

Introduction to Luminaire Level Lighting Controls Technology

October 14, 2026

The Building Energy Hub is a project of Illinois Green Alliance

The Goals of the Hub are to:

- Educate & train building professionals
- Support diverse contractors
- Connect contractors to a project pipeline
- Build capacity for advanced codes and policies
- Streamline access to financial resources



The Hub is Illinois' trusted resource center for building professionals seeking practical solutions to improve building performance.

Today's Speaker



Angela Pilant, Sr. Lighting Specialist/Program Manager

Evergreen Energy Partners

Luminaire-Level Lighting Controls

Designing Flexible, High-Performing Buildings
Illinois Green Alliance Webinar

Smart Buildings



Luminaire Level Lighting Controls (LLLC)

- Fixtures with integrated sensors and controls
- Wireless communication between fixtures
- Features include:
  - Occupancy sensing
  - Daylight harvesting
  - High-end trim
  - Zoning without rewiring
  - Temperature sensing



Lighting is the Right Place, Right Time

- Lighting is everywhere in a building
- Already includes sensors and controls
- Provides customizable settings
- Creates a “network” across the entire building



The Future: Smart & Healthy Buildings with LLLC



Link: https://youtu.be/ZErZ_jnOoMA?si=XaJm17_Vq_UHvs7w

LLLC - Lightings Unique Real Estate





Sensors = Director of Building Communications

Simple LLLC Systems

Right for straightforward projects that need core control capabilities.

- Comprehensive or Simple Projects
- Minimal Components
- Standard Control Capabilities/Vocabulary
- Standard Configuration on Site



Occupancy Sensing



Local Dimming



Basic Control



Daylight Sensing



Local Configuration

Expanded LLLC Systems

Right for larger or more complex projects that require enhanced flexibility and capabilities.

- Larger Projects
- Additional Devices Required
- Optional Control Capabilities
- 3rd Party Configuration/Training



Additional Devices



Advanced Control



System Integration



3rd Party Configuration



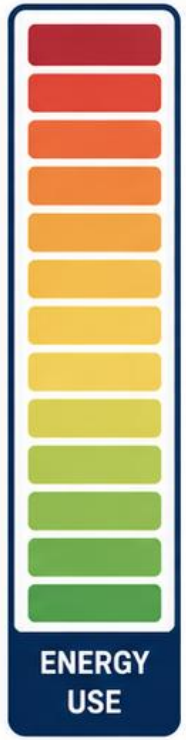
Training & Support



Analytics & Reporting

LLLC & Energy Savings

BASELINE
Traditional Lighting
(Always On)





1. Occupancy Sensing
Lights on when space is occupied.

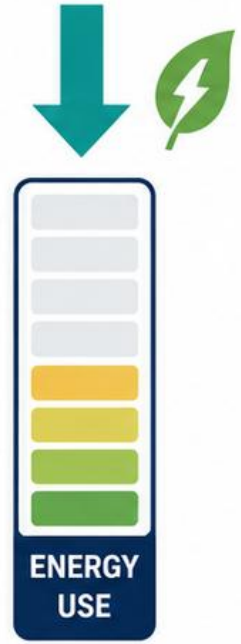
2. Daylight Harvesting
Uses natural light to dim electric light.

3. High-End Trim
Limits maximum light output to the useful level.

4. Scheduling
Lights follow time-based schedules.

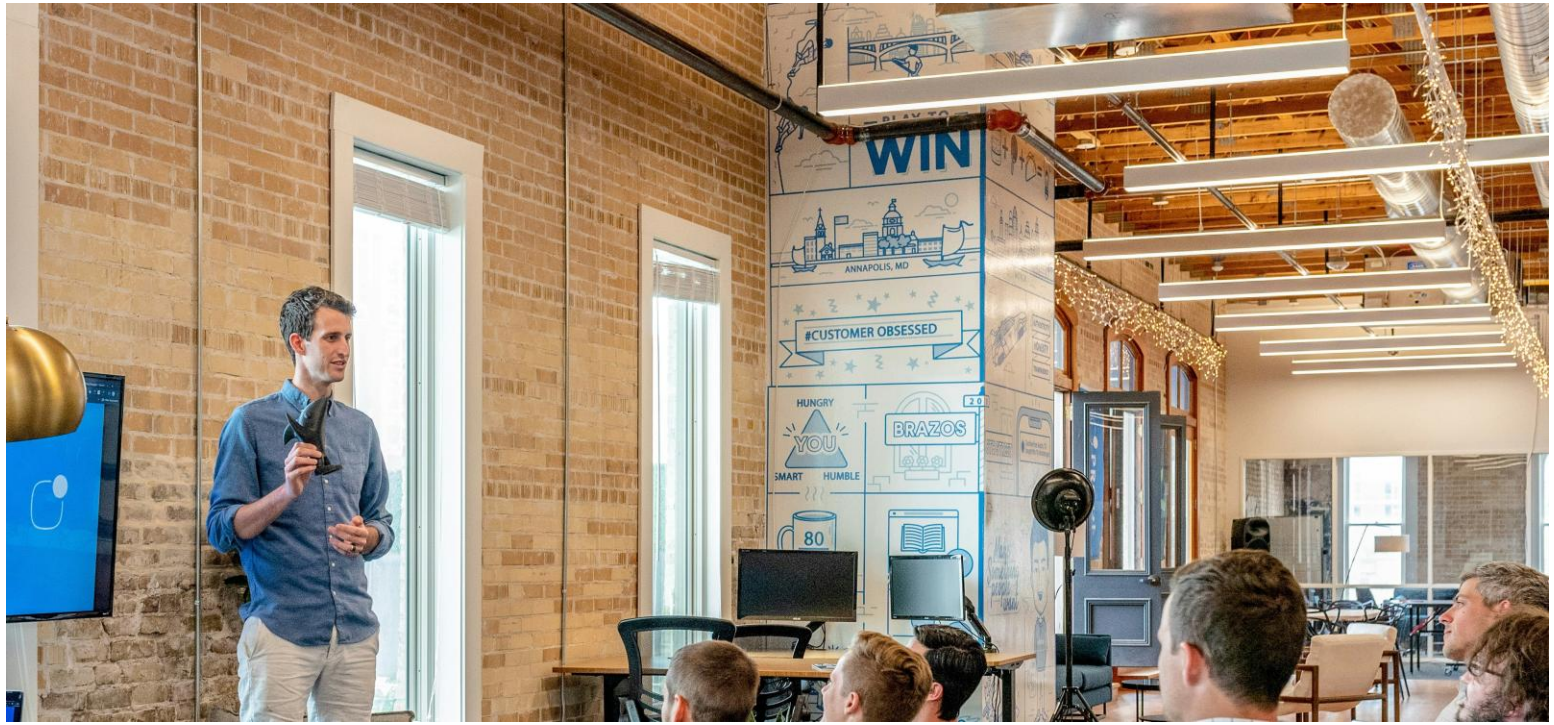
5. Continuous Optimization
Adapts over time for maximum efficiency.

OPTIMIZED
LLLC-Controlled
Lighting



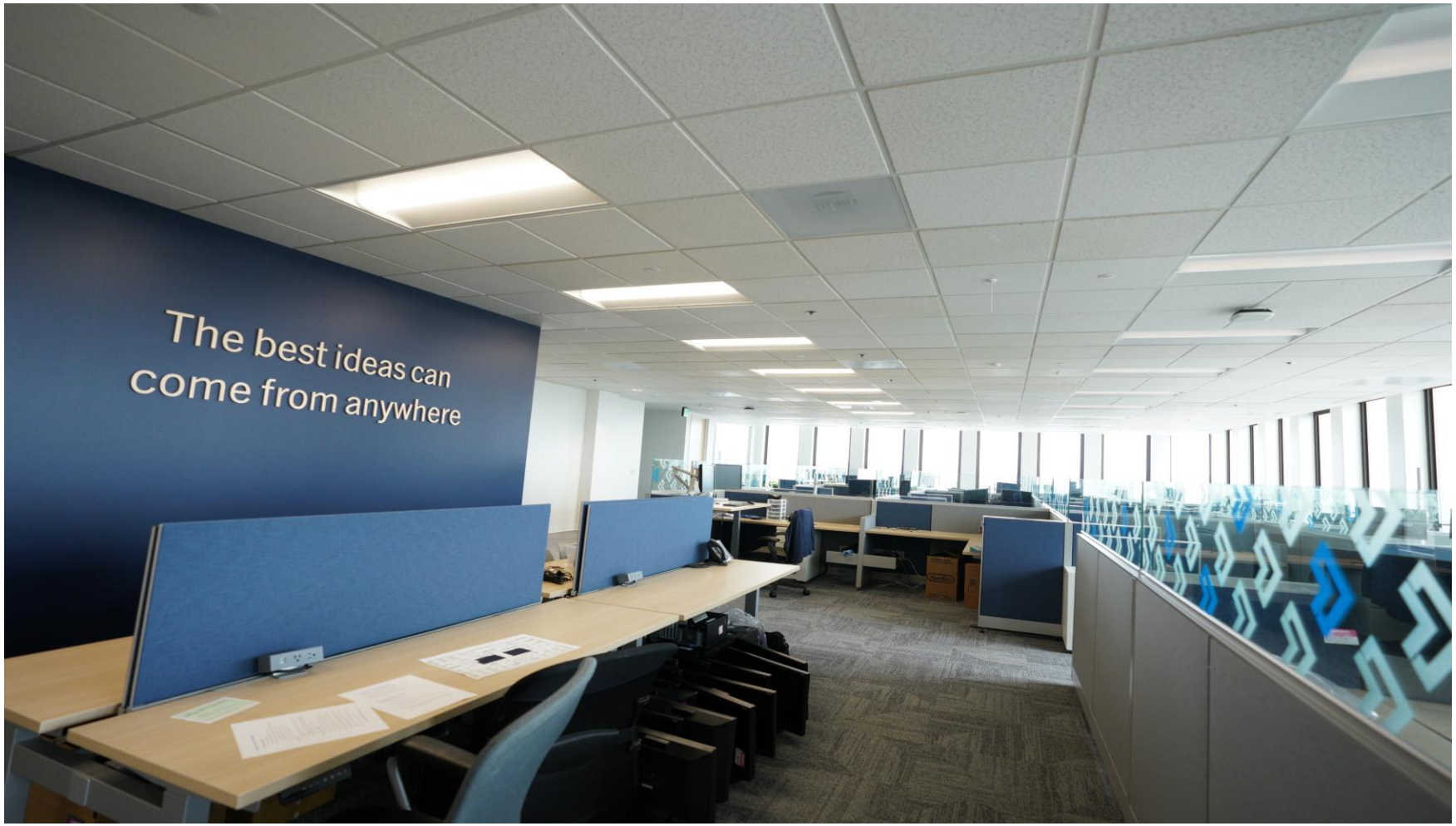
Light only where, when, and at the level needed.

With or Without Control?





With or Without Control?



Source: BetterBricks

Advantages of LLLC

Advantages for All



LLLC Design Advantages

No daylight harvesting zone design

No sensor layout and circuit connection

Control independent of power circuits

No switch leg design

Flexibility to change design or functions after installation. Who wouldn’t like that option!

LLLC Installation Advantages

- Sensors Installed at Factory
- Any Power Connection
- Relieved Wiring Frustration
- Faster Project Completion
- Simple Configuration
- Future Expandability
- Reconfigurable



Source: BetterBricks

How to Specify/Design

Embedded controls can be viewed as an:

- alternate or equal to traditional lighting controls

or

- Embedded controls can be a specified solution on its own



Resources: Design to Commissioning

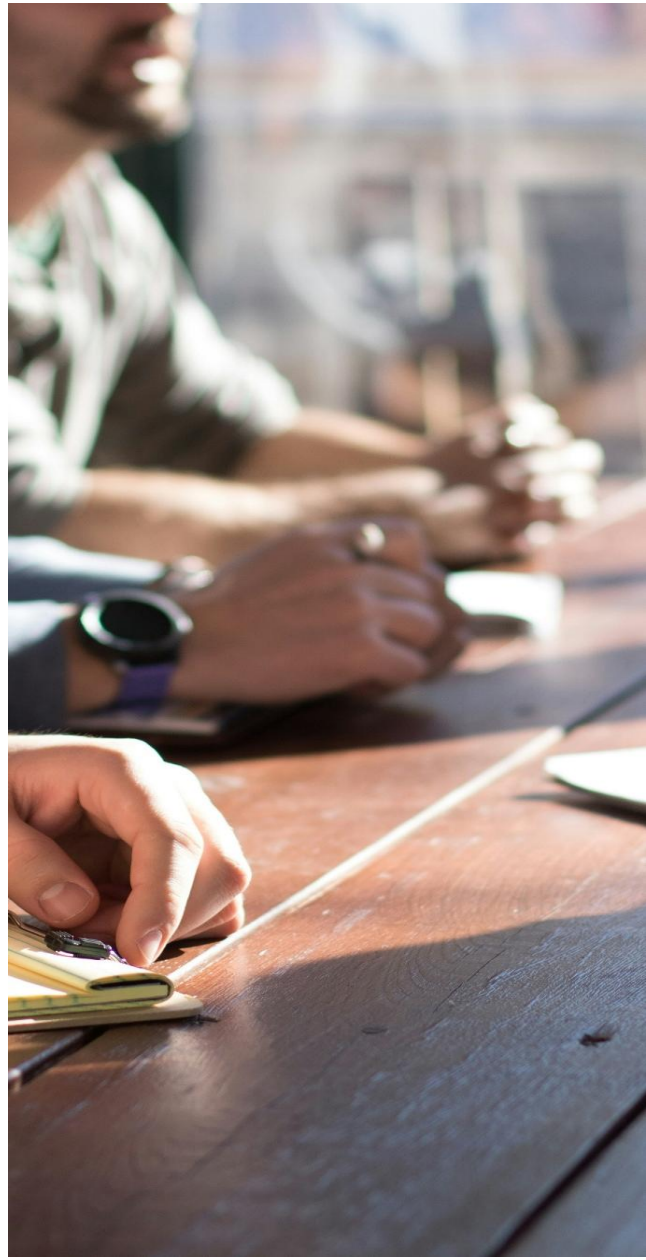
- Simplified Systems
- Factory Commissioning Tools
- Remote Access
- Owner/Occupant Education



Making LLLC Projects Easier to Deliver

Engage the project team early to align on:

- Control intent and sequences of operation
- Product compatibility and who will configure the system
- Startup, functional testing, owner training, and turnover
- Incentive requirements and project documentation



Industry Voices: James Benya



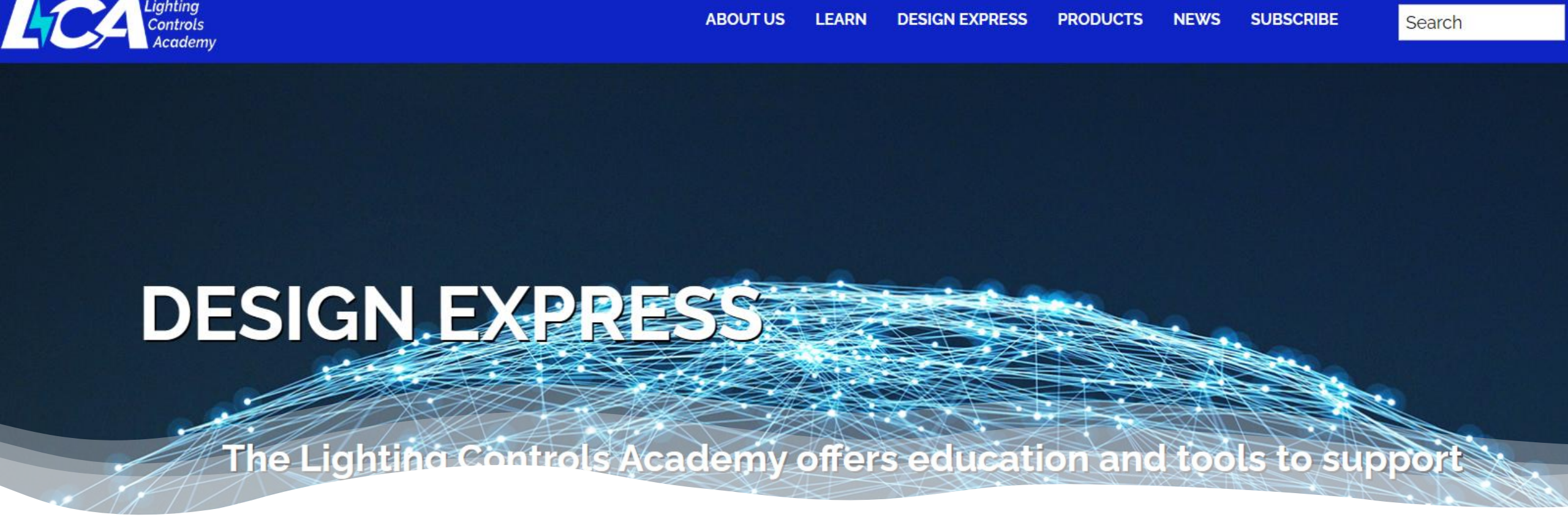
Link: https://youtu.be/Aw4QcnAp_3w?si=jz97uap8mlurZN57

Source: BetterBricks

Ameren LLLC Program Offerings & Resources

<table>
<tr><th>System Type</th><th>Implemented Control Strategies</th><th>Incentive per Unit</th></tr>
<tr><td rowspan="2">Interior | Non-LLLC installation (Single controller/sensor controls multiple luminaires)</td><td rowspan="3">Must include three:
• Occupancy
• Scheduling
• High-End Trim
• Dimming
• Daylighting</td><td>$0.50 / watt controlled (capped at $75/ fixture)</td></tr>
<tr><td>SBDI - $0.60 / watt controlled (capped at $75/ fixture)</td></tr>
<tr><td rowspan="2">Interior | LLLC installation
(Each luminaire has its own controller/sensors and DLC listing indicates LLLC)</td><td>$1.50 / watt controlled (capped at $75/ fixture</td></tr>
<tr><td>SBDI - $1.75 / watt controlled (capped at $75/ fixture</td></tr>
<tr><td>Exterior | LLLC or non-LLLC installation
(Garage/covered parking areas not eligible)</td><td>Must include:
✓ Occupancy and/or Scheduling
✓ Daylight shutoff
Plus one of:
• High-End Trim
• Dimming
• Daylighting</td><td>$0.50 / watt controlled (capped at $75/ fixture</td></tr>
</table>

Link to Ameren IL's lighting application



Lighting Controls Academy

Website: **lightingcontrolsacademy.org**

Questions?

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Thank you for joining us!