



# Lighting, HVAC, and Building Controls

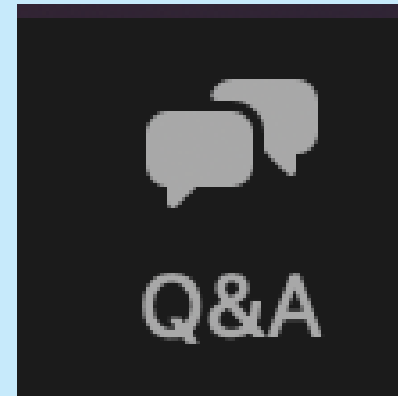
PROUD SPONSORS OF





**We look forward to  
hearing from you**

Please put all your questions into  
the questions section with this icon.



# Empowering Connecticut to Make Smart Energy Choices



Eversource, Avangrid, Inc. subsidiaries CNG, SCG and UI, the Energy Efficiency Board, Connecticut Green Bank, and the State have united on a shared mission - to provide Connecticut residents and businesses the resources they need to **save money and use clean energy**.

The Energize Connecticut initiative empowers our communities to make smart energy choices, now and in the future.



# Agenda

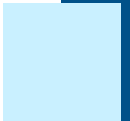
RETROFIT LIGHTING TIERS OVERVIEW

AMPLIFY PRE-QUALIFICATION TOOL

IN-DEPTH ON THREE LIGHTING TIERS

HVAC OVERVIEW

HVAC & LIGHTING CONTROLS



# Retrofit Lighting Tiers

	Tier	Requirements (see Incentive Cap Sheet full details)	Incentive Greater of	Incentive Not to Exceed
Best <sup>1</sup>	High Performance (Tier 3)	Networked Lighting Controls <sup>2</sup>	\$0.65 / kWh/year OR \$1,000/ summer kW	65% of Installed Cost
Better <sup>1</sup>	Enhanced (Tier 2)	LED <sup>3</sup> with Wirelessly Accessible Digital Controls	\$0.45 / kWh/year OR \$1,000/ summer kW	45% of Installed Cost
Good <sup>1</sup>	Standard (Tier 1)	LED <sup>3</sup>	\$0.20 / kWh/year OR \$1,000/ summer kW  <i>Additional \$0.05/kWh for EMS integration</i>	20% of Installed Cost

- 1) Exterior lighting fixtures will only receive the prescriptive rate per fixture.
- 2) System must be on DesignLights Consortium<sup>SM</sup> Networked Lighting Controls qualified products list (QPL)
- 3) Product must be on DesignLights Consortium Solid State Lighting qualified products list (QPL) if covered

# EMS Integration

## Energy Opportunities (Retrofit)

	Tier	Requirements (see Incentive Cap Sheet full details)	Incentive Greater of	Incentive Not to Exceed
Good	Standard w/ EMS (Tier 1)	LED* with EMS Integration	$(\$0.20 + \$0.05) / \text{kWh/yr}$ OR \$1,000/ summer kW	20% of Installed Cost
Good	Standard (Tier 1)	LED	$\$0.20 / \text{kWh/yr}$ OR \$1,000/ summer kW	20% of Installed Cost

\*Lighting that is connected to and controlled by an EMS using at least one strategy.  
EMS time of day control is acceptable.

# Amplify Pre-Qualification Tool for Lighting

## Eversource Only

### Traditional Approach

- Use Data Collection spreadsheet
- Attach DLC screen shots
- Attach product spec sheets

### Amplify Online Portal

- Use pre-qualification tool (Amplify) is highly recommended

#### **Benefits:**

- Pulls from DLC Qualified Products List (QPL)
- No DLC screenshots or specs needed
- Reduces error
- Faster turnaround

[https://www.amplifyincentives.com/eversource\\_ct/](https://www.amplifyincentives.com/eversource_ct/)

# Amplify Pre-Qualification Tool for Lighting

## Measures

Estimate: Berlin Office

Space Name: Oscars Office

Configured Spaces [Add](#)  
[Copy](#) Sort: [A-Z](#) or [As Entered](#)

- Office 1
- Office 2
- Allens Office
- Lobby
- Shipping
- Oscars Office

- Office 1
- Office 2
- Allens Office
- Lobby
- Shipping
- Oscars Office

[Add New]

Existing

Qty

...

...

Q i

Proposed

Qty

...

...

Trim Pct

Q i

Save

Cancel

Occupancy Sensor

Quantity

3

Vacancy Sensor

☐

Dimming Level (%)

20

# Summary of Lighting Changes

1

New Incentive for Standard Lighting connected to an EMS

2

Exterior lighting will mirror the Express Rebate structure

3

Added "Percent of Fixtures in Daylight Area" column

4

LED to LED requirements - add photos

5

High Performance Lighting - Two weeks of Energy Monitoring Data

# Interior Lighting

- Added additional lighting group type and removed exterior lighting
  - Standard Interior with EMS – fixtures are going to be connected to the EMS/BMS system.
    - Additional \$.05/kwh
    - The exterior will now be entered in a new tab

Lighting Group Type - Select From Picklist (Hold Mouse on Cell H4 To View Descriptions)		Unit Quantity After
Standard Interior		
Standard Interior		
Standard Interior w/ EMS		
Enhanced Perf. Interior		
High Performance Interior		

# Interior Lighting

- Removed “dimmable fixture” and “occupancy dim levels” column
- Added “Percent of Fixtures in Daylight Area” column

2024 Spreadsheet

Percent with Dimming Capability:			Quantity of Control Strategies:					0	Total Eligible
			Percent of Project with Controls:					0%	
DLC Product ID	Watts/ Unit After	Dimmable Fixture or Lamp? (Y or N)	"NEW" Occupancy Sensor Controlled?	Occupancy Sensor Dim Level (%) (If Applicable)	Daylight Controls Used? (If Applicable)	High End Trim % (Enter as decimal if applicable)	Installed Cost/ Fixture		

2025 Spreadsheet

			Quantity of Control Strategies:				0	
			Percent of Project with Controls:				0%	Total Eligible
	DLC Product ID	Watts/ Unit After	"NEW" Occupancy Sensor Controlled?	Percent of fixtures in Daylight Area (enter as decimal if applicable)	Daylight Controls Used? (If Applicable)	High End Trim % (Enter as decimal if applicable)	Installed Cost/ Fixture	

# LED to LED Requirements

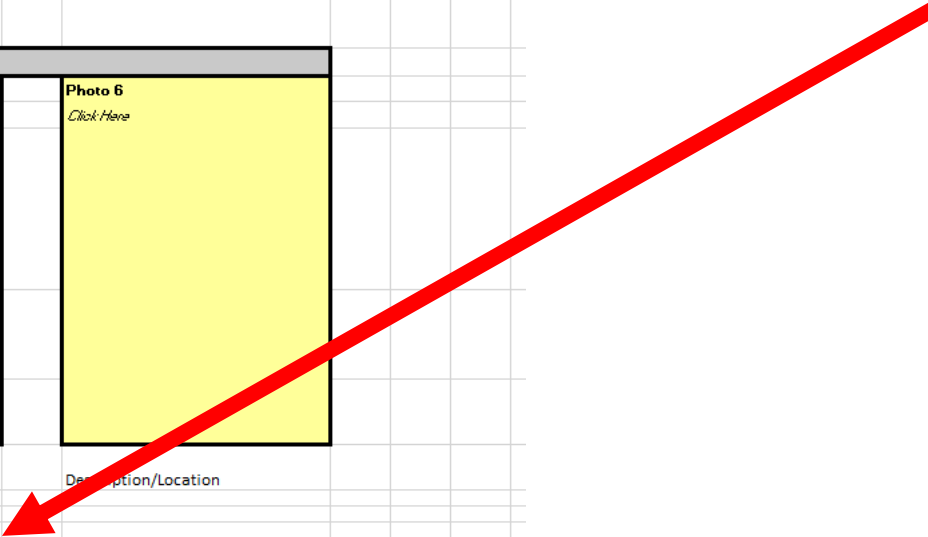
- For existing LEDs, the contractor will need to submit the following items:
  - Full fixture make and model number
  - Pictures of the existing LED sticker with complete model number showing
  - Spec sheets
- Data collection will now have a new tab for contractors to submit pictures
- If information cannot be provided, the fixtures will be marked as non-eligible



# LED to LED Requirements

Pre-Installation / Existing Wall Photos										Existing LED Pictures																													
<p><b>Instructions to add photos:</b></p> <ol style="list-style-type: none"><li>1. Select a Yellow box to the right.</li><li>2. Click on the "Insert" menu at the top of the -----&gt; left of the menu in the Excel workbook ribbon.</li><li>3. Under the "Text" group click on "Object." -----&gt;</li><li>4. Select "Create From File" tab.</li><li>5. Select "Browse" button to find photo file location &amp; select photo.</li><li>6. Check the box to "Display as icon" -----&gt;</li><li>7. Click on "OK" so photo icon shows on spreadsheet.</li><li>8. Enter description for photo (location/identifier) below icon.</li><li>9. To view the picture, double click the icon</li></ol>										<p><b>Photo 1</b> <i>Click Here</i></p>										<p><b>Photo 2</b> <i>Click Here</i></p>										<p><b>Photo 3</b> <i>Click Here</i></p>									
										<p>Description/Location</p>										<p>Description/Location</p>										<p>Description/Location</p>									
										<p><b>Photo 4</b> <i>Click Here</i></p>										<p><b>Photo 5</b> <i>Click Here</i></p>										<p><b>Photo 6</b> <i>Click Here</i></p>									
										<p>Description/Location</p>										<p>Description/Location</p>										<p>Description/Location</p>									

General Instructions | New-Fixture Instructions | High Perf. Instructions | Project Data | InteriorFixtureData | ExteriorFixtureData | **Existing LED pictures** | Existing Wattage Table | W9



# Exterior Lighting

## Will now follow rebate methodology for incentive

- Incentive will now be “per fixture”
- Incentive cannot exceed 90% of fixture cost

### REQUIREMENTS:

**UTILITY APPROVAL:** The Participating Utilities reserve the right to inspect Customer facilities irrespective of the requested rebate amount. Rebates exceeding \$7,500 require written pre-approval from the utility before the removal of existing fixtures and installation of new fixtures. The Participating Utilities reserve the right to adjust the incentive amount. Failure to obtain pre-approval may result in the applicant receiving a lower rebate amount.

**INCENTIVE CAP:** Eversource and UI will pay up to 90% of invoice amount for qualified materials.

**PRODUCT CERTIFICATIONS:** All LED fixtures or lamps must be DesignLights™ Consortium qualified at the time of application unless otherwise noted (e.g., exit signs). The lists of qualifying products can be found at [designlights.org](http://designlights.org)

New or Final Case						
Product	Qty.	NEW DLC Product ID or Model #	Watts/ Fixture	Incentive	Minimum Watts Saved	Equipment Cost/Fixture
Exterior LED Fixtures (products with lighting controls are required to be installed and commissioned to)						
Exterior: (250–5,000 lumens)				\$65	10	
Exterior: w/ Occ Sensor (250–5,000 lumens)				\$105	10	

**UL LISTING:** Items eligible for a rebate must be UL listed, as well as have the required certifications listed. Reflectors must be UL classified.

**WATTAGE REDUCTION:** All fixtures must meet minimum watts saved requirements for 1 to 1 replacements. For retrofits that are not 1 to 1 replacements, there must be at least a 10% system wattage reduction between the old and new system wattage for product to qualify. LED to LED conversion can be incentivized if minimum watts saved requirements are met.

**REFLECTORS:** It is recommended that a sample area of reflectors be installed to ensure satisfaction with light output and distribution. Lamps must be re-centered after original lamps are removed.

- Instructions have been updated
- Interior fixture tab is yellow, exterior fixture tab is green

[illegible]

# High Performance Lighting



## Network Lighting Controls

DLC NLC Requirements	Additional Utility Program Requirements
<ul style="list-style-type: none"><li>• Networking of Luminaires and Devices</li><li>• Occupancy Sensing</li><li>• Daylight Harvesting/Photocell Control</li><li>• High-End Trim</li><li>• Zoning</li><li>• Luminaire and Device Addressability</li><li>• Continuous Dimming</li><li>• Cybersecurity</li></ul>	<ul style="list-style-type: none"><li>• Energy Monitoring – <b>2 weeks</b> data in <b>hourly</b> intervals</li><li>• Load Shedding (Demand Response)</li></ul>

# High Performance Energy Monitoring Report

## Energy Report Format

Building

Site Name	Business Hours	Gross Floor Area	System kW
<i>Example Site</i>	<i>8am-6pm</i>	<i>25,000</i>	<i>17.5 kW</i>

Energy Data Table

Time Period	Area Name	Zone Name	Quantity of Luminaires in Zone	Max Power Without Controls	Hours On	kWh in Time period	High End Trim	Occupancy Sensor	Daylight Harvesting
			#	Watts	Hours	kWh	%	Y/N	Y/N

# Enhanced Performance Lighting

Minimum of:

One Control Strategy  
per Fixture

Two Control Strategies  
across the Whole  
Project

Possible  
Control  
Strategies:

Occupancy  
Sensors

Daylight  
Harvesting

High End  
Trim

# Enhanced Performance Lighting – Requirements

## Tier 2 – Enhanced Performance Lighting

Controlled LEDs need digital control & wireless accessibility to initialize, configure, & commission

All LED products used must be on DesignLights Consortium (DLC) Qualified Products List (QPL)

80% of project load must be controlled LED fixtures

Group LED fixture control acceptable; individual fixture control optional

*(Reminder LLLC needs evidence of commissioning & networking to make 49% savings claim; otherwise LLLC savings are 38%)*

Group maximum size guidance of 300W connected LED luminaire load within the same physical space and/or control zone  $\leq 1,000$  sq. ft. controlled as a group

# Enhanced Performance Lighting – Control Features

## Digital Control & Wireless Accessibility to Initialize, Configure, Commission

Variety of digital & wireless control systems/layouts can qualify; use “remotes” or “apps” etc.

Access to: set daylight threshold/sensitivity; standby dim level; hold/delay time; etc.

Can be “individual fixture level” access; using LEDs with LLLC or other means

Can be “room/group level” access; e.g. use some form of “room controller” for wireless

May have option now/later to scale to multi-room network with router/gateway/bridge

# LLLC Savings

(49% if network/commissioned evidence; 38% if none)

## Luminaire Level Lighting Controls (LLLC) Networked & Commissioned Evidence

**OPTION #1:** Formal lighting control commissioning report with sufficient detail on all control zones/ settings

**OPTION #2:** Combined set of factors/ details provided as follows in all below rows:

-- Screen shots from app AND Show control zone / fixture grouping

-- Control Zones: projects with 1-9 zones, show settings for each; for >9 zones, show representation of all

-- NOT all spaces at factory default, otherwise that strongly indicates no setup/commissioning

----- High End Trim: Values for zones need to match project spreadsheet

----- Occupancy Control: Show time out period (reasonably align with IECC 2021 guidance)

----- Daylight: Show parameters for daylight level and dimming

# Standard Lighting



No Controls Requirement



\$0.20/20% for interior lighting  
Fixtures, Retrofit Kits, TLEDs, Pin & Mogul Lamps

TLEDs*	
Eversource	UI
<b>TLED Type A &amp; B</b> Not allowed in large C&I	<b>TLED Type A</b> Not allowed in large C&I
<b>TLED Type C</b> <i>Allowed in large C&amp;I</i>	<b>TLED Type B &amp; C</b> <i>Allowed in large C&amp;I</i>

\* TLED Types A, B, & C are allowed in Express Rebate

Use Instant Discount Program or Express Rebate Form Where Applicable

<https://energizect.com/explore-solutions/energy-efficient-lighting/commercial-lighting>

# HVAC & Lighting – Energy and \$ Benefit Options

1

## Standard Lighting – EMS adder \$0.05/kWh

Connect lights to EMS + apply at least 1 EMS control strategy to lights (time scheduling OK)

2

## Comprehensiveness – combine HVAC measures with lighting project

3

## NLC – HVAC Integration

# Comprehensiveness – add HVAC Measures with Lighting Project



Comprehensiveness – extra \$ for more than 1 system  
Electric + Fossil Fuels combined OK (savings in BTU)



No single system can be >90% of total BTU/yr savings  
Each system at least 3% of total BTU/yr savings

**Add Speed Control RTU Fans (VFD)**  
– PSD: 2.2.19

**Demand Control Ventilation**  
– PSD: 2.2.5

**Commercial Kitchen Hood Controls**  
– PSD: 2.2.20

**Commercial Advanced Thermostats**  
– PSD: 2.2.16

# Comprehensiveness

## COMPREHENSIVE TIERED PROJECT INCENTIVE (ALL MEASURES)

Incentives are calculated as the greater of the annual savings or the summer peak kW savings multiplied by the incentive rate, plus fuel savings, with a maximum incentive based on a percent of project cost.

	GREATER OF		PLUS	PLUS	PLUS	Not to exceed	
	per annual kWh saved	per summer peak kW saved	per annual Natural Gas CCF saved	per annual Oil Gallon^ saved	per annual Propane Gallon^ saved	PROJECT CAP	PROJECT QUALIFICATION
<b>TIER 2 COMPREHENSIVE</b>							
Three or more systems*	\$0.65	\$1,000	\$6.00	\$8.00	\$6.00	65% of Installed Cost	<ul style="list-style-type: none"> <li>For lighting to qualify for this tier the lighting must be at least Enhanced Performance</li> <li>To include standard lighting, project must qualify for this tier independent of the lighting</li> </ul>
<b>TIER 1 COMPREHENSIVE</b>							
Minimum two systems*	\$0.50	\$1,000	\$5.00	\$7.00	\$5.00	50% of Installed Cost	<ul style="list-style-type: none"> <li>Retro-commissioning &amp; energy management system (EMS) control points automatically qualify for this tier</li> <li>Steam trap repair projects coupled with a mechanical room insulation measure automatically qualify for this tier</li> </ul>

# NLC – HVAC Integration Overview

1

Combines networked lighting controls (NLC) with HVAC controls

2

Zone-level occupancy data from luminaire occupancy sensors can be utilized to adjust airflow rates and for thermostat setbacks.

3

Centralized control can be utilized for energy management, load shedding, as well as for monitoring space usage patterns, outages, and faulty equipment.

# NLC – HVAC Integration

## DesignLights Consortium (DLC) Toolkit Overview

1 How to Screen Candidate Projects for NLC-HVAC Integration

2 How to Know Who to Involve and Their Responsibilities

3 Examples of Success and Template to Replicate it

# DesignLights Consortium (DLC) Toolkit

1

## Integration Handbook

- Best practices, references, specification documents

2

## Decision Tree

- How to choose candidate projects likely to succeed

3

## Case Studies

- Searchable list of projects

4

## Responsibility Matrix

- Major tasks and major roles needed to succeed

5

## Project Template

- Integration specifications, control points, communication protocols

6

## Where to Obtain It

<https://designlights.org/resources/reports/nlc-hvac-integration-toolkit/>

# NLC-HVAC Integration: Decision Flow to Screen a Good Candidate

Is the owner interested in innovative energy-saving ideas such as NLC-HVAC Integration?

Does the building have a Variable Occupancy Pattern?

Do HVAC zone boundaries align well with NLC zone boundaries?

Does the HVAC system support VAV (Variable Air Volume)?

Does the building have a Building Automation System (BAS) in place?

Recommend lighting with NLC, integrated with the BAS to support Occupied Standby Mode.



# Questions

# Thanks for listening.



**Ryan Esthus, CEM**

Eversource

[ryan.esthus@eversource.com](mailto:ryan.esthus@eversource.com)

**Michael Doucette, PE, LC, CEM**

Avangrid

[michael.doucette@uinet.com](mailto:michael.doucette@uinet.com)

**EVERSOURCE**



PROUD SPONSORS OF

