MODERN LIGHTING CONTROLS

For Engineers

Title 24, NLCs & LLLCs

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AGENDA

- Why controls matter
- Title 24 overview
- Network Lighting Controls (NLCs)
- Luminaire Level Lighting Controls (LLLCs)
- Case studies
- Best practices

Why Controls Matter

- Energy codes tightening
- Utility incentives
- Analytics

Benefits to the Engineer

Title 24 Overview

Mandatory controls

Acceptance testing

Daylight Zones

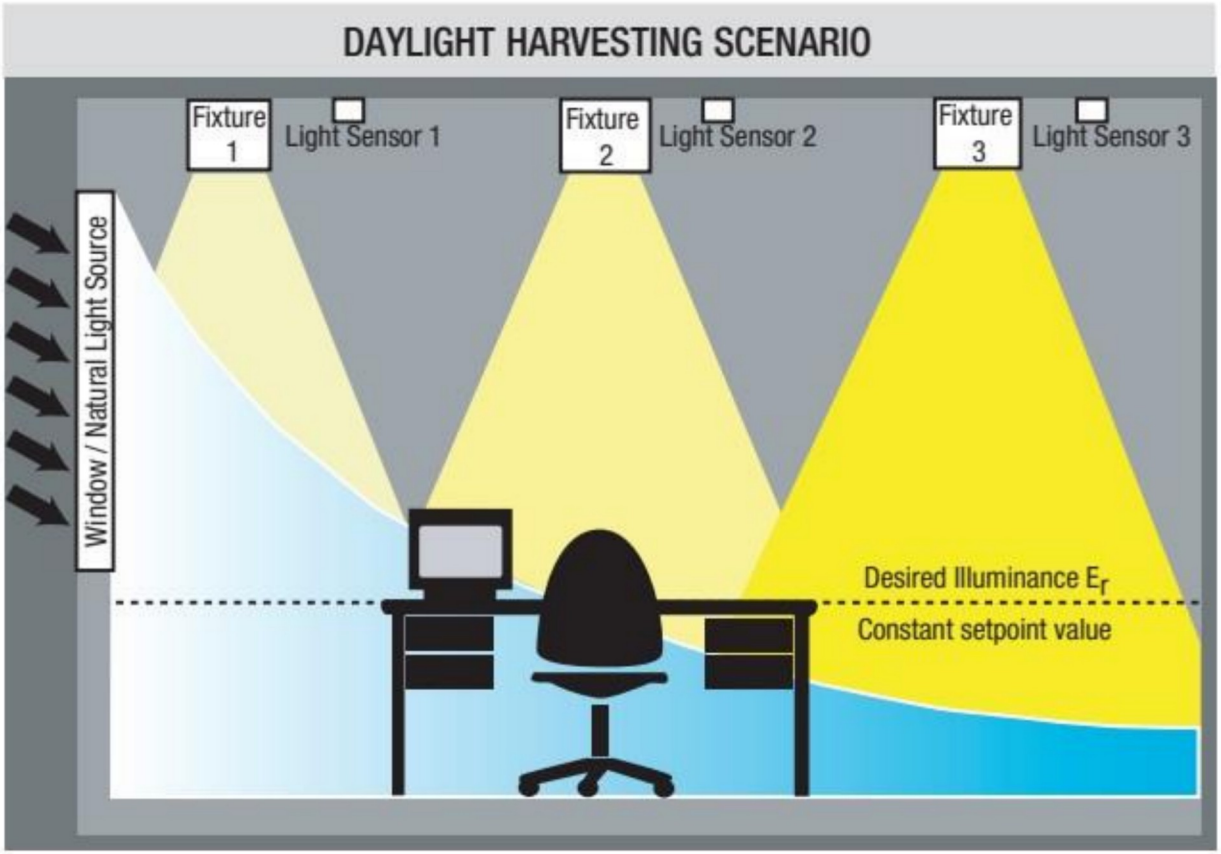
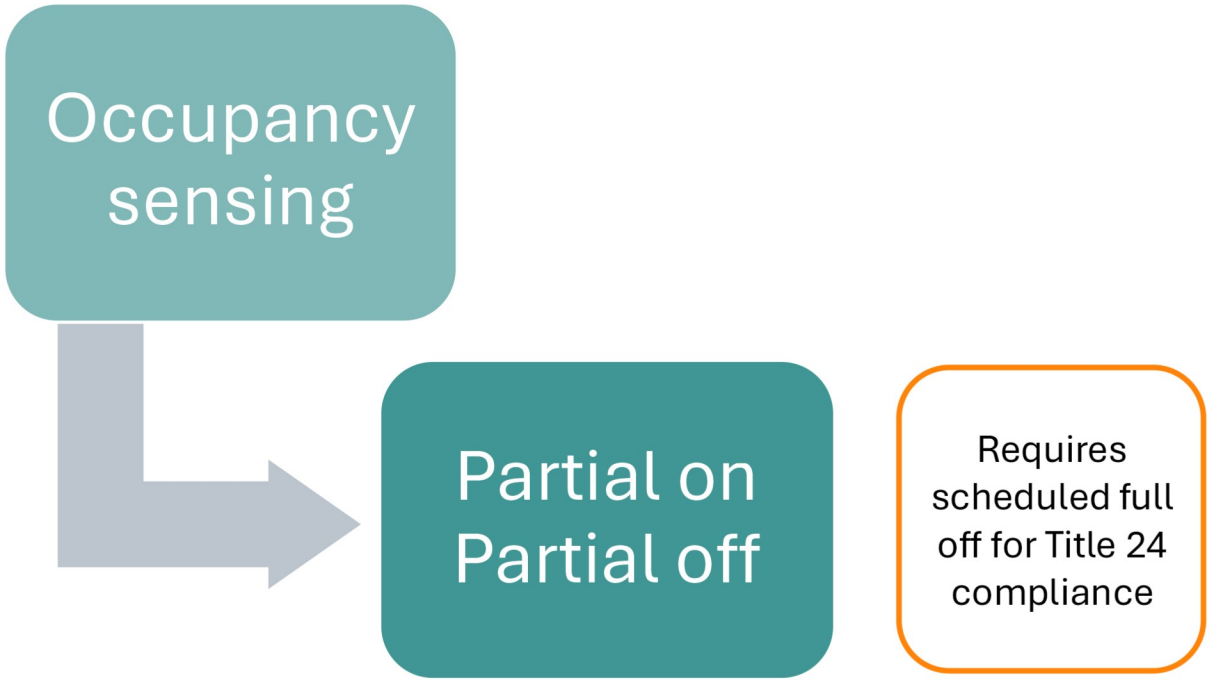


Image courtesy of Acuity Brands

Demand Response

- Load thresholds
- 15% reduction
- Open Automated Demand Response (ADR) protocol

Office Controls



Exterior / Parking

- Astronomical clock
- Motion dimming
- Daylight harvesting

Acceptance Testing

- [x] Astronomical clock
- [x] Motion dimming
- [x] Daylight harvesting

What is NLC?

- …**N**etworked **L**ighting **C**ontrols
- Digital controls
- Analytics

NLC Architecture

- Controllers
- Sensors / Keypads
- Gateway
- Cloud

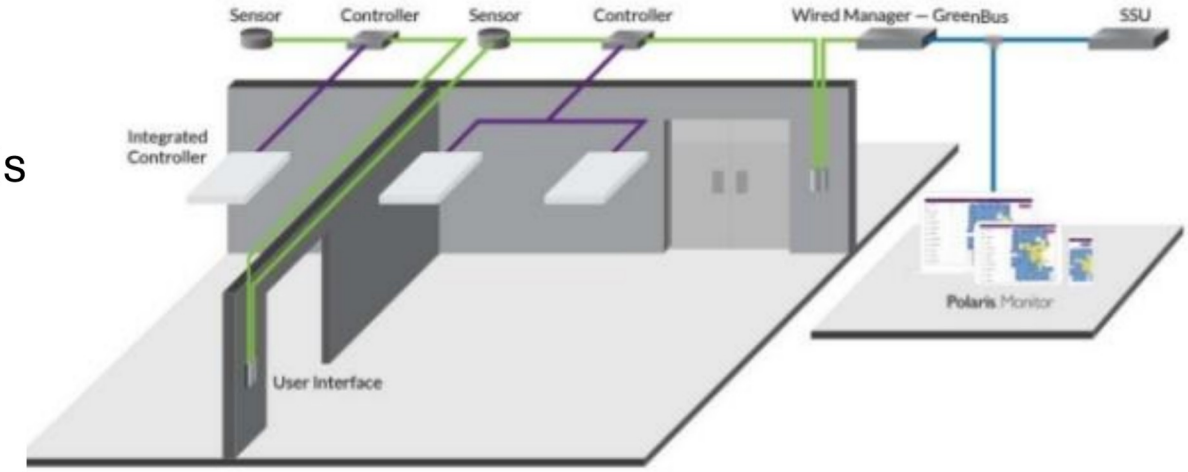


Image courtesy of Legrand Wattstopper Plus Wired

Advantages of NLC

- Granular zoning
- Software changes
- Analytics
- User interface
- Third-party integration

What is LLLC?

- …**L**uminaire **L**evel **L**ighting **C**ontrols
- Embedded sensors
- Wireless controls
- Usually installed at fixture level

LLLC Fixture Intelligence

- Bluetooth (BLE) mesh
- Zigbee mesh
- Wi-Fi
- Full AI

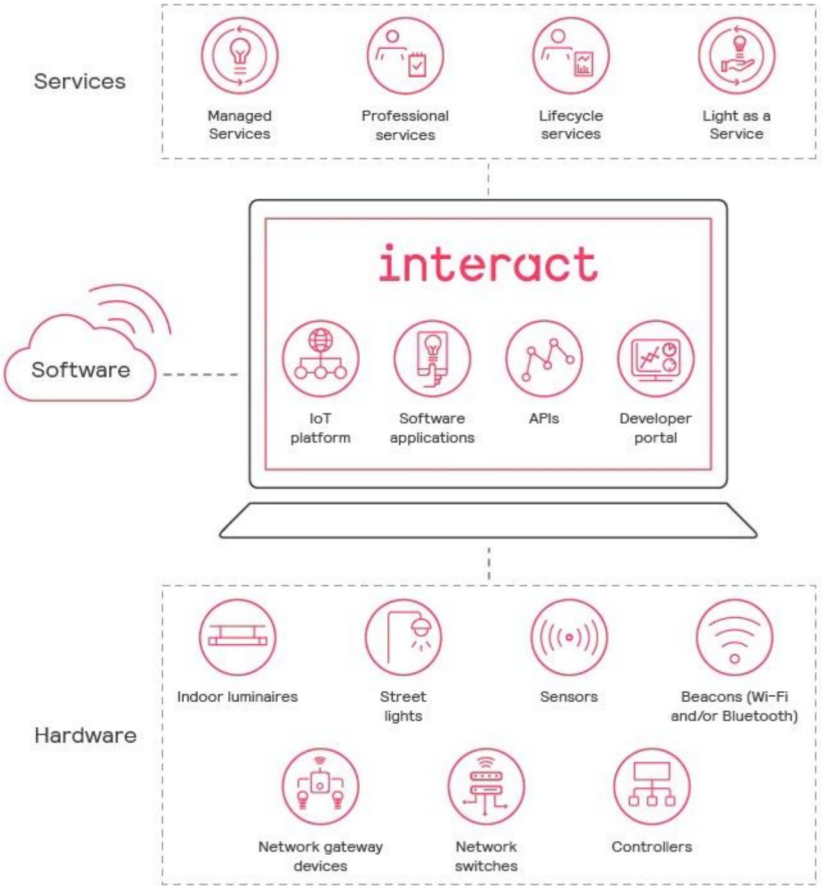


Image courtesy of Legrand Wattstopper Plus Wired

Advantages of LLLC

- Fixture-integrated logic
- Retrofit friendly
- Flexible
- More granular zoning (down to the fixture)
- More granular data capture

CASE STUDIES

Room-based vs NLC vs LLLC

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Case Study 1 --- OFFICE

LLLC troffers

50% savings on lighting costs

Smaller zones in open-office areas

Janitorial staff efficiency

Case Study 2 --- WAREHOUSE

NLCs

High-bays

Incentives

Relay panels

Best Practices

- [x] Start early – Design Development phase
- [x] Coordination
- [x] LCA's Design Express tools

LCA's Design Express Tool

https://lightingcontrolsacademy.org/design-express/

OFFICE SOO, IECC 2024

SEQUENCE OF OPERATIONS

REFERENCE SPECIFICATION SECTION/S: [SECTION #]

REFERENCE DRAWING/S: [DRAWING #]

PROJECT OPERATING SCHEDULE: OPEN = [TIME]; CLOSE = [TIME]

	PROJECT PARAMETERS			OCCUPANT SENSOR (SUPERSEDES TIME-SWITCH AND DAYLIGHT)								TIME-SWITCH (SUPERSEDES DAYLIGHT ONLY)					
	CONNECTIVITY		LOAD TYPE(S)	TYPE	TURN ON		REDUCE / TURN OFF			NARRATIVE		TURN ON		REDUCE / TURN OFF		NARRATIVE	
	STANDALONE / NETWORKED	WIRED / WIRELESS	CONTINUOUS DIMMING / NON-DIM	DUAL-TECH / PIR / ULTRASONIC	AUTO / MANUAL	LEVEL	TIMEOUT (ADJ)	AUTO / MANUAL	LEVEL	TURN ON	REDUCE / TURN OFF	TIME (ADJ)	LEVEL	TIME (ADJ)	MANUAL OVERRIDE TIMEOUT (ADJ)	TURN ON	REDUCE / TURN OFF
SPACE TYPE																	
Open Plan Office (≤600 sq ft zones)			continuous dimming		auto	100%	20 min	auto	0%	Upon occupancy within a control zone, lighting in that zone will automatically turn On to Level. In other unoccupied zones, lighting will remain at the Reduce/Turn Off Level.	Upon all occupants leaving a control zone, after Timeout, lighting in that zone will automatically go to Reduce/Turn Off.						
Stairwell										Lighting will remain On at 100% in interior exit stairways							
Gymnasium / Fitness Center			continuous dimming		auto	100%											

LCA's Design Express Tool

https://lightingcontrolsacademy.org/design-express/

- Provides documentation templates
- Assists with meeting documentation and acceptance-testing requirements
- Enhances clarity between design, commissioning, and owner hand-off

Key Takeaways

- Title 24 requires controls
- Both NLCs and LLLCs qualify for utility rebates
  - ➢ Work with rebate programs when specifying
- Both NLCs and LLLCs provide a user interface for system control
- Specify early in the Design Development phase of construction
- Ensure sequence of operations is present in spec and contract drawings
- Use tools, such as LCA's Design Express, to guide the design process
  - ➢ Make these templates your own!
  - ➢ https://lightingcontrolsacademy.org/design-express/

Questions?

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Thank you for your time!

Please visit my website

(www.wilcoservices.net)

Add me to your contacts

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