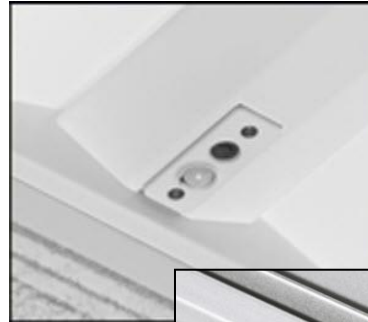


# Commercial Advanced Lighting Control Demonstration and Deployment

2015 Building Technologies Office Peer Review



U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

**Gabe Arnold**, [garnold@neep.org](mailto:garnold@neep.org)  
**NEEP & DesignLights Consortium**

# Project Summary

## Timeline:

Start date: **October 1, 2014**

Planned end date: **September 30, 2017**

## Key Milestones:

1. Recommended EE Program Offerings; October 30, 2015
2. Completed Curricula and Training Implementation Plan; December 30, 2015
3. All Demonstration Project Installations Complete; June 30, 2016

## Budget:

Total DOE \$ to date: **\$28,921**

Total future DOE: **\$466,732**

## Target Market/Audience:

The Target Market is commercial buildings including but not limited to: Office, Retail, Education, Healthcare, Hospitality, Institutional, Warehouse, and Industrial. The target Audience includes Utility Energy Efficiency Programs, Manufacturers, Distributors, Designers, Installers, Building Owners and Operators.

## Key Partners:

Burlington Electric Department	Cape Light Compact
Efficiency Vermont	PSEG – Long Island
EverSource MA and CT	NYSERDA
National Grid MA and RI	Pacific Gas and Electric
Northwest EE Alliance	Lighting Controls Assoc.
PNNL	Natural Resources Canada

## Project Goal:

Accelerate the deployment and market adoption of Advanced Lighting Controls in Commercial Buildings by addressing market barriers that have limited their adoption.

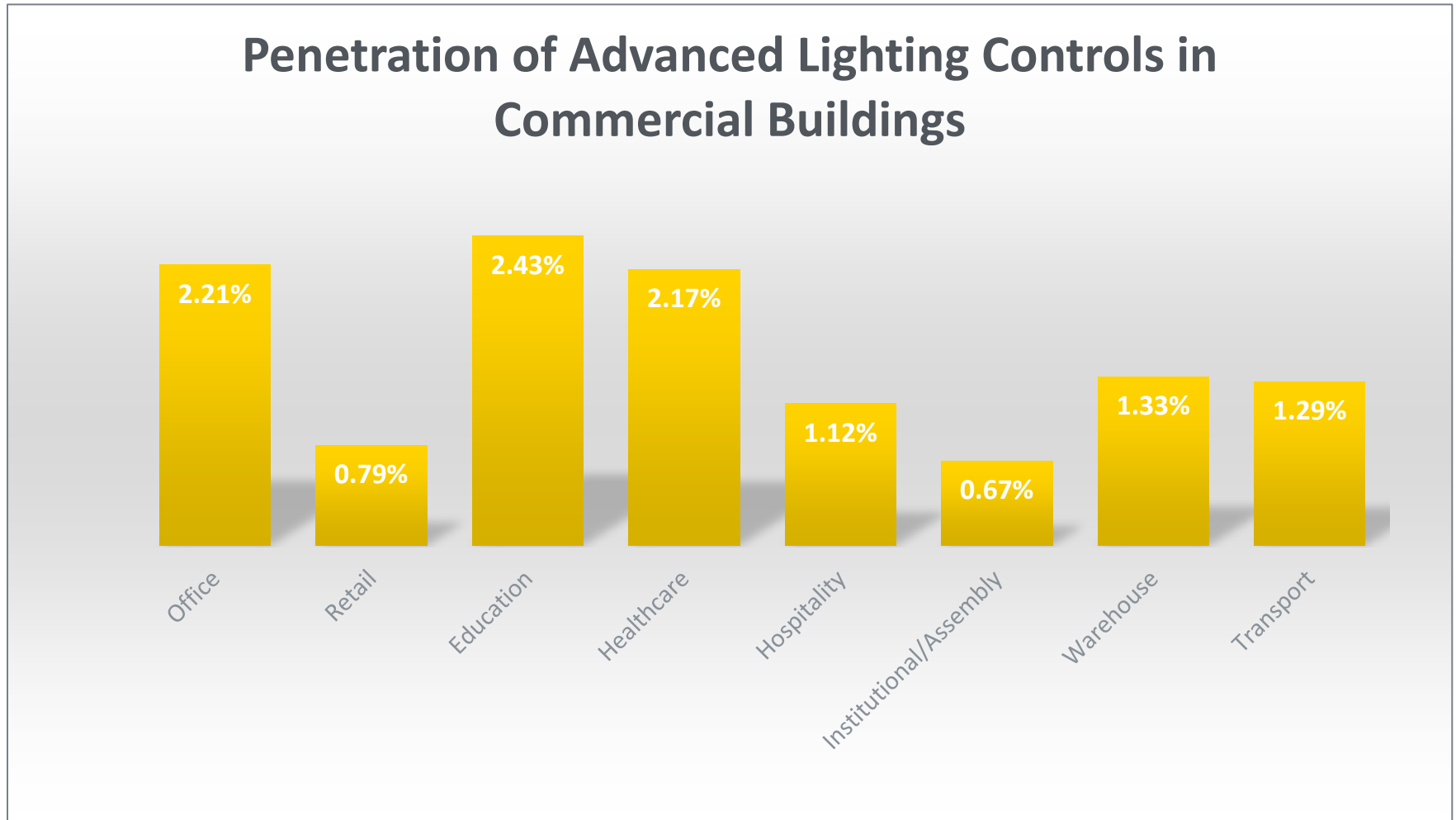
# Problem Statement, Target Market, & Audience

**Problem Statement:** Advanced Lighting Controls are an underutilized technology with low market penetration. The technology has low adoption due to several entrenched market barriers identified on slide 9.

**Target Market:** The target market is commercial buildings including Office, Retail, Education, Healthcare, Hospitality, Institutional, and Warehouse. Lighting in the commercial sector is responsible for approximately 350 TWh of energy use. If Advanced Lighting Controls were installed in all Commercial Buildings, approximately 100 TWh of energy could be saved, representing savings of \$10.4 billion annually.

**Target Audience:** The target audience includes Utility Energy Efficiency Programs, Manufacturers, Distributors, Designers, Installers, Building Owners and Operators.

# Advanced Lighting Control Market Adoption



Source: NEEP, Navigant Consulting, December 2014

# Advanced Lighting Control Market Adoption

- Utilization Rate in Utility EE Programs < 1%

Energy Efficiency Program	Number of Projects with ALCs	Total Number of Lighting Retrofit Projects	Utilization Rate
Efficiency Vermont (2011-2013)	<10 (2011-2013)	1,885	<0.5%
Cape Light Compact (2013)	0	291	0%
Burlington Electric Department (2013)	0	Unknown	0%
PSEG Long Island (2013)	<25	5602	<0.5%

# Advanced Lighting Control Market Barriers

- Knowledge and experience
- Complexity
- Value proposition
- Lack of standardization
- Construction Process
- High Costs
- Effective EE program designs



# Project Activities



- A long-term, comprehensive project designed to address market barriers and increase adoption at scale
- Project outputs will be launched under NEEP's bi-national DesignLights Consortium brand
- All activities are shown on this slide for information purposes, but only three are part of DOE scope and receive DOE funding

# Our Vision

---

## *By 2020...*

- Every luminaire seen by EE programs is controlled
- Majority of luminaires are shipped from factory with embedded sensors, intelligence, meter
- Technology, installation cost and complexity greatly reduced
- Market actors knowledgeable and skilled
- EE programs pay customers for reported savings – M&V is automated
- Lease and service models have begun to proliferate through industry
- Consistent and effective EE programs, strong industry partnerships



# Goal and Objectives

**Project Goal:** Increase the adoption of Advanced Lighting Controls in Commercial Buildings by addressing barriers to adoption.

**Project Activities:** The project is long-term and includes many activities, some DOE funded, some not, all of which contribute to the achievement of the goal. The specific DOE funded activities and associated outputs include:

1. Ten demonstration projects and associated case studies
2. Development and implementation of scalable training programs for designers and installers (deployed in US and Canada via DLC)
3. Development and implementation of replicable, system-based energy efficiency program offerings for advanced controls (deployed in US and Canada via DLC)

# Goal and Objectives

## Objectives of DOE Funded Activities:

- Identify and address market barriers that limit owner adoption of Advanced Lighting Controls (ALCs)
- Provide real building installation, performance, maintenance, and cost data, to improve use of ALCs by professionals that design, specify, install, commission and operate ALCs
- Reduce the total installed cost of ALCs
- Improve understanding of the benefits of ALCs
- Develop and deploy case studies to be used in utility and energy efficiency program marketing and outreach activities
- Develop and implement a national training program for designers and installers of ALCs
- Develop and deploy replicable, system-based utility and energy efficiency program offerings for ALC technology that can be adopted nationally

# Goal Measurement

**Near-term (during and up to 1yr after project) measured by:**

- Adoption of project outputs by target audience.

**Intermediate-term (1-3yr after project) measured by:**

- Number of Advanced Lighting Control projects and associated savings seen by utility energy efficiency program partners compared to historical results.
- Updated market penetration study on slide 7 compared to 2014 baseline.

**Long-term (3+ yr after project) measured by:**

- Number of projects and savings, same as above
- Updated market penetration study, same as above
- Additional market assessment(s) to measure progress towards the Vision on slide 11

# Approach

## Stakeholder Engagement

Engage and develop strong partnerships with energy efficiency programs, the lighting controls industry, and other key stakeholders to provide guidance, support, and investment in project.

## Training Programs

Use training to increase knowledge and experience of how to design, specify, install, commission, and operate ALCs. Target total installed cost barrier by improving installer familiarity of systems and educating designers on design and specification techniques to reduce cost.

## Demonstration Projects

Provide data, proof of concept, case studies. Incorporate results into outreach, marketing, training programs, tools, and resources.

## New Replicable, System-based EE Program Offerings

Reduced installed costs. Drive market to solutions that address market barriers.

# Key Accomplishments to Date

## Stakeholder Engagement

- Formed project Advisory Committee made up of diverse stakeholders and experts, met monthly since beginning of project
- Hosted Advanced Lighting Control Summit with Industry and Utilities/ EE Programs attended by 12 manufacturers and 20 Utility/EE Programs
- Obtained commitments from EE Programs to participate
- Multiple high-level speaking engagements on project

## Training Programs

- Developed Framework for scalable, partnership model between Industry and Utilities/EE Programs
- Currently vetting and refining model – overall very positive response

## Demonstration Projects

- Selected Technologies for demonstrations using team of experts and scoring systems that identified technologies that address market barriers and have potential for scale adoption
- Developed Site Selection criteria for each technology using process that identified types of sites that would provide most value towards achieving project objectives.
- Site recruitment now underway...

# Project Integration and Collaboration

**Project Integration:** Strong engagement and partnership with stakeholders is essential to success and has been a cornerstone of the project since it began.

**Partners, Subcontractors, and Collaborators:** Burlington Electric Department, Cape Light Compact, Efficiency Vermont, PSEG-Long Island, EverSource MA & CT, NYSERDA, National Grid MA and RI, Pacific Gas & Electric, Northwest Energy Efficiency Alliance, Lighting Controls Association, Pacific Northwest National Lab, Natural Resources Canada

**Communications:** Work has been presented in numerous forums:

Northeast ALC Summit 10/9/14	West Coast Utility Lighting Team 12/3/14	Midwest Energy Solutions Conference 1/30/15	AESP-NEEC Conference 11/13/14
CSA TC419 Committee 10/28/14	ANSI C.137 Committee – Lighting Systems 12/4/14	Midwest Lumen January Meeting 1/27/15	Upcoming: ACEEE MT Symposium, Lightfair, NEMA Lighting Forum

# Next Steps and Future Plans

## Demonstration Projects

- Site Selection Complete by May 30, 2015
- Installation, M&V first five projects Q3-Q4 2015
- Installation, M&V remaining five projects Q1-Q2 2016

## Training Programs

- Recommended Training Framework and Curricula due June 30, 2015
- Created Curricula and Implementation Plan due December 30, 2015

## New Replicable, System-based EE Program Offerings

- Recommended EE Program Offering due October 30, 2015

---

# REFERENCE SLIDES



# Project Budget

**Project Budget:** Total project budget \$1,152,139; DOE \$495,653 (43%); Cost Share \$656,486 (57%)

**Variances:** No significant variances to date

**Cost to Date:** Actual costs claimed to date (as of 12-31-14) \$57,843 (5% of budget)

**Additional Funding:** Non-Federal sources are from Project Participants and Energy Efficiency Program Incentives

## Budget History

10/1/14– 12/31/14 (past)		1/1/15-12/31/15 (current plan)		1/1/16+ (future-planned)	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
\$28,921	\$28,922	\$248,514	\$337,812	\$218,218	\$289,752

# Project Plan and Schedule

Project Schedule												
Project Start: <b>October 1, 2014</b>	Completed Work											
Projected End: <b>September 30, 2017</b>	Active Task (in progress work)											
	◆ Milestone/Deliverable (Originally Planned) <b>use for missed</b>											
	◆ Milestone/Deliverable (Actual) <b>use when met on time</b>											
	2014				2015				2016			
Task	Q1 (Jan-Mar)	Q2 (Apr-Jun)	Q3 (Jul-Sep)	Q4 (Oct-Dec)	Q1 (Jan-Mar)	Q2 (Apr-Jun)	Q3 (Jul-Sep)	Q4 (Oct-Dec)	Q1 (Jan-Mar)	Q2 (Apr-Jun)	Q3 (Jul-Sep)	Q4 (Oct-Dec)
<b>Past Work</b>												
Q4 Milestone: Approved Project Management. Plan				◆								
Q4 Milestone: Draft Market Assessment and T2M Strategy				◆								
Q4 Milestone: Energy Efficiency Partner Commitments				◆	Go/No-Go							
Q4 Milestone: Site Selection Criteria				◆	◆							
Q4 Milestone: Technology Selection				◆								
Q4 Milestone: Approved Training Plan				◆	◆							
<b>Current/Future Work</b>												
Q1 Milestone: Final Market Assessment and T2M Strategy					◆							
Q2 Milestone: Recommended EE Program Offering						◆	Go/No-Go					
Q2 Milestone: Recommended Training Framework and Curricula						◆						
Q2 Milestone: Demonstration Site Selected						◆	Go/No-Go					
Q3 Milestone: Completed Installation Plan						◆						
Q4 Milestone: Five Demonstration Sites Installed								◆				
Q4 Milestone: Completed Curricula and Training Plan								◆				
Q1 Milestone: Trained Designers and Installers									◆	◆	◆	◆
Q2 Milestone: All Demonstration Installations Complete										◆		
Q3 Milestone: All Case Studies Complete											◆	