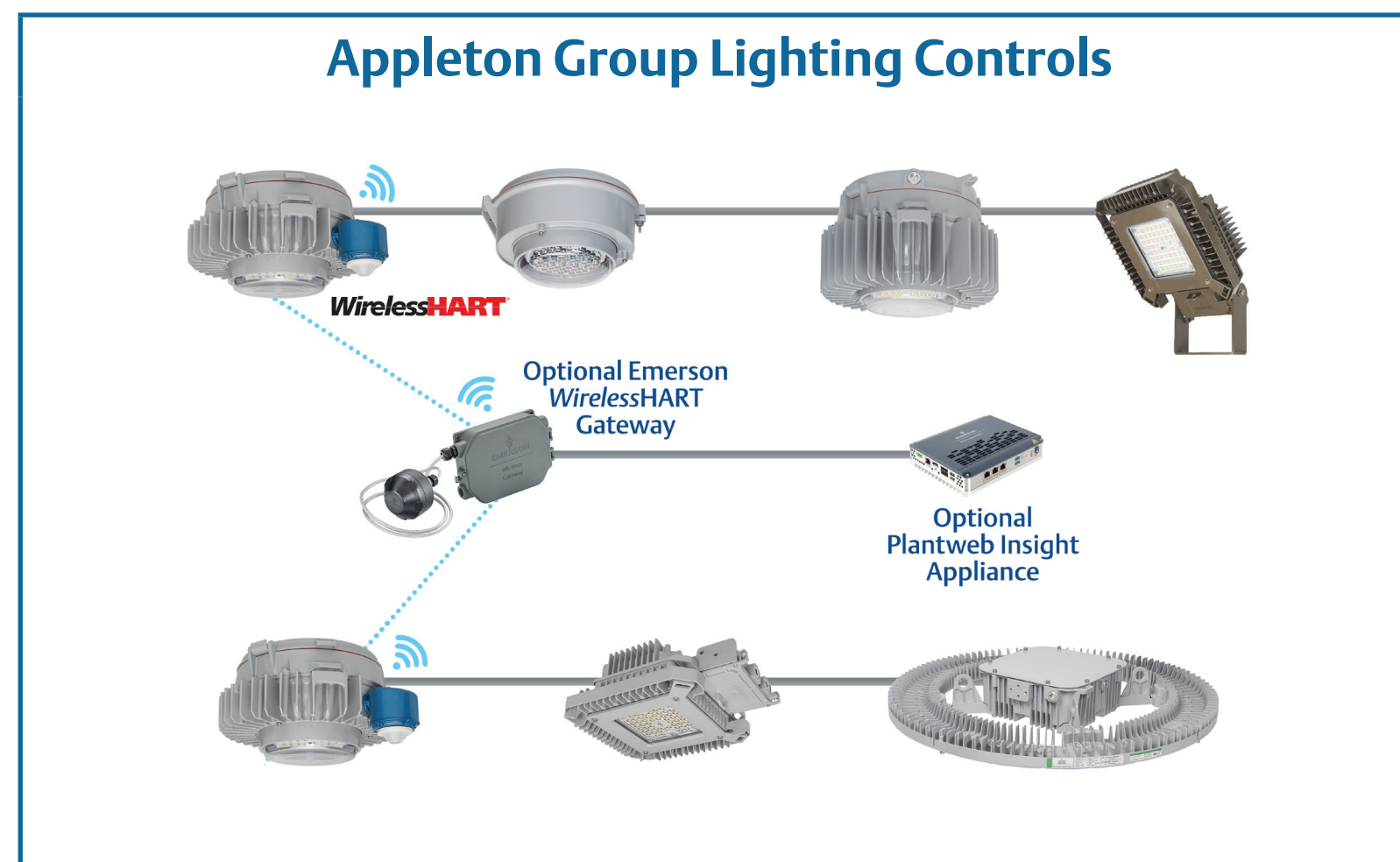
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Appleton Group Lighting Controls by Emerson is a new approach to smart lighting technologies. The combination of Appleton Connect LED Luminaires, Appleton dimmable LED luminaires and Plantweb Insight's Connected Lighting Application creates an **end-to-end solution for optimizing, monitoring, and analyzing lighting performance**. Customers can achieve carbon footprint reduction with this new approach to energy sustainability for harsh and hazardous locations and meet their Environmental, Social, and Governance (ESG) Goals.



When an electrical dimming connection is made from an Appleton Mercmaster Connect LED Luminaire to a bank of up to 10 of dimmable Appleton LED Luminaires, the Mercmaster Connect's advanced capabilities are enabled for the entire run. By utilizing different control schemes, optimizing the lighting output for a location is straightforward. Dimming modes and motion sensors provide the ability to reduce light levels when workers are not present or when light is not needed. **Appleton Group Lighting Controls optimize lighting levels for each installation type** to maximize product life, minimize energy consumption, minimize nighttime lighting usage, improve maintenance planning, and reduce the carbon footprint of the facility.



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CONNECTED LIGHTING APPLICATION

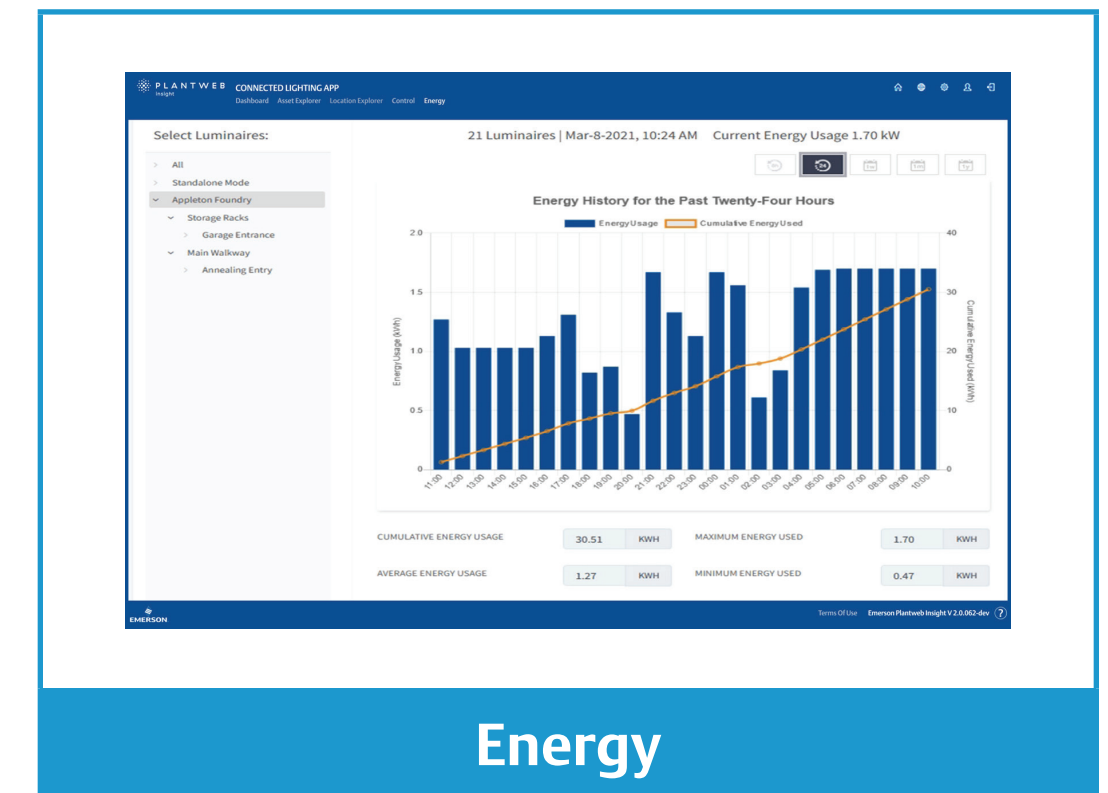
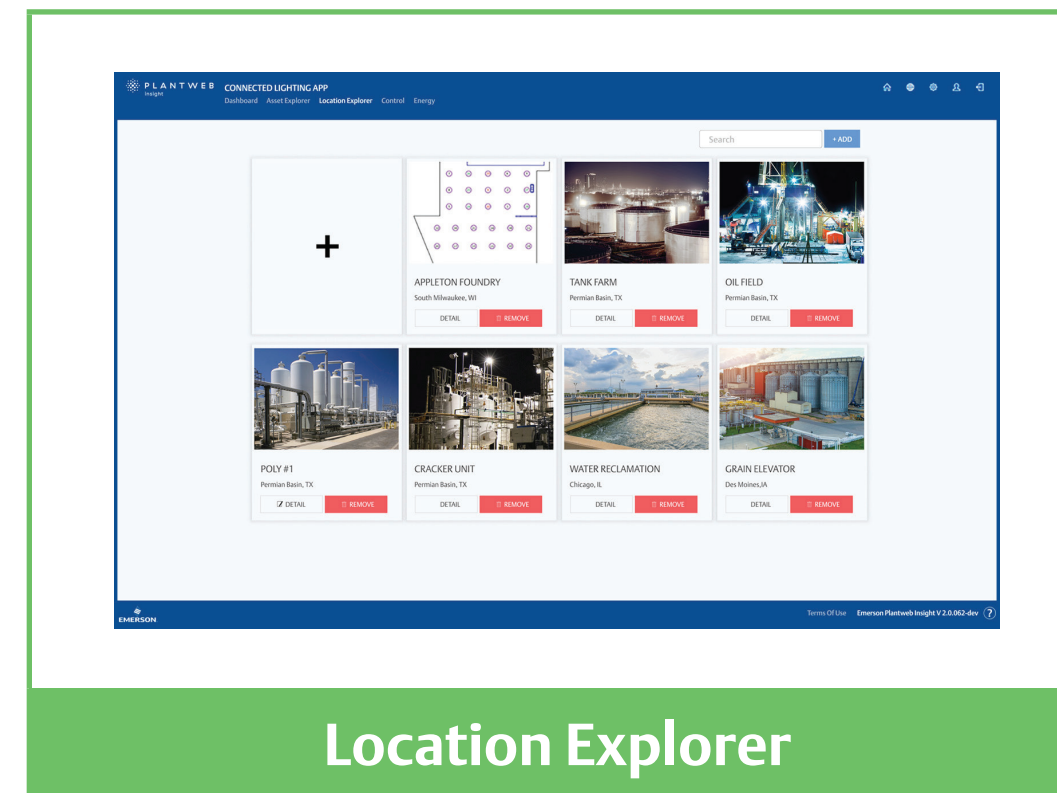
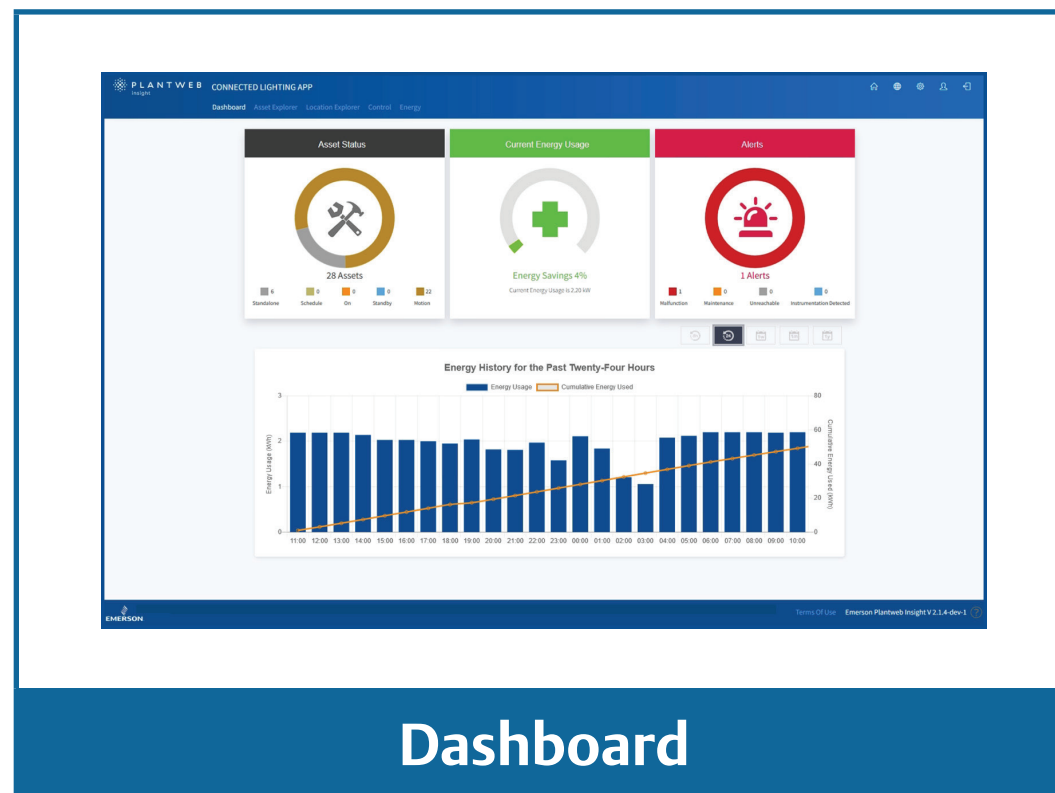
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The Connected Lighting Application remotely monitors the state of the lighting system and alerts personnel to potential issues. **Commission, monitor, and analyze energy and sustainability data** of the entire system using the Connected Lighting Application. When paired with Emerson’s Plantweb Insight, the Connected Lighting Application **aggregates and reports energy and carbon reduction analysis** across the facility for use in facility energy reporting and ESG (Environmental, Sustainability, and Governance) calculations.

Connected Lighting Application | Key Features



Appleton Connected LED Luminaires



- Mercmaster Connect LED Luminaires with WirelessHART
- Industrial Mercmaster Connect LED Luminaires with WirelessHART

Appleton Dimmable LED Luminaires



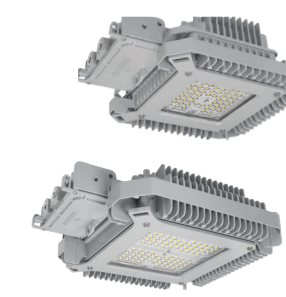
- Mercmaster LED Low Profile Luminaires
- Industrial Mercmaster LED Low Profile Luminaires



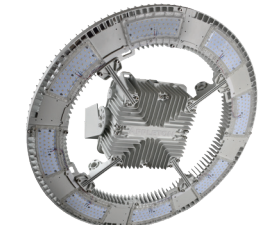
- HB LED Multilens Bulkhead Luminaires
- Industrial HB LED Multilens Bulkhead Luminaires



- Areamaster™ LED Generation 2 and High Lumen Luminaires
- Industrial Areamaster Generation 2 LED and High Lumen Luminaires



- Baymaster™ LED and High Lumen Luminaires
- Industrial Baymaster LED and High Lumen Luminaires



- IHC Series LED Luminaires


REMOTE MONITORING AND SUSTAINABILITY ANALYTICS

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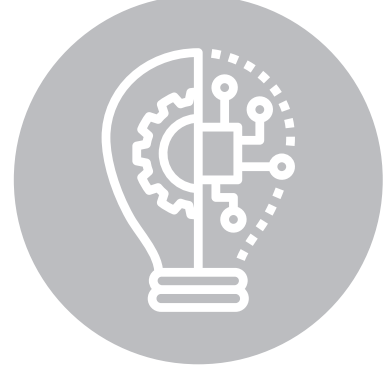
The combination of Emerson's Appleton Smart Lighting Solutions capabilities with their Plantweb Insight's Connected Lighting Application creates an end to end solution for optimizing, monitoring, and analyzing lighting performance to **support autonomous operations**.

Data




Record long term trends of lighting performance

Lighting Optimization




By combining dimmable lighting with connected lighting, facilities can modify the lighting usage as the needs of the facility change

Analytics and Data Management



Automatically track lighting usage, energy consumption, and performance

Maintenance Planning



Track the life cycle of installed connected lighting



- Focusing on reliability as a business strategy can improve safety, production efficiency, and emissions



- Intuitive digital software and ecosystem, that provides operators the ability to monitor the overall health of the connected equipment



- Provides new and amazing insights about the health of your facilities equipment, enabling better condition-based maintenance decisions that increase operational availability



- Achieve measurable performance gains in production, reliability, safety and energy management



- Improves personnel efficiency by empowering them with the information they need to make smarter, more strategic decisions as well as diagnose and address critical issues before they negatively impact operations



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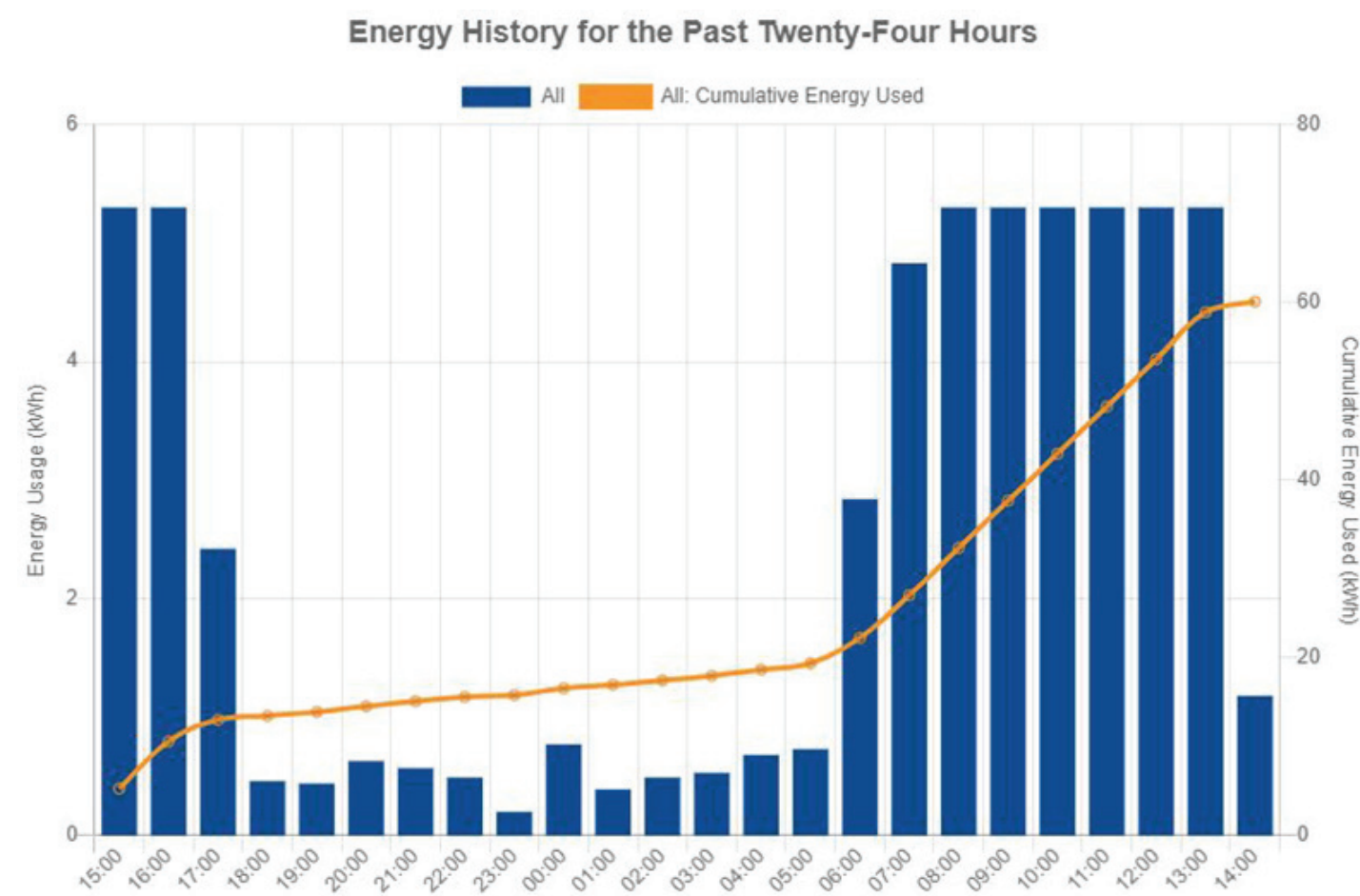
Typical Applications

Learn More

Sample Report | Group Lighting Control Warehouse | 24 Luminaires | Energy History for the Past Month







Sustainability officers no longer need to manually estimate energy usage of lighting controls.

Plantweb Insight grants users commissioning and analytical capabilities.



- Access to historical energy consumption graphs and other energy and sustainability analytics, including calculated carbon dioxide emissions.
- Energy analytics of the Appleton Connected LED Luminaire - up to one year.
- Easy calculation of long-term energy consumption.

Adding controls optimizes lighting operations.

One Year Environmental Impact : Group Lighting Control Warehouse ?					
	Reduction of kWh:	161852 kWh		Acres of Trees Planted:	140
	Reduction of Carbon Dioxide Emissions:	114.75 Metric Tons 252986 Pounds		Reduction of Coal Emissions:	57.51 Metric Tons 126799 Pounds
	Electricity Saved (Average Household Usage for 1 Year):	21		Fewer Miles Driven (By Average Passenger Vehicle):	288324

- Reduces the energy consumption of lighting.
- Extends the life of the luminaire.
- Reduces overall maintenance.
- Assists with proactive maintenance.

TYPICAL APPLICATIONS

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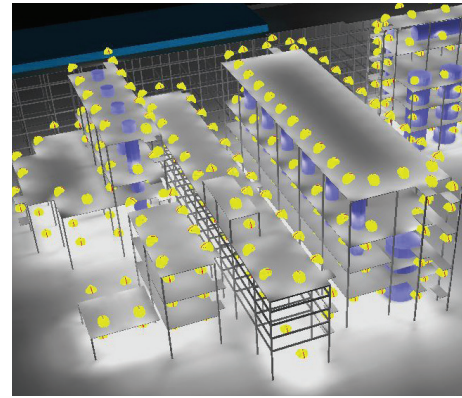
Connected Lighting Application

Remote Monitoring and Sustainability Analytics

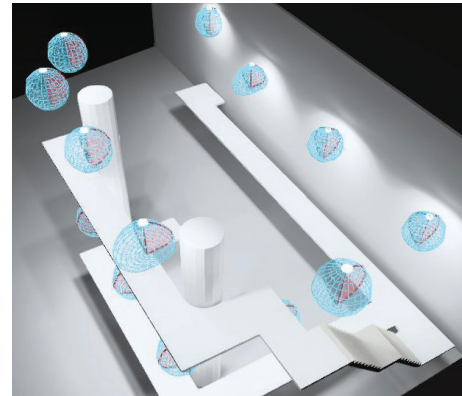
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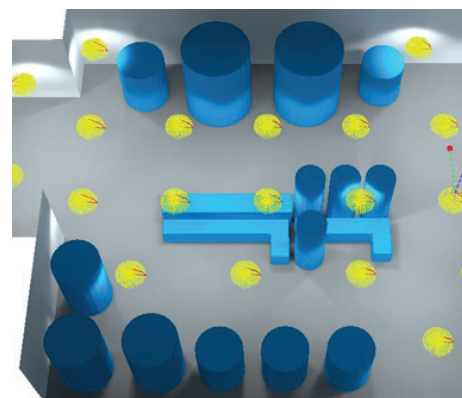
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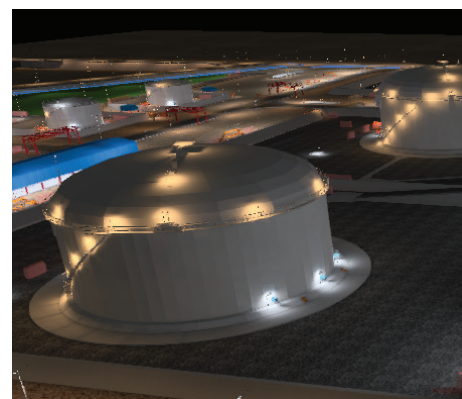
Multi-level Outdoor Platforms and Industrial Stairs | Their inherent design allows sunlight to penetrate to lower levels of the structure through the open areas of the metal grating. Used to access, inspect, and maintain equipment, structures, and machinery, high quality lighting is essential. With smart lighting, designers can incorporate natural light as well as luminaires with dimming capabilities into their lighting layouts.



Walkways | Used to ensure employees can be routed over or around hazardous obstacles throughout a facility. Must be illuminated evenly, sufficiently, and have adequate overhead clearance. Process areas that require monitoring of instrumentation need additional consideration. Walkway luminaires are typically installed in a straight line, connecting the wires of one fixture to the next one, from a single circuit.



Warehouses and Limited Use Facilities | Locations where materials are held in reserve, visited infrequently, or contain high levels of autonomous operations are lit 24 hours a day, subjecting them to high levels of lighting energy consumption. By adopting connected lighting solutions these facilities can capture valuable insights into minimizing energy usage and enabling plant operators to make real-time adjustments to lighting levels for improved efficiency, comfort, and safety.



Tank Farms | Luminaires are installed around the perimeter and up the stairways on a typical tank providing basic safety for personnel; and in key locations to check gauges, sensors and perform other types of inspections. Typical photocontrol devices can be affected by environmental factors, often leaving luminaires operating in the wrong state. Integrating a smart lighting solution ensures the lights are on when and where they need to be.



Exterior Facility Lighting | Facilities require exterior lighting solutions that properly illuminate the areas around buildings for entrances, loading docks, emergency exits and roof access points. These lighting solution needs to illuminate a wide area or provide a focused beam to project light over a great distance. Outdoor lighting installed on the exterior walls are typically installed in a linear design, most often on the same electrical circuit. .

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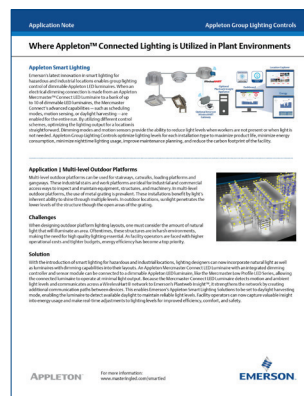
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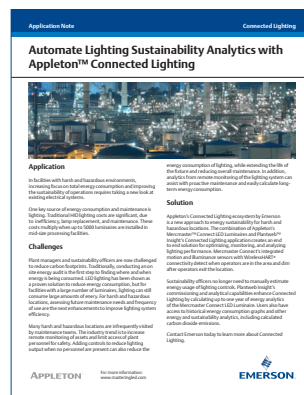
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To learn more about Emerson's smart lighting solutions for hazardous and industrial locations visit us online at www.masteringled.com/smartled.

Implementing our Appleton Connected LED Luminaires, Group Lighting Controls, and Plantweb Insight Connected Lighting Application is a highly effective way to reduce facility costs while improving the productivity, safety, and functionality of your facility.



Appleton Group Lighting Controls | Where Appleton Connected Lighting is Utilized in Plant Environments | Application Note



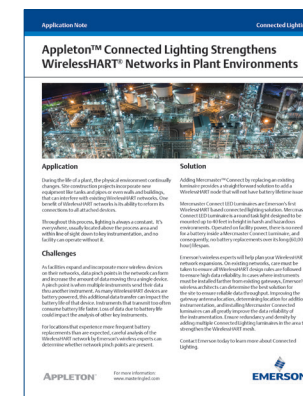
Automate Lighting Sustainability Analytics with Appleton Connected Lighting | Connected Lighting | Application Note



Increase Operational Sustainability With Appleton LED Luminaires | Group Lighting Controls | FAQs



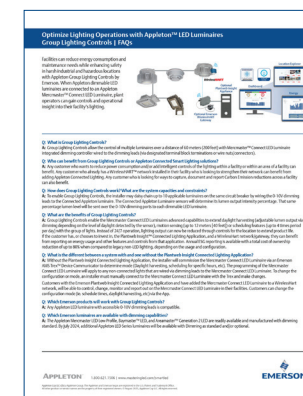
Extend Luminaire Life While Reducing Energy Consumption | Connected Lighting | Flyer



Appleton Connected Lighting Strengthens WirelessHART Networks in Plant Environments | Connected Lighting | Application Note



The Next Step in Digital Transformation: Connected LED Lighting in Hazardous Industrial Locations | White Paper



Optimize Lighting Operations with Appleton LED Luminaires | Group Lighting Controls | FAQs



Smart Lighting Solutions for Hazardous and Industrial Locations | Appleton Group Lighting Controls by Emerson | Selection Guide