



Ameren Illinois Power Lunch

Lighting Control Systems - NLCs and LLLCs

June 8th, 2022

Instructor: Steven Mesh, LC, IESNA

June Power Lunch – Controls – Ameren Illinois V1 5-17-22 compressed.pptx

Introduction

Steve Mesh professional affiliations

- **Illuminating Engineering Society**

- ✓ Northeast Regional Vice President, 2007-2008
- ✓ Energy Management Committee member for 25 years
- ✓ Former Quality of the Visual Environment Committee member
- ✓ IES/New York section Education Committee chairperson, 1999-2001

- **International Association of Lighting Designers**

- ✓ Former IALD Corporate Member
- ✓ 1997 Intern Program administrator

- **American Institute of Architects**

- ✓ AIA Registered Provider, 2003-2008

- **Invited speaker:**

- LightFair (1992, 2007-2013, 2016, 2017, 2020)
- Lux Pacifica (New Delhi, India – 2002)

- **LC:**

- “Lighting Certified”
- “Item Writer”

CALCTP* controls training (2008-2010)

Curriculum developer and instructor



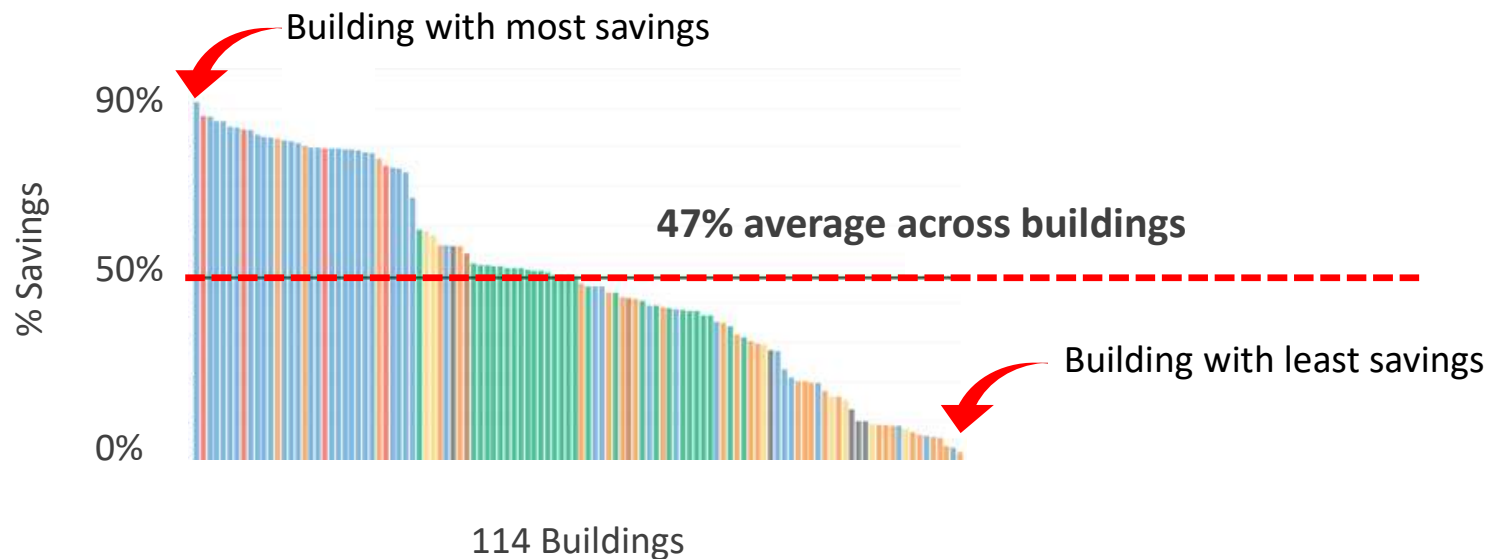
* - California Advanced Lighting Controls Training Program

Young Eagles pilot

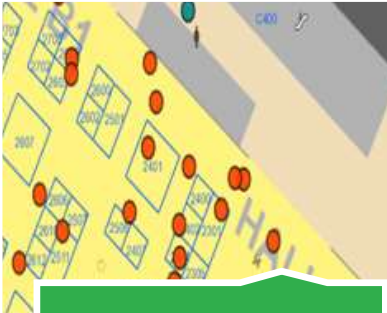


DLC (DesignLights Consortium) study

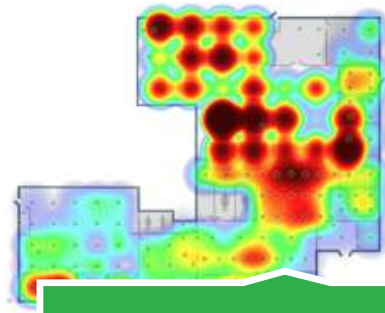
- Average savings in lighting energy from lighting controls – **47%**
- Data was from voluntary contributions
- Individual buildings: lighting control savings ranged from **2%-90%**
- Search “DLC Energy Savings Report” online to download the full report and webinar
- Other utility auditing groups are beginning to confirm similar values to this report’s averages



Non-energy benefits of LLLC systems



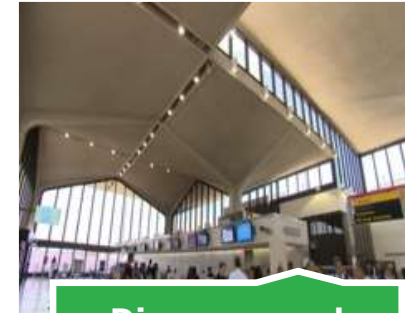
Asset Tracking



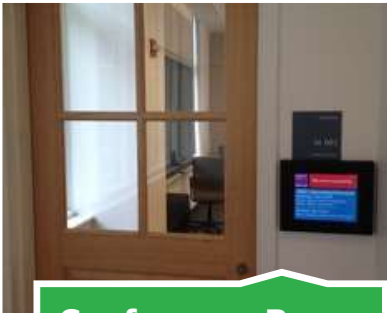
Space Utilization



Indoor Positioning



Diagnose and Report



Conference Room Scheduling



Security



Energy Tracking



Integrate with BMS/HVAC

What are LLLCs?

- **LLLC** = Luminaire Level Lighting Controls
- As defined in the 2018 version of the Illinois Energy Conservation Code (based on IECC 2018 <International Energy Conservation Code>) ...
 - ✓ “**LUMINAIRE-LEVEL LIGHTING CONTROLS**. A lighting system consisting of one or more luminaires with embedded lighting control logic, occupancy and ambient light sensors, wireless networking capabilities and local override switching capability, where required.”
- In plain English, **LLLC** means that fixtures must have:
 - ✓ Controller (to switch and dim)
 - ✓ Occupancy sensor
 - ✓ Photosensor
 - ✓ Wireless connection to network (only according to code ... see next page for clarification)

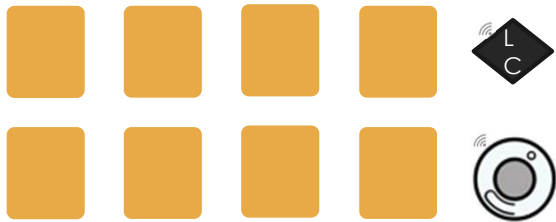
What are LLLCs?

- **LLLCs** are a type of **NLC** (Networked Lighting Control) system.
- However, not all NLC systems use LLLCs (*as defined by the code*):
 - ✓ Some NLC systems with fixture-integrated controllers and sensors are **wired**.
 - Wired NLC systems that have fixture-integrated controllers and sensors **can still be used** in a project (even if it doesn't meet the "official" code designation of an LLLC system).
 - You can still get **Ameren incentives** for using these systems.
 - ✓ Some NLC systems – whether they are wired or wireless – do **not** use fixture-integrated sensors (or controllers). They use **zone-based** sensors and/or controllers.
- **Most important takeaway**: regardless of whether a system uses a wired or wireless connection to the network – if it has fixture-integrated controllers and sensors, then it is considered an LLLC system by Ameren and eligible for financial incentives.

What is actually contained in each fixture?

NLC Configuration

1 sensor : many fixtures



1 load controller : many fixtures

Individually Addressable

1 sensor: many fixtures



1 load controller : 1 fixtures

LLLC (also individually addressable)

1 sensor : 1 fixtures



1 load controller : 1 fixtures

Occupancy Sensor Zoning for Open Offices

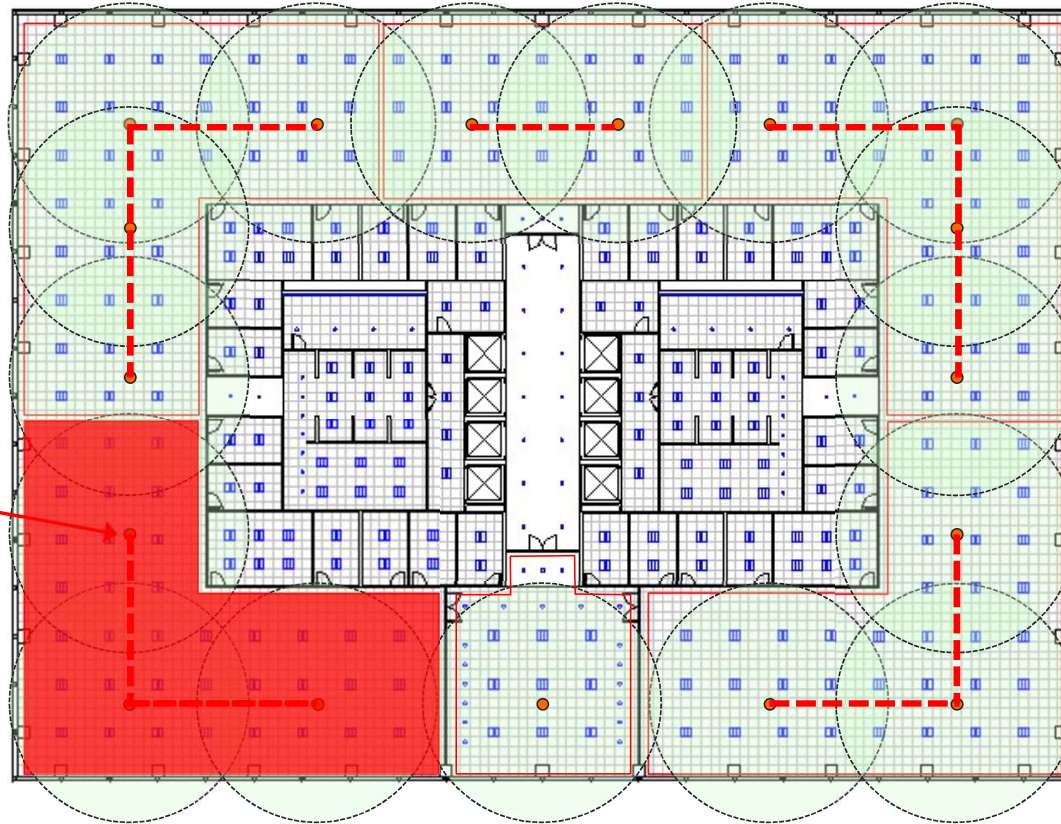
“Occupant sensor controls”

1st pass; occupancy sensors with large coverage pattern (1500 ft²/sensor)

17 occupancy sensors

6 zones (including reception; sensors would work “in parallel” in each zone)

Occupancy sensor with 1500 ft² coverage pattern



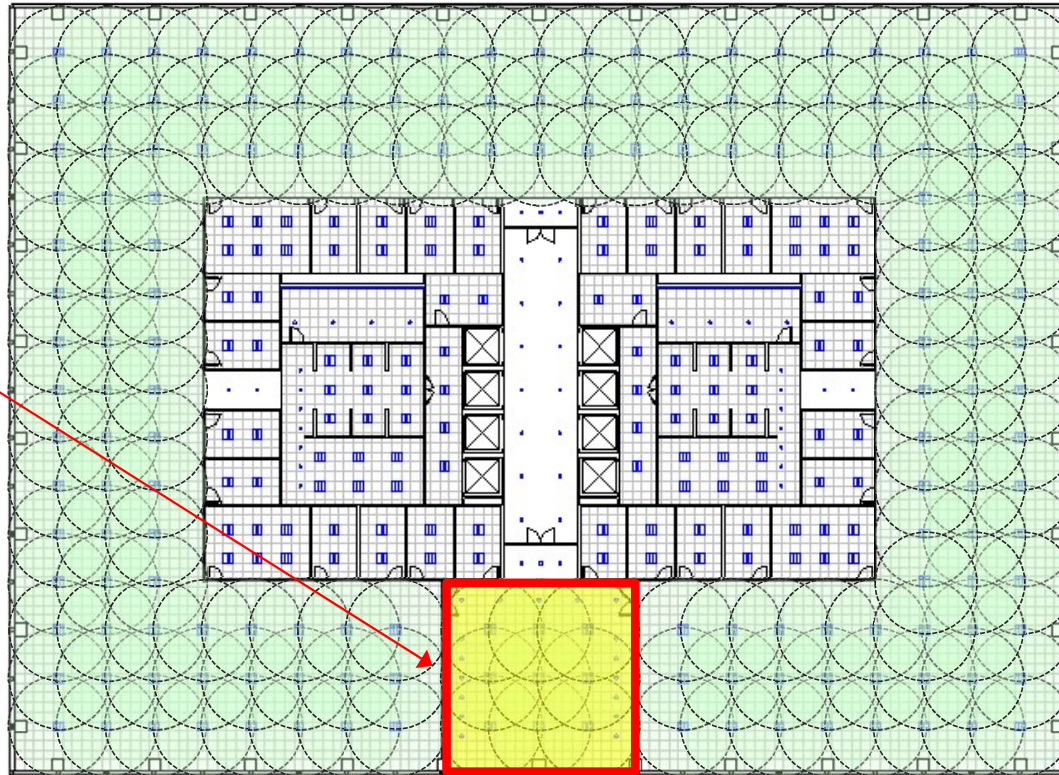
“Occupant sensor controls”

4th pass – LLLC (fixture-integrated, 100 ft²/sensor)

174 occupancy sensors

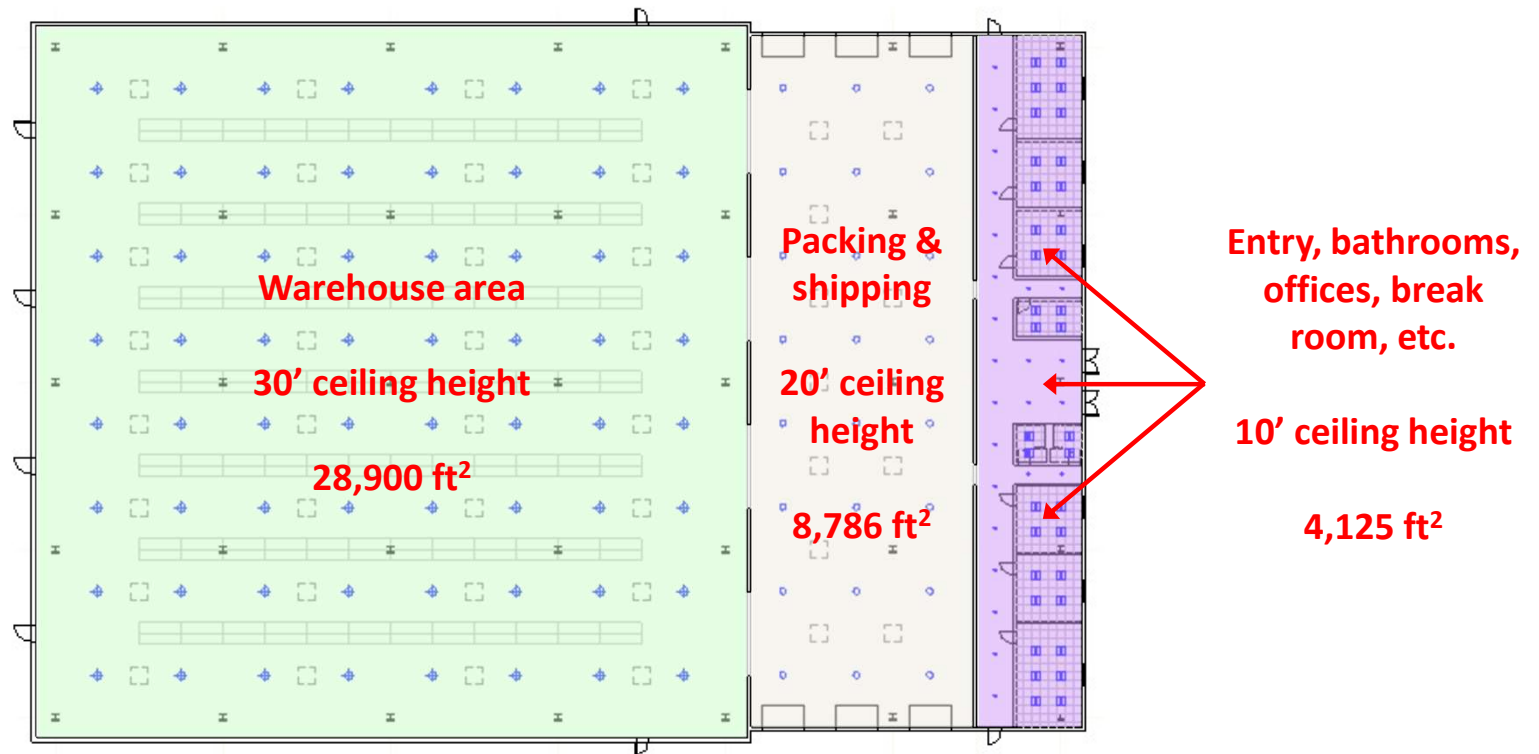
☞ With “fixture-integrated” sensors in an LLLC system, every fixture is essentially its own zone.

☞ In LLLC systems, the software allows you to “group” multiple fixtures. For example, the (9) fixtures in the partitioned reception area can be grouped so that if any fixture picks up motion, all (9) fixtures will turn on.

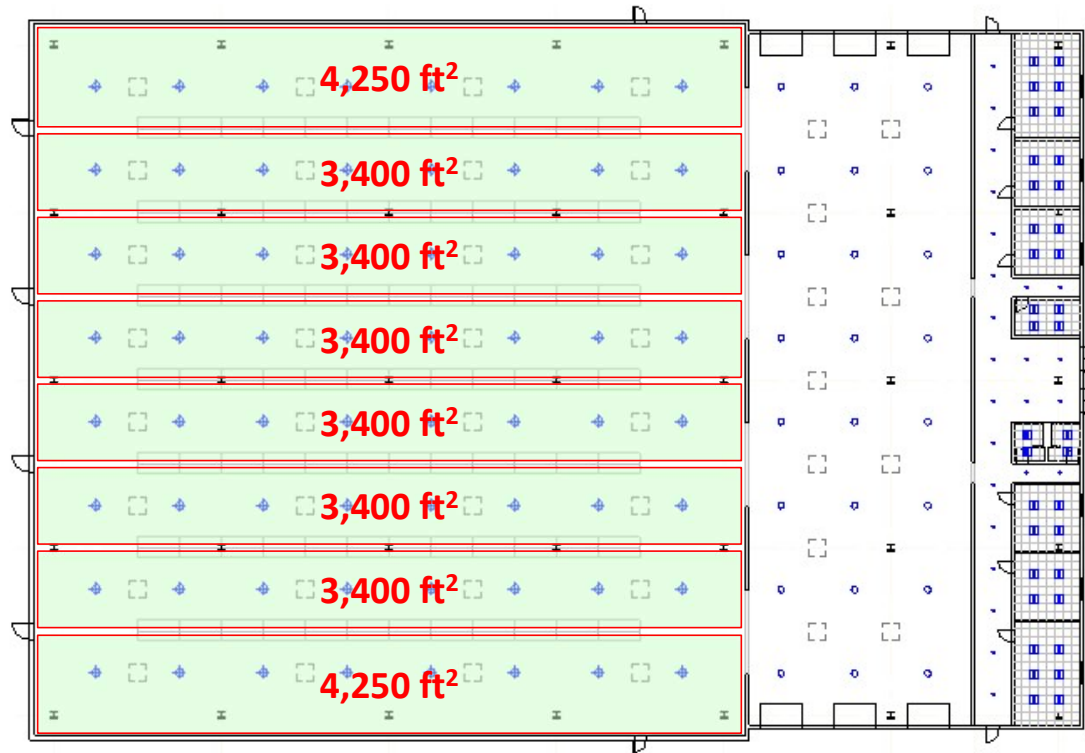


Zoning for Warehouses

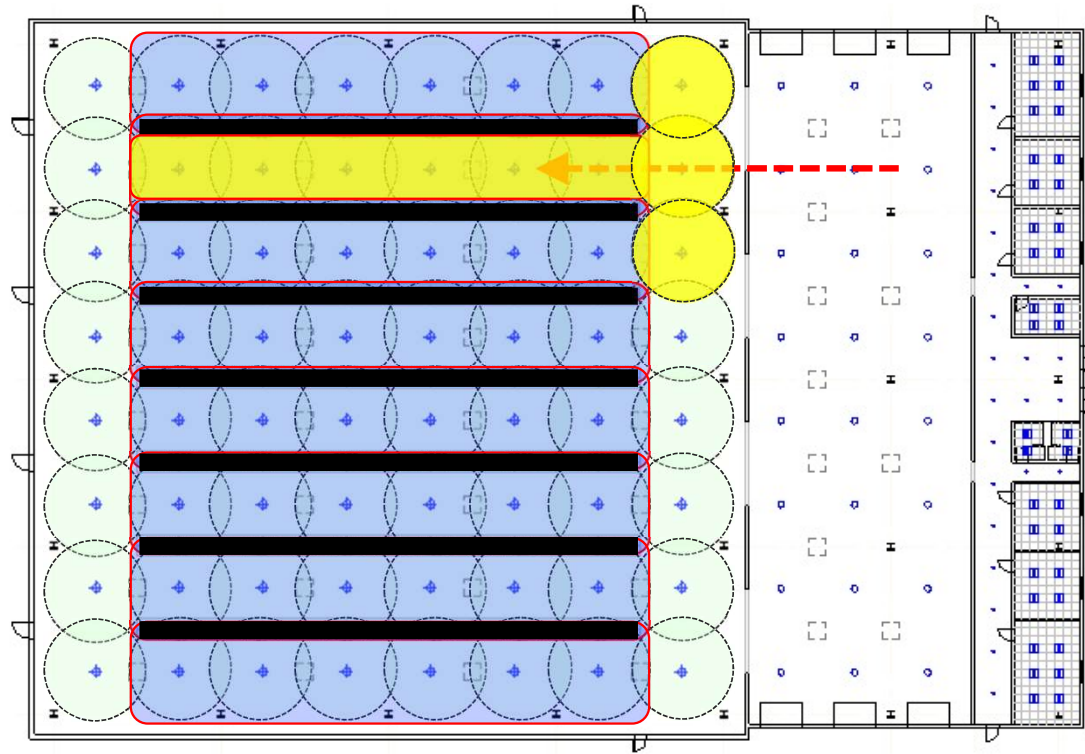
Warehouse building information (41,811 ft² total area)



Warehouse zones – alternate layout



Warehouse zones – using an LLC system with aisles grouped for occupancy sensing



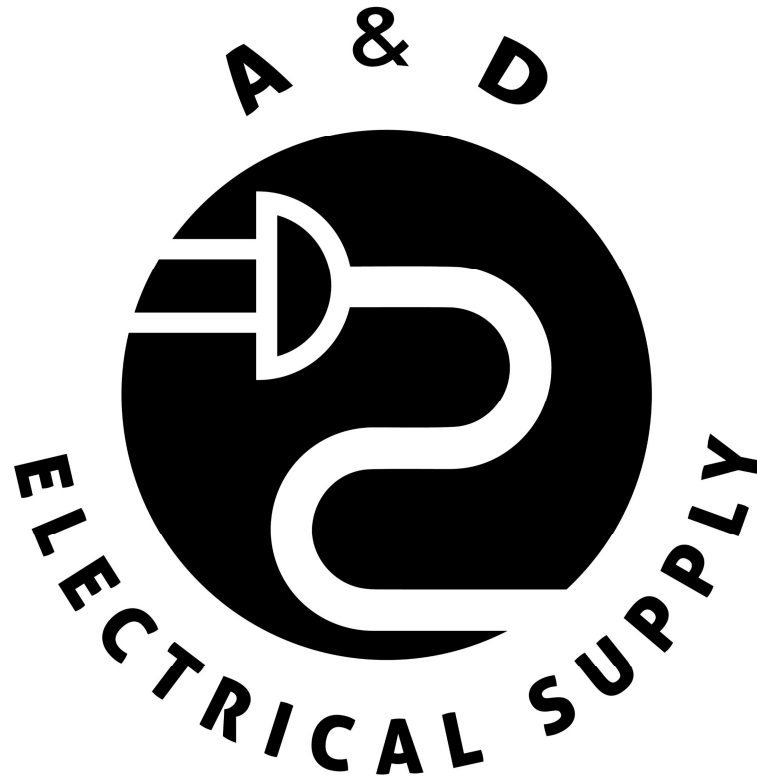
Instructor information

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Efficiently Lighting Challenging Areas

Date: Sept 2022

Brian Barnhart: brian@adelectricalsupply.com

Chris Chandler: chris@adelectricalsupply.com

Steve Mesh: steve@stevemesh.com

Agenda: Efficiently Lighting Challenging Areas

- Introduction
- Luminaire Level Lighting Controls (LLLCs) – Steve Mesh
- Why LED for Industrial Locations – Chris Chandler
- Case Studies – Brian Barnhart and Chris Chandler
- Wrap up and questions
- Ameren Energy Efficiency Program Symposium 2022 Reminder



Luminaire Level Lighting Controls

Steve Mesh



Why LED for Industrial Locations – Chris Chandler

Safety

Efficiency

Maintenance

Industrial Properties offer unique challenges and opportunities when considering upgrading lighting to LED's.



Safety

- Slip
- Chemical Burns
- Trip



\$250 billion dollars a year in job site injuries!!



Less Maintenance & Less Energy



LED VS Metal Halide Replacement

	
LED High Bay Light	Metal Halide High Bay Light
30-80W	150W
90-120W	250W
150-200W	400W
250W	600W

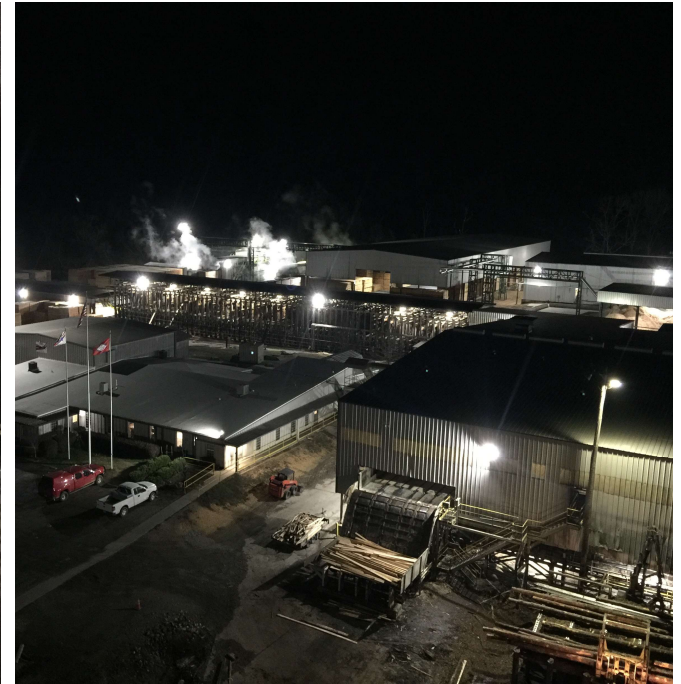


Less Heat
Output

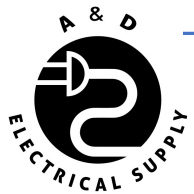


Incentives





Before and After Photos



Case Studies

A

Manufacturing Facility with Inconvenient Wiring

- Production Lines ran north/south, but electricity ran east/west
- Large vacant, illuminated spaces 24 hrs/day

B

Spray Booth for Art Projects

- Vapor and particulate risks (Need Explosion Proof lighting)
- Poor lighting leads to poor quality





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PROGRAM**



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