

Latest on Lighting: Luminaire Level Lighting Controls

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Agenda

- Introduction
- Luminaire Level Lighting Controls:
What Are They and How Are They Different?
- The Benefits
- Available Products
- Discussion/Questions

My Background

- Sr. Product Manager, Commercial Lighting – NEEA
- Energy Efficiency Engineer contracted to BPA
- Certified Energy Manager (CEM) & Certified Demand-Side Management (CDSM)
- Energy Management Specialist III - Eugene Water & Electric Board
- Residential/Commercial Account Manager - NW Natural

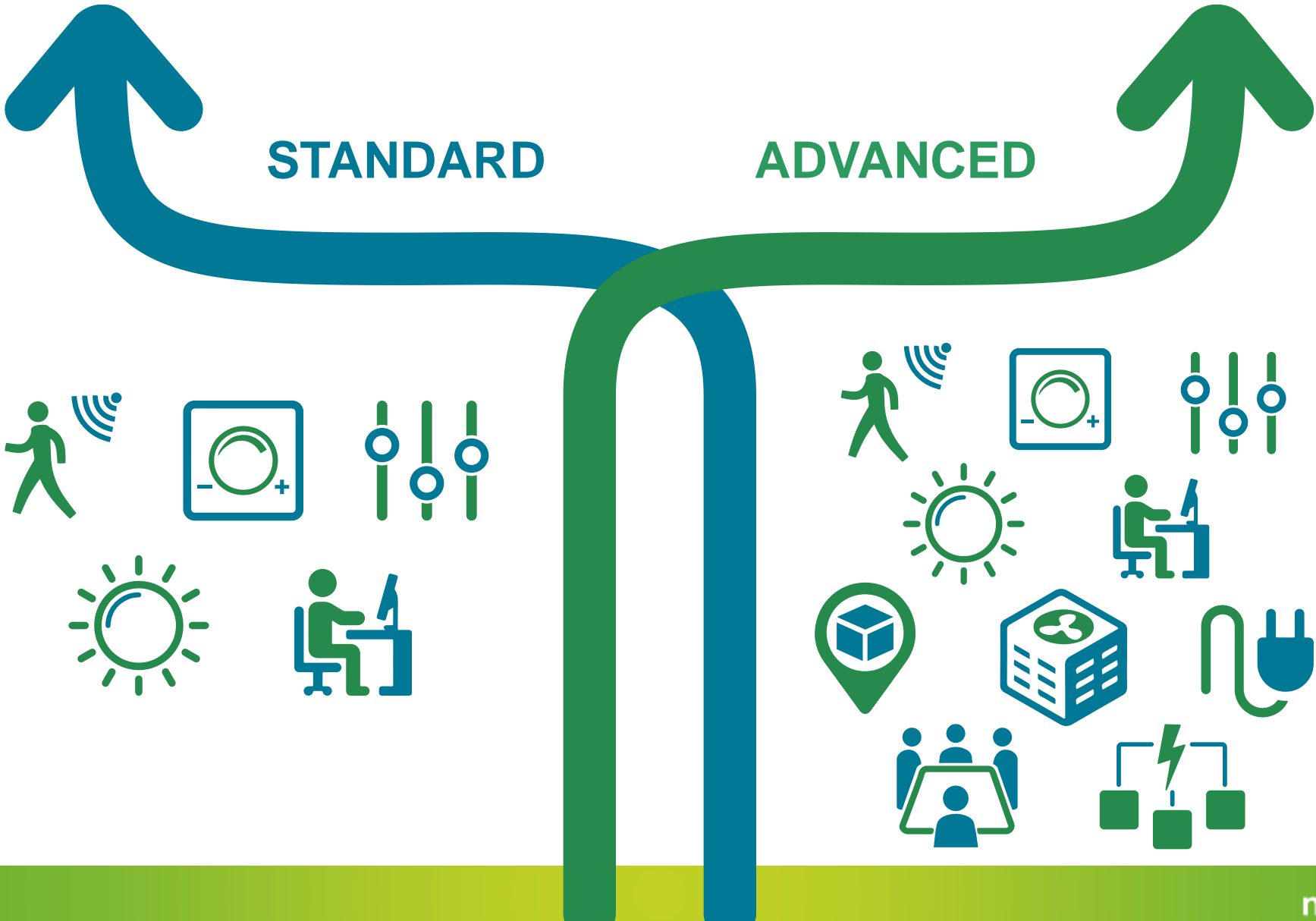
***Luminaire Level Lighting Controls:
What Are They and
How Are They Different?***

The Next Generation of Lighting Controls Are Here

- An LED lighting system consisting of one or more luminaires
- With integrated occupancy and daylight sensors in each luminaire and embedded lighting control logic and wireless networking capabilities



Two Pathways



Standard LLLCs

Required in all LLLC systems:

- ✓ Occupancy sensing
- ✓ Daylight harvesting
- ✓ Continuous dimming
- ✓ High-end trim/
Task Tuning
- ✓ Controls persistence



Advanced LLLCs

More advanced systems allow for:

- ✓ Asset tracking
- ✓ Optimized space usage
- ✓ Building integration (HVAC, CO2, security)
- ✓ Demand response
- ✓ Plug load



The Benefits

The Benefits

- The 3-30-300 Rule™
- Non-Energy Benefits
- Energy Savings
- Occupant Comfort & Productivity
- Simplified Installation
- Ease in Programming
- Maximized Flexibility



The 3 • 30 • 300 Rule™

\$3

Energy, water, waste and **use of resources** including lighting, heating and cooling, plug loads and server rooms, green purchasing, use of paper, recycling programs, commuting, green tenant programs.

\$30

Space use efficiency and **layout** that reflect workflows and offer an optimum environment for individual tasks, employee interaction, team building, operations and customer service.

\$300

Employee Wellness and **Productivity** including acoustic and visual comfort, thermal and indoor air quality, amenities and measures that help improve employees' health, comfort and work-life balance.

Non-Energy Benefits



Color tuning possibilities



Space utilization

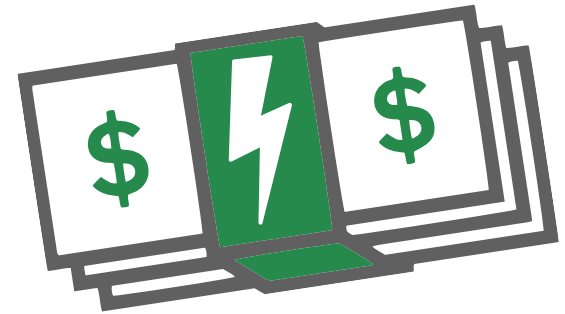


Asset tracking

- Operation & maintenance time/cost savings
- Safety/emergency capabilities
- Easier spatial reconfiguration

Energy Savings

- Estimates show 25 to 75% savings compared to non-controlled fixtures
 - Depending on space type and control strategies used
 - Office buildings seeing 50% savings, warehouses seeing 75% savings



Regional Technical Forum Non-Res Lighting Protocols V.4 (2019)

Table 8: Control Savings Fraction (CSF) Ex-Ante Assumptions

Calculator Space Use Type	Manual switch (On/Off)	Bi-level switch/personal tuning	Daylight control - On/Off	Daylight control - Multi-step and Continuous	Occupancy sensor	Occupancy sensor with daylighting control	Luminaire Level Lighting Control
Assembly	0%	15%	10%	30%	25%	33%	33%
Break Room	0%	15%	10%	30%	25%	40%	50%
Classroom	0%	10%	10%	30%	15%	25%	25%
Computer Room	0%	15%	10%	30%	25%	40%	50%
Conference	0%	15%	10%	30%	25%	40%	50%
Dining	0%	15%	10%	30%	15%	40%	50%
Gymnasium	0%	15%	10%	30%	25%	40%	50%
Hallway	0%	15%	10%	30%	60%	64%	64%
Hospital Room	0%	15%	10%	30%	25%	40%	50%
Industrial	0%	15%	10%	30%	25%	40%	50%
Kitchen	0%	15%	10%	30%	25%	40%	50%
Library	0%	15%	10%	30%	25%	40%	50%
Lobby	0%	15%	10%	30%	25%	40%	50%
Lodging (Guest Rooms)	0%	15%	10%	30%	25%	40%	50%
Open Office	0%	15%	10%	30%	15%	40%	50%
Parking Garage	0%	15%	10%	30%	25%	40%	50%
Private Office	0%	20%	10%	30%	15%	40%	50%
Process	0%	15%	10%	30%	25%	40%	50%
Public Assembly	0%	15%	10%	30%	25%	40%	50%
Restroom	0%	15%	10%	30%	50%	55%	55%
Retail	0%	15%	10%	30%	25%	40%	50%
Stairs	0%	15%	10%	30%	64%	68%	68%
Storage	0%	15%	10%	30%	50%	55%	55%
Technical Area	0%	15%	10%	30%	25%	33%	33%
Warehouse Aisle	0%	15%	10%	30%	50%	60%	75%
Other	0%	15%	10%	30%	25%	40%	50%



Occupant Comfort and Productivity

- Adjust lighting and color temperatures for occupant comfort
- Optimize productivity through task tuning
- Can provide demand driven heating and cooling



Simplified Installation

- Pre-programmed for straightforward setup out of the box
- Same basic install process as non-controlled fixtures
- Less wiring
 - No additional 0-10v wiring
 - No extra sensors to install



Ease in Programming

- Control strategies pre-set at factory
- Wireless features and programming tools (apps or remote controls) ease start-up and programming



Maximized Flexibility

- Granularity of control down to individual fixture
- Future-proofing: adaptable space usage
- Tap into Internet of Things (IoT)



Available Products

DLC Qualified Products List

- ✓ Acuity Controls nLight and nLight Air[®]
- ✓ Enlighted IoT System
- ✓ Acuity Controls Xpoint[™] Wireless
- ✓ LG Sensor Connect
- ✓ Cree SmartCast[™] Technology
- ✓ Lutron Vive Wireless Solutions
- ✓ Digital Lumens SiteWorx Tune[®]
- ✓ Philips SpaceWise
- ✓ Eaton WaveLinx Wireless Connected Lighting
- ✓ Philips EasySense Advanced Grouping SNS200
- ✓ Eaton LumaWatt Pro
- ✓ RAB Lighting Lightcloud

Types of Fixtures



Retrofit Kits

Tool-less installation without entering the ceiling make retrofitting simple



LLLCs and Office Buildings



Increase employee **satisfaction** rates and productivity by optimizing lighting for individual tenant needs.

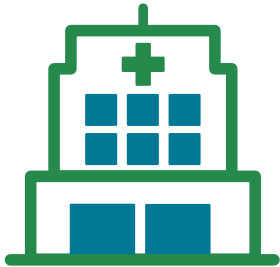


Tenant changeover is **cost effective and easy** with the ability to regroup lighting and adjust settings at the touch of a button – eliminating the need to rewire when new occupants move in.



Increase **safety, security and efficiency** by discovering your building's most and least utilized spaces and enabling real-time tracking of building assets with many LLLC systems.

LLCs and Hospitals



Create a more **healing environment** with higher-quality lighting that adapts to patient needs



Reduce unnecessary **purchases and wasted labor** by enabling smarter asset tracking for medical equipment, available in many LLC systems



Increase patient **satisfaction rates** and staff happiness and productivity by optimizing light temperature and intensity

LLCs and Schools



Enhance learning conditions with lighting that improves visibility and adapts to student needs



Easily **create the ideal lighting environment** at any time of day, with energizing cool light in the morning and calming warm light later



Increase safety, security and efficiency by enabling real-time tracking of building assets with many LLC systems

Discussion/Questions

Thank you!

BetterBricks.com/LLLC

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