



Bringing Efficiency to LightSM

NLC Technical Requirements

Version 4, Draft 1

February 19, 2019

Team



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Agenda

- Introduction
- Cybersecurity
- Energy Monitoring
- Interoperability
- Other Changes, Topics, and Wrap-Up




**DRAFT Networked Lighting Control System
Technical Requirements**

**Version 4.0 Draft 1
February 5, 2019**

1
2
3
4
5 Note: Changes from Version 3.0 are highlighted in **yellow**.

6 **Schedule of Revisions**

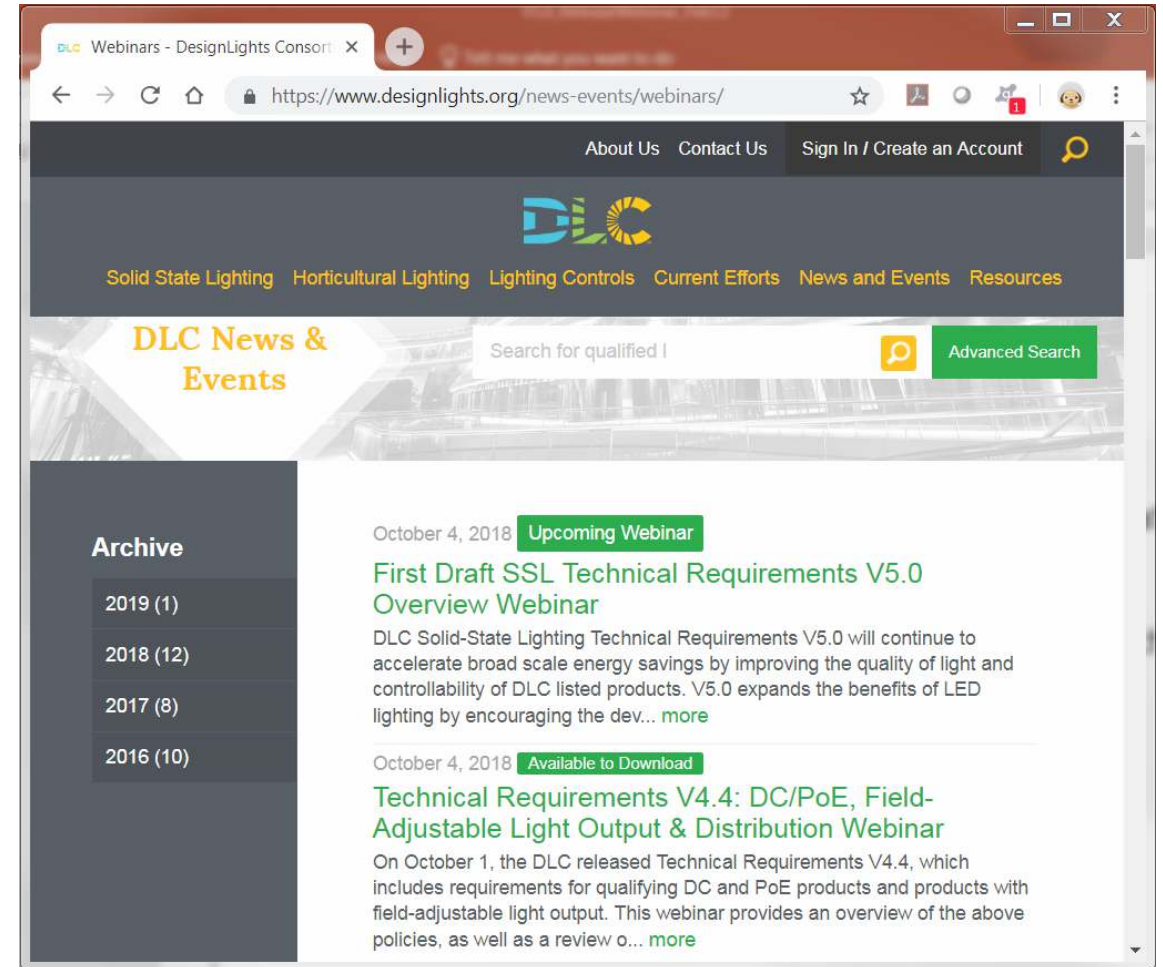
Revision Number	Date	Description
1.0	Apr 21, 2016	• Initial Technical Requirements published.
1.01	May 7, 2016	• Clarified that the Technical Requirements are for Interior Control Systems. Systems designed and marketed exclusively for exterior applications are not eligible to be qualified.
1.02	Feb 24, 2017	• Clarified that the Technical Requirements do not cover DC or PoE systems.
2.0	Jun 1, 2017	• Version 2.0 published, with addition of Exterior Control Systems.
3.0	Jun 1, 2018	• Version 3.0 published, with addition of DC/PoE Systems, Scenes, and multiyear plans for Energy Monitoring and Cybersecurity.

7
8 This document defines requirements to be met or reported for lighting control systems listed on the
9 DesignLights Consortium® (DLC) Networked Lighting Controls Qualified Products List (QPL).
10



Webinar Logistics

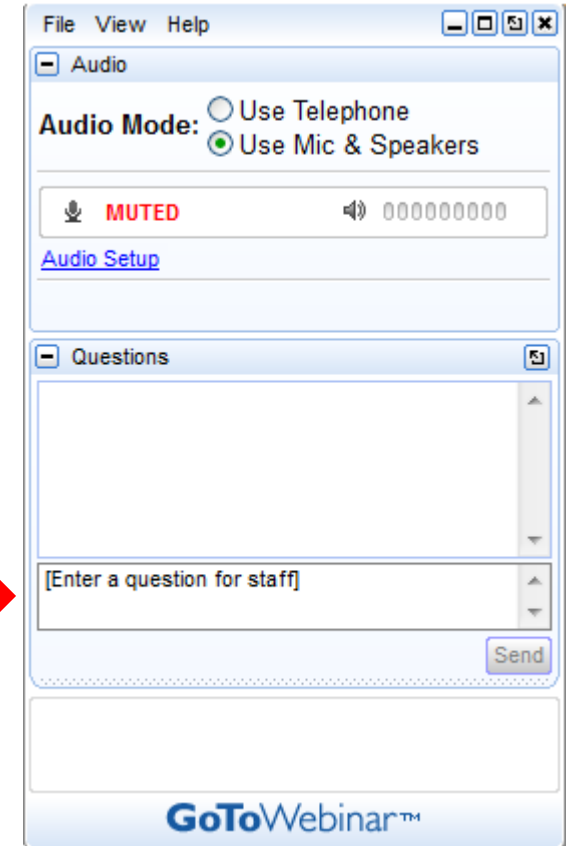
- Slides and recorded webinar will be posted on the *DLC News & Events* page at www.designlights.org shortly after today's presentation
- All attendees are automatically muted
 - If you experience technical issues, please use the chat feature to let us know using the chat function



Questions and Comments

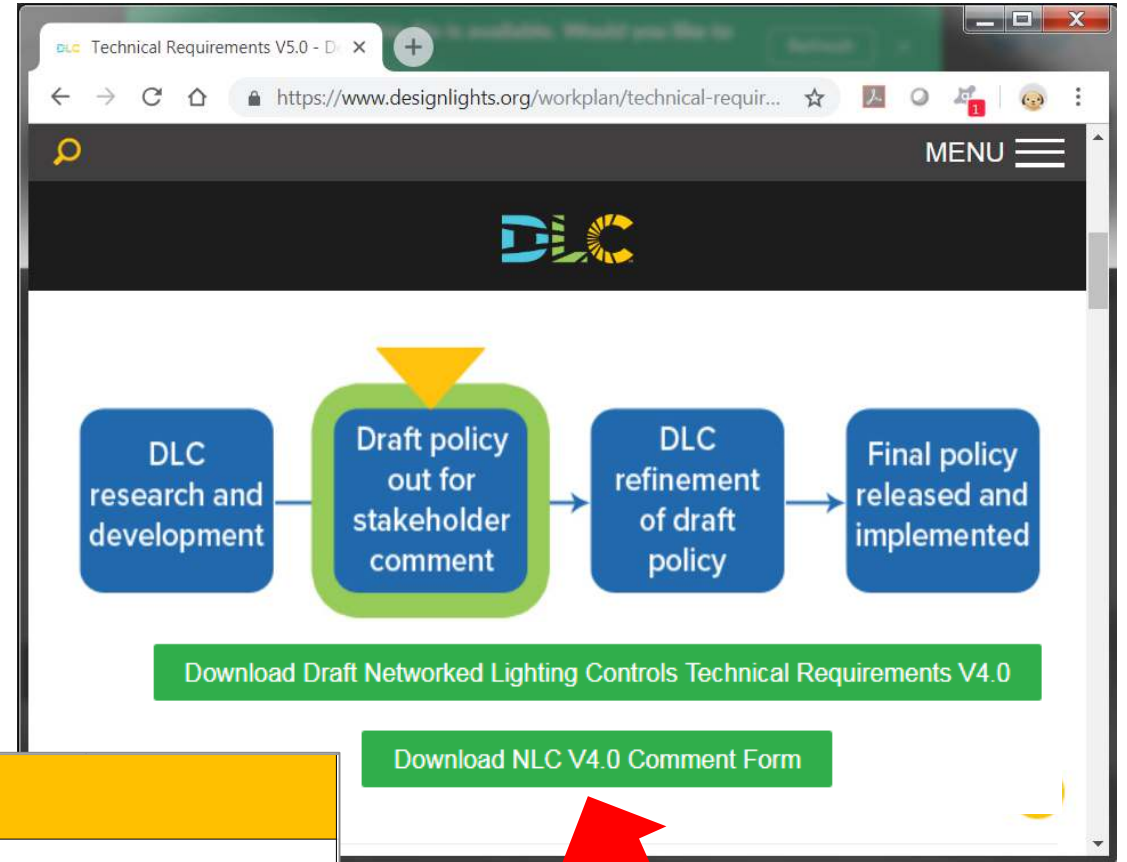
- Clarifying questions may be submitted via the Questions pane in GoToWebinar.
- Detailed technical questions and comments should be submitted through a [Comment Form](#) and sent to:


Comments@designlights.org



Comment Forms

All comments must be submitted using DLC Comment Forms. Please download the Comment Form and submit the completed forms to comments@designlights.org



 Comment Form	
Document:	Networked Lighting Control (NLC) System Technical Requirements Version 4.0
Version:	Draft 1 of NLC V4.0
Comments Due:	Close of business, Tuesday March 12, 2019
Instructions and Background:	<p>This document lists all of the proposed updates in the first draft of the 2019 DLC "Networked Lighting Control System Technical Requirements Version 4.0".</p> <p>To comment on these updates, enter your Organization, Name, Email Address and Phone Number at the top of the worksheet. Then enter any comments in Column F "Comment and Rationale". If applicable, please provide alternate approaches, technical justification, or data to support your comment and responses to any questions posed in Column E "Explanation by DLC". Provide your proposed change corresponding to your comment in Column G "Proposed Change".</p> <p>Comments to the Technical Requirements that are not related to a specific revision the DLC has proposed may be added at the bottom of the worksheet.</p> <p>Save the Excel file with your comments, with your initials appended to the end of the filename, and email the file to comments@designlights.org by close of business, Tuesday March 12, 2019.</p>
Reviewer Organization	Reviewer Name
Reviewer Email Address	Reviewer Phone #

Networked Controls Revision Cycle

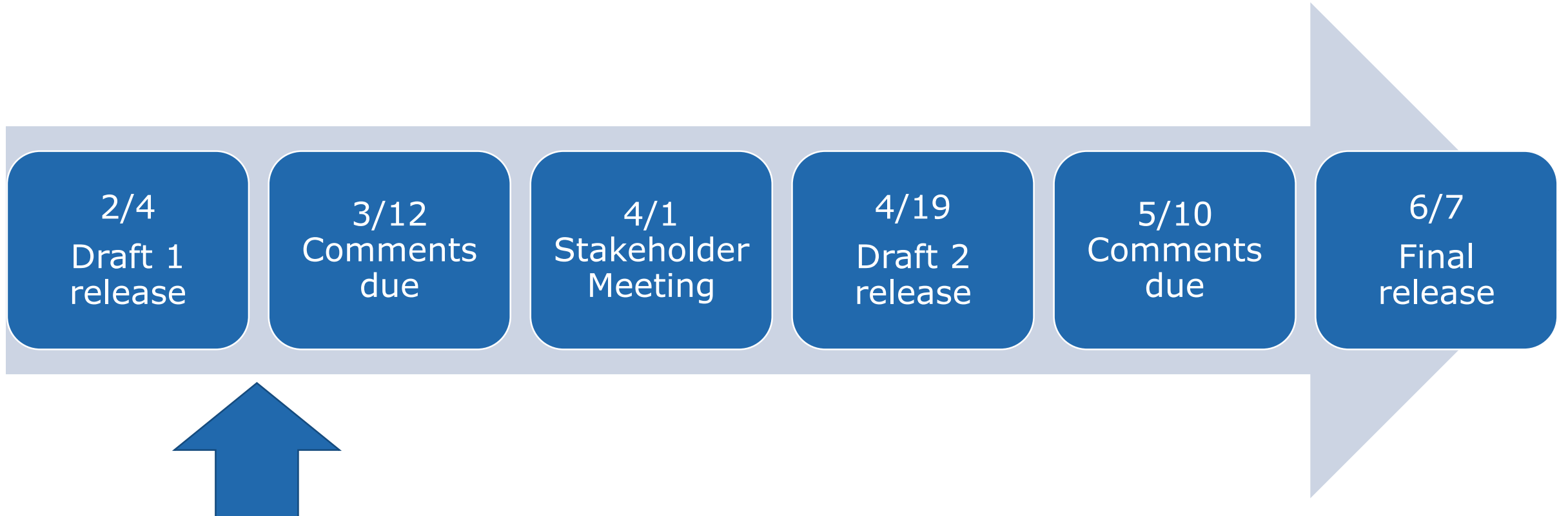
Technical Requirement
Revised Annually every June 1

Revision process begins every
January to allow time for
stakeholder input

One Year Grace Period:
re-apply under last year's version.



Current Timeline for V4.0



You are here



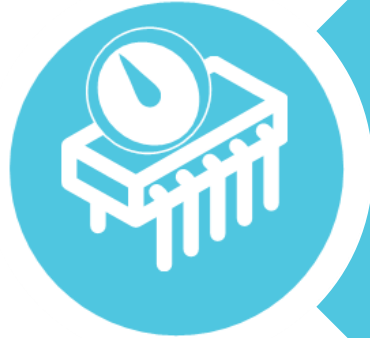
V4.0: Strengthen Value, Improve Market Acceptance

V4.0 Focus Areas



Cybersecurity

- The practice of defending networked systems and data from malicious attacks
- Critical for customer trust and adoption



Energy Monitoring

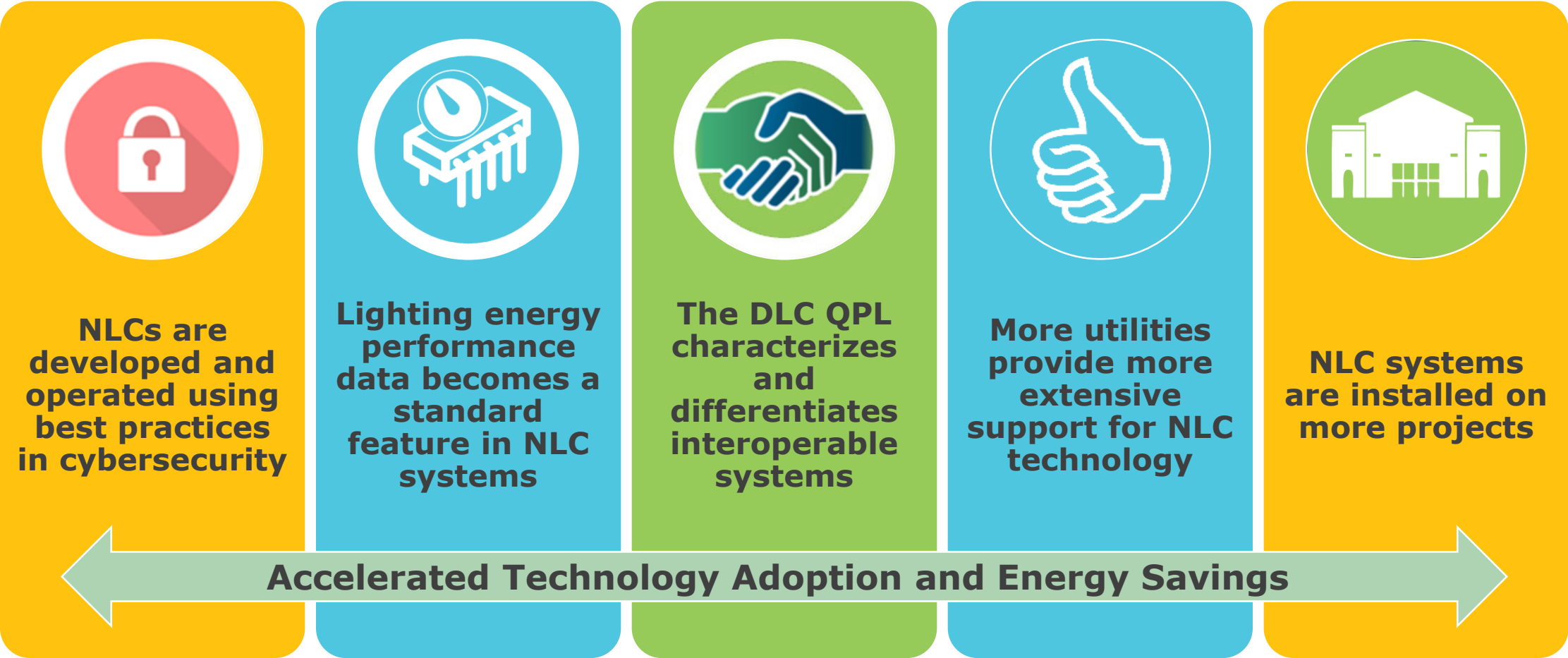
- The capability of a system to measure and report the energy consumption
- Strengthens the value for utilities and customers



Interoperability

- The capability of lighting and/or building systems or components to connect to one another
- Unlocks new energy savings by connecting different systems

Desired Outcomes



Technical Requirement Layout

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Example: Energy Monitoring Multi Year Plan

87 Multi Year Plans

88 Energy Monitoring Plan

89 New with V4.0, Energy Monitoring is now a required capability. The details of this capability are described in
90 Table 3 below. Various methods of energy monitoring are acceptable for meeting this requirement, including
91 automated measurement methods and methods that require manual input of fixture wattage to measure
92 energy use.

93 Future Plan

94 In V5.0, to be released June 1, 2020, methodologies with numerical manual input will not be accepted as
95 meeting the energy monitoring requirement unless supported by a new ANSI standard that specifies the
96 accuracy of the methodology. If an ANSI standard to support the methodology is not developed, then only
97 automated measurement methods will be accepted and manufacturers will self-report the accuracy of the
98 automated measurement method. The DLC will require timestamped output data to be available via API.
99 Optional .CSV file output will also be reported.

Example: Energy Monitoring in Table 1

197 **Table 1: Interior Lighting Systems**

'Required' Interior System Capabilities	'Reported' Interior System Capabilities
<ul style="list-style-type: none">• Networking of Luminaires and Devices• Occupancy Sensing• Daylight Harvesting / Photocell Control• High-End Trim• Zoning• Luminaire and Device Addressability• Continuous Dimming• Energy Monitoring	<ul style="list-style-type: none">• Control Persistence• Scheduling• Device Monitoring / Remote Diagnostics• Type of User Interface• Luminaire Level Lighting Control (LLLC, integrated)• Personal Control• Load Shedding (DR)• Plug Load Control• Emergency Lighting• Cybersecurity• Color Changing / Tuning• Ease of Implementation• Scene Control• Interoperable

Example: Energy Monitoring in Table 3

207 **Table 3: Capability and Requirement Definitions**

Row	Capability	Definition
1	Networking of Luminaires and Devices	The capability of individual luminaires and control devices to exchange digital data with other luminaires and control devices on the system. This capability is required at the room, space, or area level, but not at the whole building level or beyond (e.g. non-lighting systems, or the internet).
11	Energy Monitoring	<p>The capability of a system to report the energy consumption of a luminaire and/or a group of luminaires. Individual luminaire monitoring as well as energy monitoring on dedicated lighting circuits is acceptable. The method by which the system implements this capability must be clearly described, including whether the system provides automated energy measurement or relies on numerical manual input during system setup for accurate measurement (such as inputting the wattage of each luminaire in a project). Timestamped output data must be available from the system as either a regularly-spaced series in time, or a series of state-change events. If data is recorded in a regularly-spaced time series, then the time interval between recorded data points must be less than or equal to 15 minutes.</p> <p>Timestamped output data must be available via one or more of the following: .CSV file, API.</p> <p>The record duration and accuracy of reported data must be specified.</p>

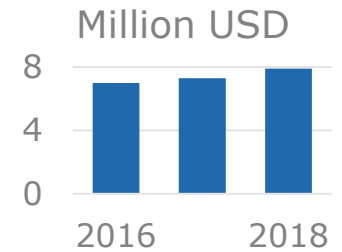
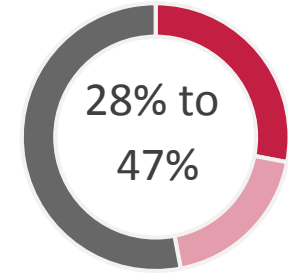


Cybersecurity

Cybersecurity Threat



- In 2015, 28% to 47% of organizations had experienced IoT-related breaches (*Source: Forrester/CISCO*)
- In 2018, the average consolidated total cost of a data breach in the USA was \$7.9M USD (*Source: 2018 Ponemon/IBM Study*)
- “The lighting industry can’t afford to be the weak link in the IoT” (*IES LD+A “Thought Leader” article, Feb. 2019*)





Cybersecurity Plan

June 2018 V3

Cybersecurity activity is reported.

June 2019 V4

Establish criteria to qualify a set of cybersecurity standards.

Only products that comply with a qualified standard may declare the **optional** cybersecurity capability.

June 2020 V5

Cybersecurity is **Required**. Products must comply with at least one standard that meets the criteria defined in V4 (or reapply under V4 with the 1-year grace period).

June 2021 V6

Cybersecurity is **Required**.



Draft Criteria for Acceptable Cybersecurity Standards

- Certifiable with a standardized methodology established through either:
 - A voluntary consensus process such as ANSI, ISO, IEC...
 - A federal agency of the USA or Canada
- Multiple third-party accredited labs are available to perform testing and certification
- Applies to one or more of the following:
 - a) Product development process lifecycle
 - b) Components
 - c) System
 - d) Cloud Services
- Includes at least 3 of the following technical content, for (b,c,d) above
 - a) Penetration testing
 - b) Communication robustness testing
 - c) Vulnerability identification testing
 - d) Multiple levels of security



Cybersecurity standards that currently meet the draft criteria

Standard	Process	Components	System	Cloud Services
ANSI/UL 2900-1	y	y	y	
CTIA Cybersecurity	y	y		
FedRAMP				y
IEC 62443	-4-1	-4-2	-3-3	
ISO 27001	y			

Future potential standards

ANSI/UL 2900-2-4 for BMS

ANSI/UL 2900-2-5 for lighting

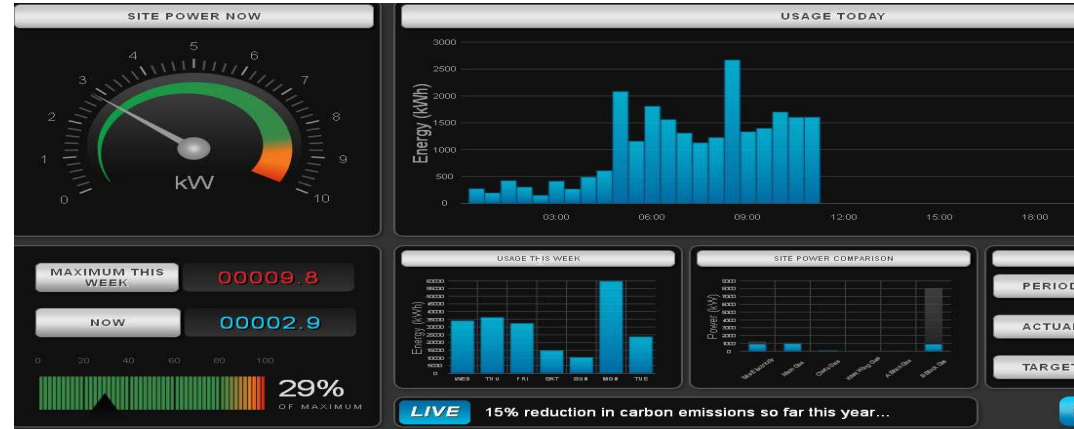
CSA CVP (Cybersecurity Verification Process)



Energy Monitoring



Energy Monitoring Opportunities



- Expanded support from energy efficiency programs
- Support research to clarify savings potential for building owners
- Provide manufacturers, building owners and efficiency programs ongoing feedback, to optimize energy performance over time
- Most qualified products already offer some form of Energy Monitoring as an option.

Energy Monitoring Plan



June 2018 V3

- Energy Monitoring is **Reported**.

June 2019 V4

- Energy Monitoring with data report is **Required**
- Accuracy is self-reported, unless the accuracy depends on manual input
- Option to reapply under V3 with 1-year grace period.

June 2020 V5

- Energy Monitoring Capability is **Required**
- Methods requiring manual input are not accepted, unless a new ANSI standard specifies the accuracy
- ANSI Standards for Accuracy and Data Model will be required after they become available





Updated Energy Monitoring Definition

- Automated energy measurement versus numerical manual input (both qualify, type is reported)
- Output data is either regularly spaced or state-change events. If regularly spaced, 15 minutes or less.
- Timestamped output data record via .CSV file and/or API.



Draft Energy Monitoring Definition

(new parts in Red)

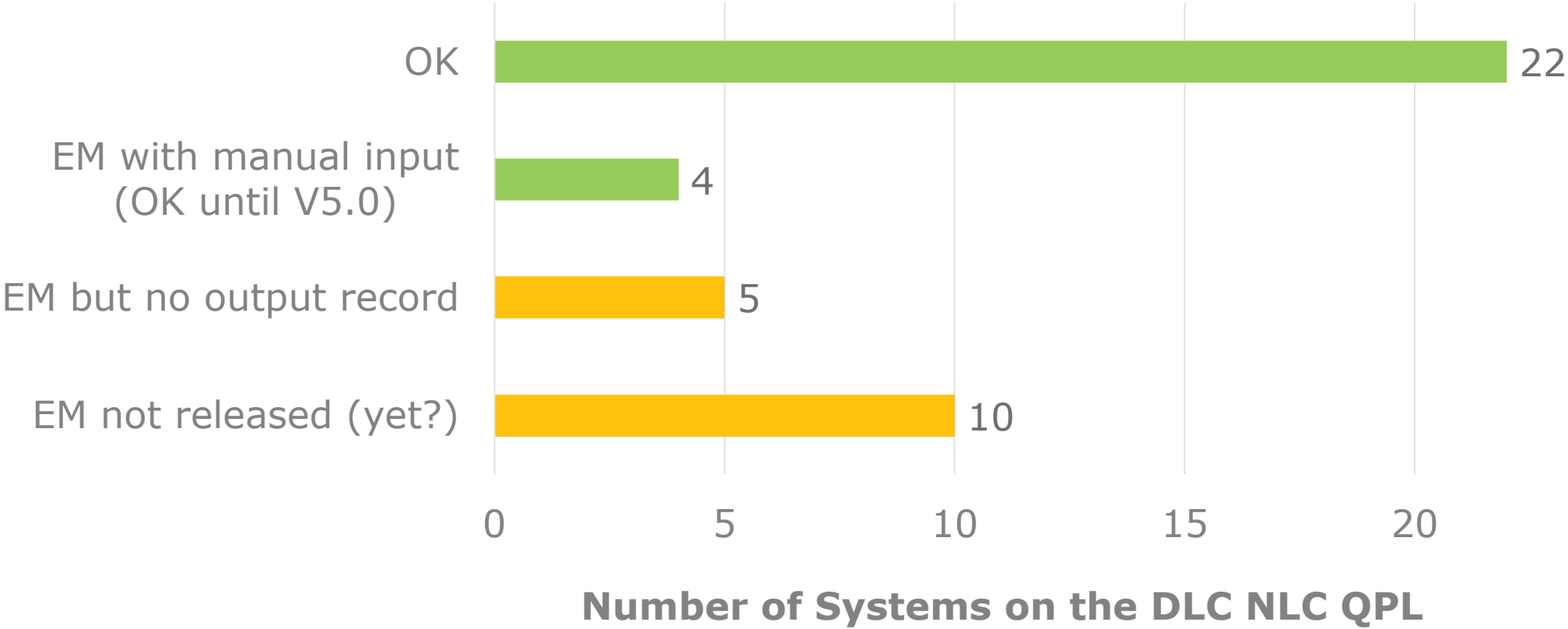
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**Timestamped output data must be available via one or more of the following:
.CSV file, API.**

The record duration and accuracy of reported data must be specified.

Energy Monitoring (EM) Status of NLC Systems on the QPL





Interoperability



Interoperability Plan

- Recognize as a “Reported Capability”, products that offer interoperability within a system and/or between systems
- In V4, mainly based on currently reported system information.
- Conduct a research project in 2019 to define a multi-year plan



Interoperability Capability

- Interoperability—the ability of systems or system components to transmit, receive, interpret, and/or react to data, and function in a defined and appropriate manner.
- Modified from NEMA/ANSI C137.0
- This applies to either of the following types of digital communication:
 - Within a system (among sensors, drivers, wall switches...)
 - Between systems (lighting, cloud, HVAC, BMS, API...)



Interoperability Objectives

- Unlock energy savings opportunities
- Broader customer acceptance
- Stronger value proposition





Interoperability Research Objective

- Develop a public resource supporting NLC interoperability
- Develop a multi-year strategic plan to support the interoperability of DLC-qualified Networked Lighting Control (NLC) systems.

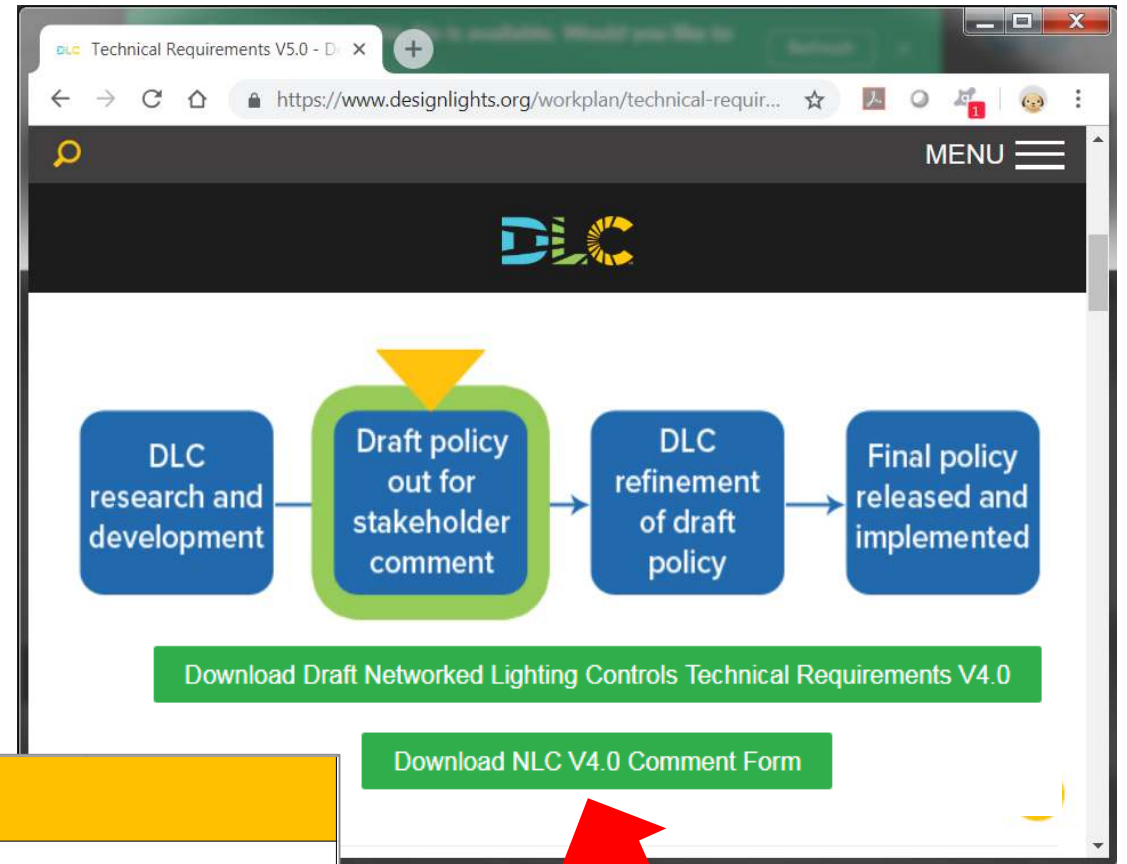



Other Changes

Topic	Plan
Horticulture	Exclude for now
BMS	Acceptable if it qualifies
Start-up & Configuration Party	Rename as "Ease of Implementation"

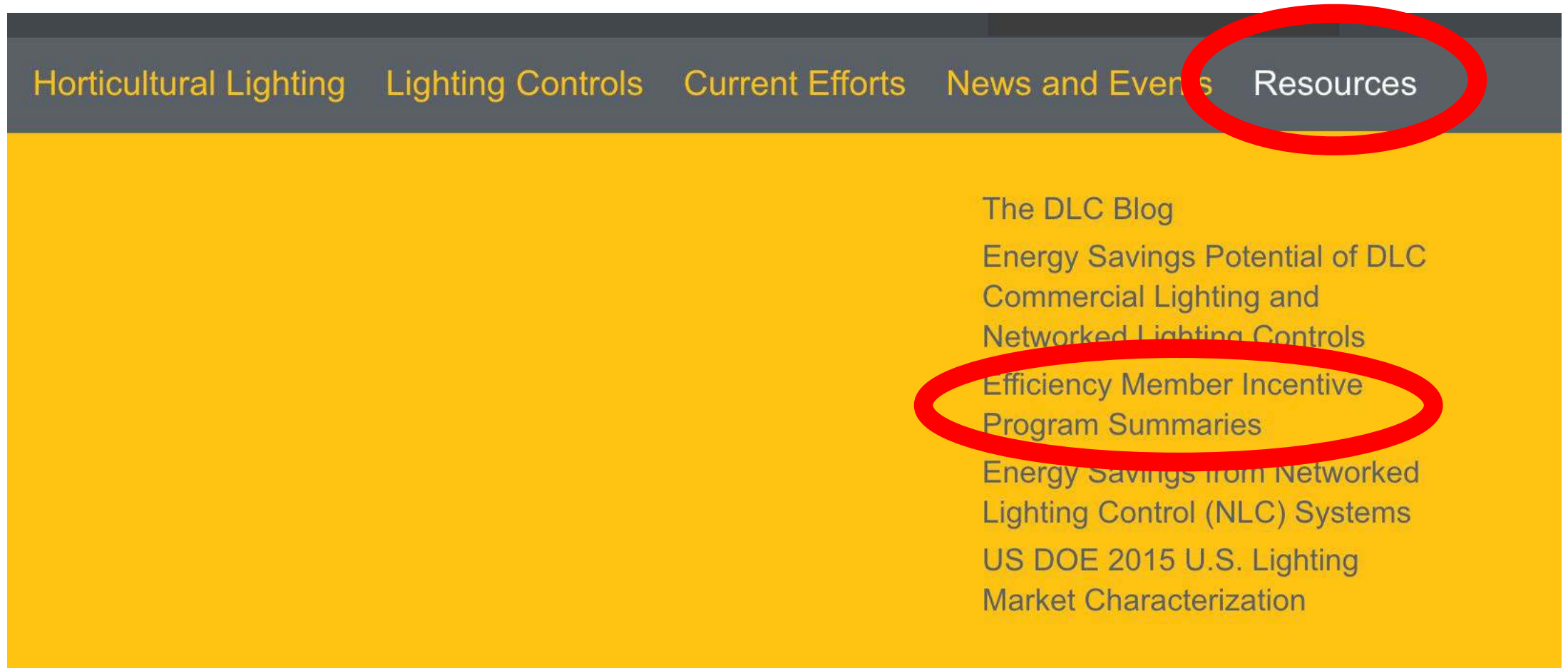
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			Reviewer Organization	Reviewer Name
			Reviewer Email Address	Reviewer Phone #

News: Updated Summary of NLC Programs



Horticultural Lighting Lighting Controls Current Efforts News and Events **Resources**


- The DLC Blog
- Energy Savings Potential of DLC Commercial Lighting and Networked Lighting Controls
- Efficiency Member Incentive Program Summaries**
- Energy Savings from Networked Lighting Control (NLC) Systems
- US DOE 2015 U.S. Lighting Market Characterization

Updated Summary of NLC Programs

NLC Program Summary 2018.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER

D1

	A	B	C	D	E	F	G	H
1							NETWORKED LIGHTING CONTROLS	*Custom Rebate: Energy savings may vary by program
2								**Unit: What the rebate is calculated for
3								***Type: Calculation type
4								
5	DLC Member Programs	Region	State or Province	**Unit	***Type	Rate	Networked Lighting Controls Incentives	URL
6	BC Hydro	Canada	British Columbia				N/A	
7	Efficiency Nova Scotia	Canada	Nova Scotia				N/A	
8	Fortis BC	Canada	British Columbia				N/A	
9	Hydro Québec	Canada	Quebec				N/A	
10	Sask Power	Canada	Saskatchewan	Custom	kWh	\$ 0.08	*Custom Rebate	N/A
11	BGE	Mid - Atlantic	Maryland	Fixture	Fixed	\$ 40.00	DLC required. Wall/surface-mounted control cap: \$80.	https://bgsmartenergy.com/sites/default/files/2018-05/IC_Tech_Sheet_Lighting.pdf
12	DC SEU	Mid - Atlantic	Washington DC				N/A	
13	PECO	Mid - Atlantic	Pennsylvania				N/A	http://pecoci.programprocessing.com/Reference_Sheet
14	PSEG - LI	Mid - Atlantic	Long Island				N/A	
15	SMECO	Mid - Atlantic	Maryland	Fixture	Fixed	\$ 40.00	DLC required. Wall/surface-mounted control cap: \$80.	https://smecoretrofitlighting.programprocessing.com/ad/SMECO_CI_Tech_Sheet_Lighting_5
16	AEP Ohio	Midwest	Ohio	Square Foot	Fixed	\$ 0.75	\$0.75/sqft <12ft fixture height, \$0.3/sqft > 12 ft, outdoor standard controls incentive, 3 control strategies.	https://www.aepohio.com/global/utility/business/programs/AEPOhio/2018/2018-2021/2018-2021-04-2018.pdf



DLC Stakeholder Meeting **(combined with Controls Summit)**

2019  April 1 - 3 • St. Louis, MO
STAKEHOLDER MEETING





Day	Agenda
PRE-CONFERENCE morning	DLC Efficiency Member meeting
PRE-CONFERENCE afternoon	Pre-conference workshops & CEU courses Opening Reception
Day 1	Full day conference Panels Discussion Sessions Breakout Sessions Structured Networking Off-site Reception
Day 2	Full day conference Panels Discussion Sessions Breakout Sessions Structured Networking



Panels

- Solutions-Based Lighting
- Lighting and the Smart Building
- The Hort Report
- Light, Health and Energy

Discussion Sessions

- NLC V4.0: Cybersecurity
- NLC V4.0: Energy Monitoring & Interoperability
- SSL V5.0: Controllability
- SSL V5.0: Glare Distribution
- SSL V5.0: Efficacy and Flicker
- SSL V5.0: Color and Spectral Quality

You are invited to participate in Structured Networking at the Stakeholder Meeting!

- An exclusive opportunity for DLC Efficiency Members to meet in small groups with individual lighting manufacturers.
- Advance registration required.
- These sessions are not facilitated by the DLC, and provide you the opportunity to discuss topics that are important to your organization and build new business relationships.



Thank You!

Gabe Arnold
Levin Nock
Bagwat Mohan

Please send questions and comments to:
Comments@designlights.org

DesignLights Consortium®
www.designlights.org

Additional Requirements (in addition to Tables 1,2,3)

- No change from last year
- Customer Available Information
- Warranty
- Commercial Availability and Verification
- System Overview Presentation