



ENERGY FUTURES GROUP

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NLC/LLLC Program Spotlights

ILLINOIS SAG NLC SUBCOMMITTEE

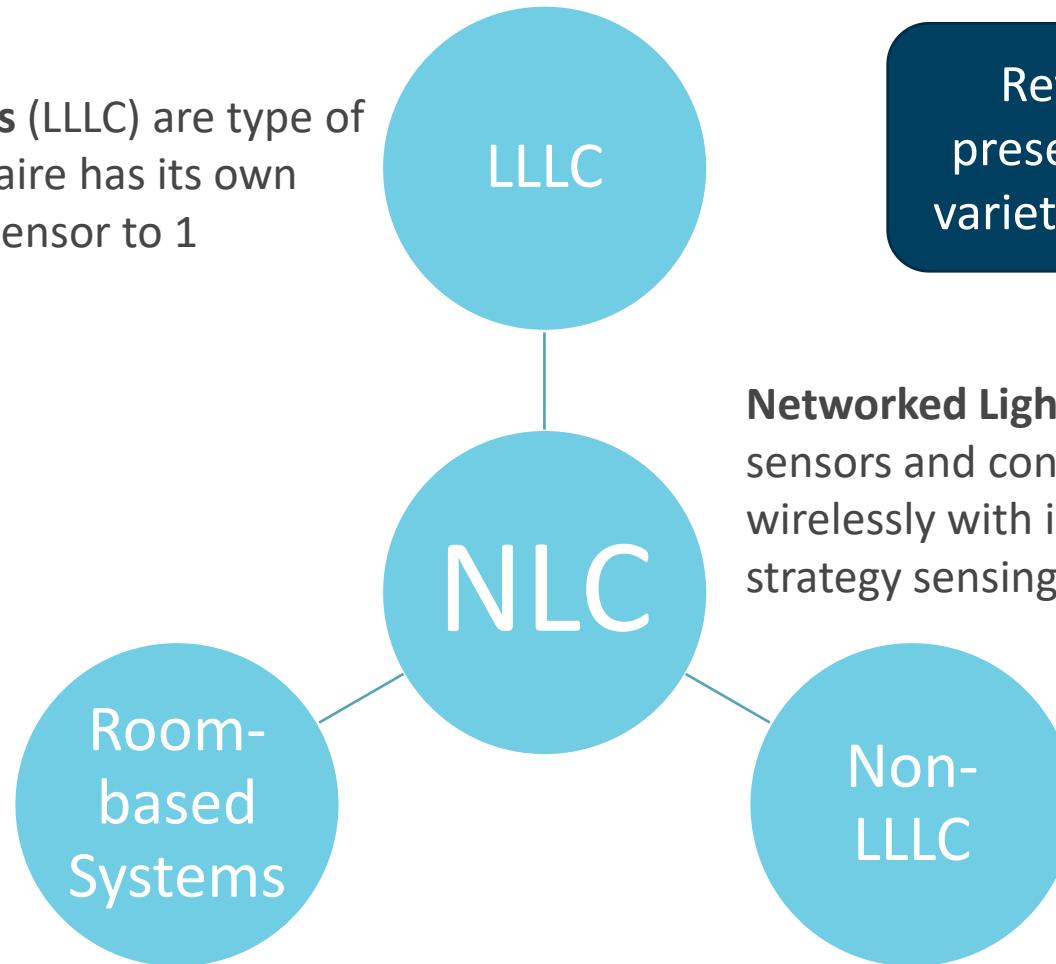
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NLC Taxonomy

Luminaire-Level Lighting Controls (LLLC) are type of NLC system in which every luminaire has its own built-in sensor and controller (1 sensor to 1 luminaire).

Pre-packaged sensors and controllers, intended for lighting control in small spaces, designed for simplicity and code compliance. *Networking may be localized.*



References to “NLC” in this presentation will encompass all varieties, unless otherwise noted

Networked Lighting Controls (NLC) are luminaires, sensors and control hardware networked wired or wirelessly with individual addressability and multi-strategy sensing

A type of NLC system in which sensors and controllers are installed remotely from luminaires (1 sensor to many luminaires).

NLC Program Design Observations

Lighting controls are not a one-size-fits-all proposition

- Important to match the technology, capabilities, and cost to the customer's need

Complexity kills

- Program complexity is a participation barrier
- Technology complexity is a project barrier

Incentives alone will not drive volume

- Contractors and customers need to be convinced of the benefits

Energy savings are not a sufficient motivator

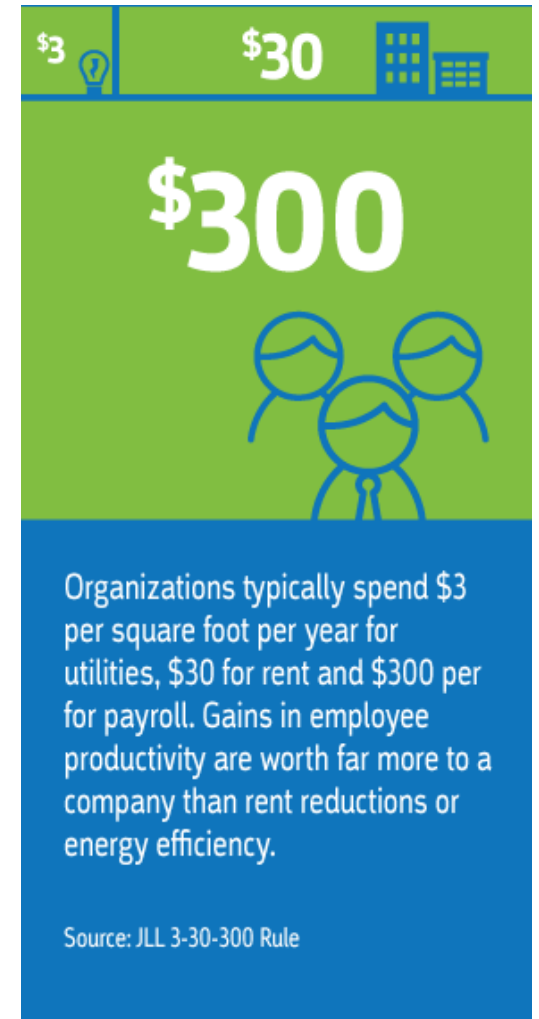
- Most customers see little value in controls once an LED conversion occurs
- Simple payback based on energy savings is often underwhelming

NLC Program Design Recommendations



Reframing the Opportunity and Benefits

- Adoption of lighting controls as an energy-savings tool has not been successful
 - High cost with low perceived value
 - Poor performance of legacy controls
 - Complexity
- Energy alone isn't a sufficient driver
 - Increased LED efficacy creates diminishing returns
 - 3/30/300 Rule
- Promotion of networked lighting can achieve energy savings potential by focusing on non-energy benefits
 - Increase value proposition
 - Create “bottom-up” demand at the customer level
 - Emphasize benefits in the \$30 and \$300 per square foot categories



Value Propositions Related to COVID

Employee Well Being

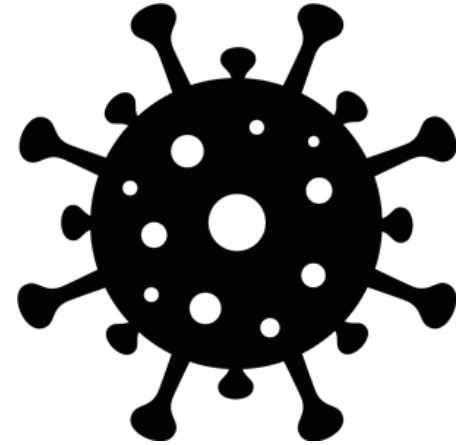
- Create a space in which people are comfortable and want to work in
- Optimize ventilation rates based on occupancy number of people
- Improve occupant satisfaction
- Increase employee retention

Space Utilization

- Facilitate flexible workspaces for hybrid office/remote employees
- Enable space customization and schedule changes
- Minimize space footprint through optimized use

Commercial Real Estate

- Add attractive benefits for space leasing



NLC Program Spotlights



Consumers Energy

Network Lighting Controls

Illuminate your energy savings



Harness the power of lighting and never waste a watt with a Network Lighting Controls (NLC) system. Already installed LEDs in your facility? Great! Take the next step in reducing your energy use by investing in networked lighting.

Highlights	Aims to transform the market from a “widget/gadget” approach to a systems approach of lighting improvements, with deeper energy savings, by taking a holistic approach to lighting retrofits
Program Type	Hybrid – prescriptive incentive levels, custom savings calculation
Technologies	NLC, LLLC, or room-based systems that meet the required capabilities.

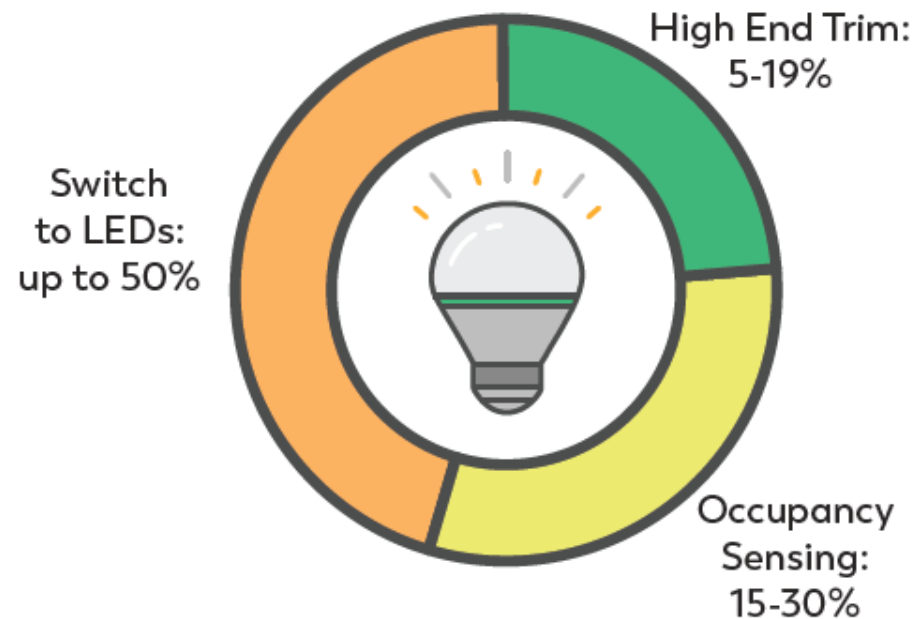
Consumers Energy

Qualifications	<ul style="list-style-type: none"> • Payback greater than 1 year and less than 8 years • At least three energy saving strategies • DLC qualification not required for the NLC system (required for luminaires)
Incentives	<p>Type 1: \$0.25/kWh for Commercial, Offices, Schools and Hospitals</p> <p>Type 2: \$0.18/kWh for Manufacturing, Industrial, Parking Structures and Warehousing</p> <p>Capped at lesser of 50% of project cost or \$1.5M</p>
Energy Monitoring	Required for facilities over 100,000 square feet
Training	<p>Level I and Level II in the past with instructor Steve Mesh</p> <p>Since 2017, CE has trained over 150 trade allies</p>
Results	<p>2021 results: 69 projects completed, 28,500 MWh, \$5.2M incentives</p> <p>Portfolio impact: 5.5% of total C&I savings, 33% of Business Solutions lighting savings</p>
More Info	<p>https://www.consumersenergy.com/business/energy-efficiency/special-programs/advanced-lighting-controls-program</p>

Consumers Energy – Marketing Example

Lighting Saving Opportunity

NLC retrofit example



Total Potential Energy Savings: 70-99%

Based on a study by DNV GL

Other benefits for building owners:

- Exceeds regulatory and code compliance.
- Improves worker productivity, comfort and safety.
- Increases employee morale.
- Incorporates best practice lighting design for visual appeal and acuity.
- Reduces maintenance.

Energize Connecticut



Highlights	Good/better/best Performance Lighting complemented by midstream and prescriptive offerings to flexibly serve customers of all types and sizes.
Program Type	Performance lighting, midstream prescriptive
Technologies	NLC, LLLC, room-based controls

Energize Connecticut

Qualifications	<ul style="list-style-type: none"> • Open to all business customers • NLC/LLLC systems must be DLC qualified
Incentives	<p>Prescriptive and midstream: \$40-90 adder for LLLC/NLC</p> <p>Enhanced and High Performance Lighting: \$0.55 to \$0.75 per kWh; see next slide</p>
Energy Monitoring	Required for High Performance tier
Training	Multiple training resources offered include on-demand DLC training and live in-person events
Results	<p>United Illuminating: 49% of retrofit lighting savings came from controls (46% from enhanced/performance tier, 3% from midstream).</p> <p>Eversource: 56% of retrofit lighting savings came from controls (8% from enhanced/performance tier, 48% from midstream).</p>
More Info	https://energizect.com/your-business/solutions-list/Express-Service-Lighting-Rebate

Energize Connecticut – Performance Lighting Incentives

	GREATER OF		PLUS	Not to exceed
	per kWh	per kW	per CCF	PROJECT CAP
HIGH PERFORMANCE LIGHTING				
LED Fixtures with Networked Lighting Controls System	\$0.75	\$1000/ summer peak	NA	75% of Installed Cost
ENHANCED PERFORMANCE LIGHTING				
LED Lighting with Luminaire Level Lighting Controls or Wirelessly Accessible Controls	\$0.55	\$1000/ summer peak	NA	60% of Installed Cost
STANDARD LIGHTING				
Must use Expedited Lighting Application	\$0.40	\$1000/ summer peak	NA	45% of Installed Cost

Energize Connecticut – Commissioning Requirement

Table 2-1. Lighting control measure savings factors (SF)

Sector & Application	Measure	Description	2022 PSD	
			SF	Proposed SF
Commercial Interior Lighting Controls	Networked Lighting Controls (NLC)	An intelligent network of individually addressable luminaires and control devices for remote access by the user. NLC have fixture networking capabilities, individual addressability, occupancy sensing, daylight harvesting, high-end trim, flexible zoning, continuous dimming, scheduling, and cybersecurity.	49%	49%
	Luminaire-Level Lighting Controls (LLLC) – Networked & Cx	Network-capable fixtures which integrates high-end trim, occupancy and daylight sensors into the LED fixture Networked and commissioned.	49%	49%
	Integrated fixture with Room-Based controls	LLLC that is not networked	N/A	38% ⁴

CT Evaluation “CT X1931-4 ALC PSD Phase 2 Memo: Recommendations for ALC Measure Parameters” June 6, 2022

<https://energizect.com/sites/default/files/2022-07/CT%20X1931-4%20ALC%20PSD%20Phase%202%20Memo%20Final060822.pdf>

Rhode Island Energy

Light your way to energy savings.



Highlights	Comprehensive program offerings designed to maximum participation and enable customers of all types and sizes to access solutions that match their needs.
Program Type	Performance lighting (NC and retrofit), midstream, prescriptive, and small business DI
Technologies	NLC, LLLC, room-based controls

Rhode Island Energy

Qualifications	<ul style="list-style-type: none"> • Midstream and prescriptive: all business customers • Performance lighting: all business customers; code calculations required • NLC/LLC systems must be DLC qualified
Incentives	<p>Midstream: see next slide</p> <p>PL tier 1: wireless LLC or room-based controls, at least 2 control strategies</p> <ul style="list-style-type: none"> • \$0.55 per gross kWh saved greater than 40% below code <p>PL tier 2: NLC/LLC, at least 3 control strategies, energy monitoring, commissioning</p> <ul style="list-style-type: none"> • \$0.85 per gross kWh saved greater than 40% below code
Energy Monitoring	Required for Performance Lighting tier 2
Training	On-demand modules offered through DLC, live webinars, multiple in-person trainings
Results	<p>Midstream: 15% of product volume incorporated controls in 2021</p> <p>Performance lighting: 23 projects in 2021, 16% of all custom interior lighting savings</p>
More Info	<p>https://www.rienergy.com/media/pdfs/bus-ways-to-save/ee8119-ri-commercial-lighting-incentive.pdf</p> <p>https://www.rienergy.com/media/ri-energy/pdfs/energy-efficiency/rie8102_pay-for-performance_ri_retrofit_form.pdf</p>

Rhode Island Energy – Midstream Incentives

Rhode Island Commercial and Industrial Lighting Instant Incentives

Effective January 1, 2022



Rhode Island Energy™

a PPL company

	Product Category	Lamp & Fixture Type	Incentive	Incentive w/ Occ Sensor	Incentive w/ Dual Sensor	Incentive w/ LLLC/ NLC†	Minimum Contribution	QPL
Pre-approval Quantities 50+	LED Troffer & Troffer Retrofit Kits	1x4, 2x2, 2x4 LED Troffer – Standard/Premium	\$25.00	\$70.00	\$75.00	\$85.00	\$15.00	DLC
		1x4, 2x2, 2x4 LED Troffer Retrofit Kit – Standard/Premium	\$20.00	\$65.00	\$70.00	\$80.00	\$15.00	
	High/Low Bay	High/Low Bay: Mid Output (5,000–10,000 lumens)	\$80.00	\$125.00	\$130.00	\$140.00	\$20.00	DLC
		High/Low Bay: High Output (> 10,000–30,000 lumens)	\$105.00	\$175.00	\$180.00	\$190.00	\$30.00	
		High/Low Bay: Very High Output (> 30,000 lumens)	\$140.00	\$225.00	\$230.00	\$240.00	\$40.00	
	Stairwell Fixture	Stairwell Kit, Low Output w/sensor	\$50.00	N/A	N/A	N/A	\$15.00	DLC
		Stairwell Kit, Mid Output w/sensor	\$75.00	N/A	N/A	N/A	\$15.00	

Additional Resources

- **Lighting Controls Associated (LCA) Education Express**
 - Free on-line training modules with comprehensive topic list
 - <http://aboutlightingcontrols.org/EducationExpress/>
- **NXT Level Lighting**
 - Lighting training and certification program for trade allies
 - <https://nxtleveltraining.com/>
- **DLC NLC Program Summaries**
 - <https://www.designlights.org/resources/reports/dlc-member-incentive-program-summaries-networked-lighting-controls/>



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