

Lighting and Electrical Team Leadership and Project Delivery

2014 Building Technologies Office Peer Review



U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Linda Sandahl, linda.sandahl@pnnl.gov
Pacific Northwest National Laboratory

Project Summary

Timeline:

Start date: July 2008

Planned end date: 2015 or after

Key Milestones

1. LEEP: 100 million sq ft of high efficiency parking lighting by February 2014
2. LEEP: 300 million sq ft of high efficiency parking lighting by December 2014
3. Interior Lighting Initiative (Campaign) ready for launch by October 2014

Budget:

Total DOE \$ to date: \$2.288 M (2008 – 2014)

Total future DOE \$: TBD

Target Market/Audience:

- Commercial building owners and operators for BBA Lighting Team.
- Larger audience of commercial building sector for campaign initiatives.
 - Manufactures, utilities, contractors, etc.

Key Partners:

Building Owners and Managers Association (BOMA) International
Green Parking Council
International Facility Management Association
Better Buildings Alliance Lighting & Electrical Team members
LEEP Campaign Supporters (manufacturers, utilities, lighting designers, efficiency groups)
Federal Energy Management Program

Project Goal:

To speed the market adoption of high efficiency lighting technologies and practices by utilizing the tools and resources developed by the BBA Lighting & Electrical Project Team and others to address the barriers faced by facility managers and operators.

Project Overview

Task 1. Better Building Alliance (BBA)* Lighting & Electrical Team Leadership (2008 - present)

- Over 60 organizations and over 150 individuals on listserv
- Identify and address BBA member barriers & resource gaps
- Jointly develop tools and resources
- Annual outreach at the Better Buildings Summit

Task 2. Lighting Energy Efficiency in Parking (LEEP) Campaign

- www.LEEPCampaign.org (launched Sept. 2012)

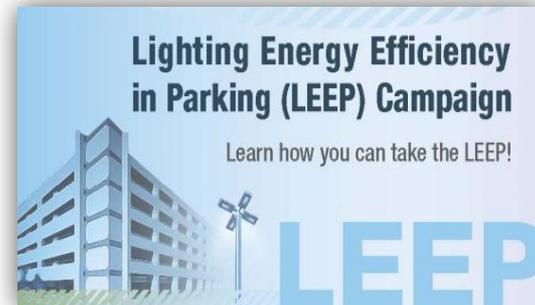
- Specifications, tools, resources developed by Team rolled into larger recognition and guidance program (Campaign)
- Industry partnership; PNNL tech. assistance to Participants
- Surpassed goal of achieving at least 100M sq ft of high efficiency parking lighting installed or planned

Task 3. Interior Lighting Initiative Planning (2015+)

- Finalize plan in FY 2014; FY 2015 launch
- Focus on high impact interior lighting applications and technologies
- Currently identifying tools, resources, partner organizations.



Collaborative development of resources



³ * Formerly the Commercial Building Energy Alliance (CBEA)

Purpose and Objectives

Problem Statement: Lighting often provides some of the easiest, most cost-effective energy-saving opportunities for building owners and occupants – but there are challenges to realizing this potential at scale.

- Barriers addressed include:
 - unfamiliarity with new, rapidly changing technology or approaches
 - lack of reliable, actionable information that demonstrates real world applications of the technology and its cost-effectiveness,
 - difficulty in quickly locating applicable utility incentives, and
 - lack of market recognition for exemplary energy practices.

Target Market and Audience: Commercial lighting uses about 16%* of total commercial building source energy use, more than any other single end-use, and the BBA Lighting & Electrical Project Team is pursuing projects that can reduce lighting energy use by 20% to 75% or more. Audiences includes:

- BBA Members (building owners and managers, engineers),
- Federal users,
- the larger commercial buildings community, including:
 - offices, hospitals, higher education, retail stores, and hotels, and
- other industry players that support efficient lighting.

Purpose and Objectives (continued)

Exterior Lighting (LEEP Campaign)

LEEP Planned Contribution to Energy Efficiency



- **The Opportunity**

- Nation could save \approx 187 Tbtu annually or \approx \$1.84 billion with high efficiency parking lighting ¹
- LEEP award documentation represents only \approx 0.10% of the estimated 505 million parking spaces in the U.S.² Lots more opportunity!

1. Project Endpoint

- June 2015 LEEP Award Announcements
- Suite of resources to support exterior lighting upgrades
- Examples of successful implementation available

2. Key Success Indicators

- Phase 1 Goal (Year 1)
 - Participants agree to evaluate their portfolio to identify potential sites that can apply high efficiency lighting technology, and to use it where feasible and cost-effective
 - Goal: 100 million sq ft of installed/planned high efficiency parking space
 - Awards in up to 12 categories
- Phase 2 Goal (Year 2) – Progress toward 300M sq ft goal
- Phase 3 Goal (Year 3+) – 300M sq ft achieved; new Participants, Supporters, and award winners

1. DOE 2013 Adoption of LEDs in Common Lighting Applications

5 2. DOE 2011 Energy Savings Estimates of LEDs in Niche Lighting Applications

Purpose and Objectives (continued)

Interior Lighting Campaign Planning (FY 2015 launch)



Project Contribution to Energy Efficiency:

- Interior lighting applications offer substantial savings, for example:
 - If all US **troffers** were replaced to BBA specification compliance troffers, could save ≈ 290 TBtu, or $\approx \$2.6$ billion annually
 - If all US **commercial CFL downlights** were replaced to BBA specification compliant downlights* the US could save ≈ 12.7 TBtu or $\approx \$115$ million annually

1. Project Endpoint

- 3 year expected duration starting 2015 -- 2 rounds of interior awards
- Savings and costs calculated

2. Key Success Indicators

- Project plan draft complete March 2014; Final September 2014
- Organizing Partners who represent significant market share; responsive to industry needs; able to track energy savings and participation; document target applications and performance; provide resources and technical assistance to move idea to execution.
- If we demonstrate success we will have ___ participants impacting ___M sq ft of interior space and ___TBtu savings

*assumes 16W LED replaces 26W CFL lamp + ballast

Approach (General)

Speed the adoption of high efficiency lighting by:

1. identifying technology and/or market adoption barriers to increased uptake of new/underutilized lighting technologies in high-use, replicable application categories through the BBA Lighting & Electrical Team;
2. identifying current resources available, and gaps/needs;
3. developing tools and resources that address barriers, in coordination with industry partners;
4. testing/vetting resources within and outside the BBA;
5. encouraging wider execution of energy saving practices in commercial lighting, once resources prove successful with BBA membership, document participation, performance and implementation via larger initiatives (e.g., Campaigns);
6. continuing to explore new lighting-related barriers and challenges with the BBA community via the Lighting & Electrical Team.
7. Coordination within DOE (FEMP, DOE SSL Program, etc.)

LEEP Approach

Collaboration and Resources



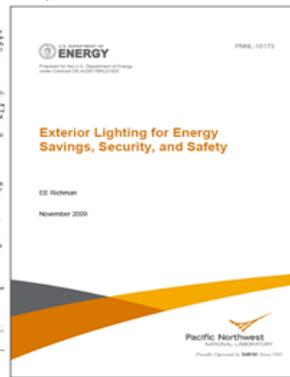
DOE provides tools and technical assistance to Participants in helping the Campaign Organizers maximize participation



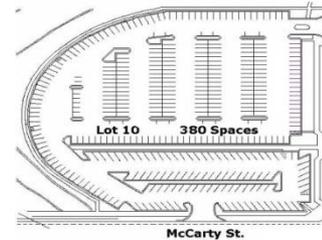
Case Studies



Specifications



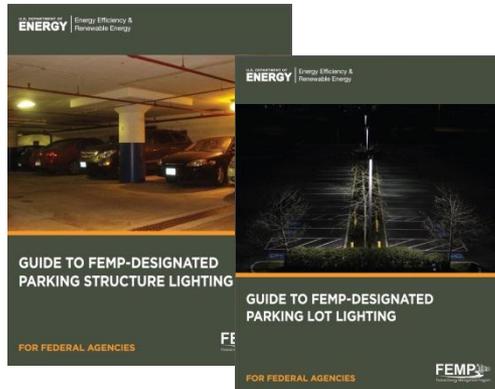
M&V guidance



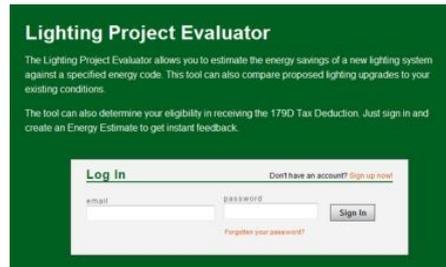
Technical Assistance (limited)

List of utility incentives

Parking Garage	Utility	State	Technology	Product	Rebate Amount
	Alliant Energy	IA	LED	Fixture	\$30
	Alliant Energy	IA	Controls	Occupancy Sensor	\$20



Design Vignettes



Energy Estimator to compare against code



Approach (LEEP Campaign)

Key Issues:

- Long lead times for site selection → design → construction means that many sites will not have been completed by end of Campaign
- Participants do not always provide all the needed site information

Distinctive Characteristics:

- Collaborative effort with industry that leverages resources developed by the BBA's Lighting & Electrical Project Team
- Campaign offers unusual opportunity to count use of DOE resources in Participant facilities



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Progress and Accomplishments

Lessons Learned

- Significant industry interest in a variety of approaches/technologies.
- More interest in awards than we thought!
- “Campaigns” are successful when you have; key partners with significant market share and parallel mission; market interest in the application; engagement and leadership by industry leaders; and recognition to help track and document success.

Accomplishments

- LEEP Phase 1 total installed/planned sq ft is over 270M sq ft
 - Goal: 100M sq ft of high efficiency parking installed or planned
- LEEP Award submissions received from 21 organizations represents:
 - over 160M sq ft of installed parking space;
 - about 45 million kWh/year (or \approx 155 billion Btu of site energy) saved;
 - about 500,000 parking spaces;
 - about 600 parking facilities; and
 - median energy savings of nearly 60% with some sites reaching over 80%.
- LEEP Award winners in all 12 categories

Progress and Accomplishments (continued)

Over 100 LEEP Campaign Participants (as of March 2014)

ABM Energy	Cushman & Wakefield	MGM Resorts International	The Hermitage Centre
ABM Facility Services	Denver Office Park / CBRE	Midwest Moving & Storing	The Kroger Co.
AGC Banquet & Event Center	Dept. of Defense, Joint Base San Antonio	Miller-Valentine Group	ThedaCare
Alexandria Real Estate Equities, Inc.	Dept. of Veterans Affairs, Perry Point, MD	MN National Guard	Tower Companies
Allentown Parking Authority	Evolvelectric	Morlin Asset Management	Town of Amherst
American Realty Advisors	Ford Motor Company	Newmark Grubb Knight Frank	Town of Mountain Village
Arby's Restaurant Group	Forest City Enterprises Inc.	Parmenter Realty Partners	U.S. Army Reserve Parks Reserve Forces Training Area
AT&T	Franklin Resources Inc	Perry CSD	U.S. Army - Dugway Proving Ground
Blue Hill Partners	Gaylord Nat Resort & Convention Ctr	Point Park University	Union Station
Bradford Exchange	Georgia Building Authority	Prince William County Govt., Department of Public Works	University of California at Irvine
Brookfield Office Properties	Groupe Pacific	Prologis L.P.	University of Colorado Health
Brookshire Brothers	Grubb Ventures	Providence Heath & Services	University of Maryland Medical Center
Bruce Wayne Kubena	Hammerschlag & Co., Inc.	Prudential Real Estate	University of Minnesota - Parking and Transportation Services
CBRE for Regions Bank	Hines	PTP Management, Inc.	University of Pennsylvania
CC Frost Properties, LTD	Horizon Solutions LLC	Regency Centers	University of South Florida
CentraCare Health System	ibx lighting	Reit Management & Research LLC	Univ. of Pittsburgh Medical Center)
City of Melrose	JBG Companies	Santa Barbara County	US Air Force - Lackland, AFB
City of San Jose, Dept. Transp.	Jones Lang LaSalle	Shelor Motor Mile	Village of Great Neck Plaza
CLTC	Julin Realty Services, LLC	Standard Parking	Von Braun Center
Compass Properties, LLC	Kimco Realty Group	State of Missouri	Walmart
Connecticut General Assembly	Marine Corps Base Quantico (MCBQ)	Sumner School District	Wells Fargo Insurance USA
Cox Enterprises Inc.	MC Realty Group LLC	Supervalu, Inc.	Wyndham
Crescent Real Estate Equities	MD Anderson Cancer Center	TES Engineering	

Over 100 organizations have signed up as LEEP Campaign **Supporters** (see reference slide)

Progress and Accomplishments (continued)

Market Impacts – LEEP Phase 1 Award Winners

Org.	Retrofits				New				Other			
	1	2	3	4	5	6	7	8	9	10	11	12
A	≈1.7 million											
B		≈4 million									65%	
C		≈2 million										
D			>80%		≈400,000		>80%					≈15.3 million
E			>80%									
F			>80%									
G				>80%								
H				>80%								
I						≈500,000		≈70%				
J									X			
K									X			
L										160		

Award Categories

Retrofit	New construction	Other
1 - Absolute savings - parking lot	5 - Absolute savings - parking lot	9 - Best use of controls
2 - Absolute savings - parking structure	6 - Absolute savings - parking structure	10 - Absolute number of sites
3 - Greatest % savings - parking lot	7 - Greatest % savings - parking lot	11 - Greatest percentage of portfolio
4 - Greatest % savings - parking structure	8 - Greatest % savings - parking structure	12 - Greatest overall savings kWh
Notes: Savings are kWh/year; Additional savings from maintenance costs, etc. not included. For award descriptions, see http://www.leepcampaign.org/uploads/7/4/8/7/7487823/leep_award_categories_and_details.pdf		

Progress and Accomplishments (continued)

Tools and Resources Developed – BBA Lighting & Electrical Team

LED Site (Parking Lot) Lighting	High-Efficiency Parking Structures Lighting
Parking Lot Lighting Specification	Parking Structure Lighting Specification
Parking Lot Lighting Fact Sheet	Parking Structure Lighting Fact Sheet
Walmart Parking Lot Goes LED Case Study	Cleveland Clinic Goes LED in Parking Garages Case Study
Lighting Measurement and Evaluation Protocol	Lighting Measurement and Evaluation Protocol
Street and Parking Lighting Retrofit Financial Analysis Tool	Street and Parking Lighting Retrofit Financial Analysis Tool
Lighting Energy Efficiency in Parking (LEEP) Campaign	Lighting Energy Efficiency in Parking (LEEP) Campaign
Exterior Lighting for Energy Savings, Security, and Safety	Exterior Lighting for Energy Savings, Security, and Safety
Using the Specification: GATEWAY Demonstration Projects	
High-Efficiency Troffers	Controls
High-Efficiency Troffer Lighting Specification	Exterior Lighting Controls Guidance
High-Efficiency Troffer Lighting Fact Sheet - Benefits and Energy Savings	LED Refrigerated Case Lighting LED Refrigerated Display Case Lighting Specification LED Refrigerated Display Case Lighting Fact Sheet
High-Efficiency Troffer Lighting Fact Sheet	
Walmart Demonstrates LEDs on the Sales Floor Case Study	
Wall Pack Lighting	Surgical Lighting
Wall Pack Lighting Specification and Application Guidance	Surgical Task Lighting Fact Sheet

FEMP Resources
Case Studies of Federal Sites
Design Guidance
- FEMP-Designated Parking Lot Lighting
- FEMP-Designated Parking Structure Lighting
FEMP Acquisition Guidance Product List

Project Integration and Collaboration

Project Integration:

- BBA Lighting & Electrical Team –
 - Representatives from over 60 organizations; over 150 people on listserv; 47 regular participants
 - Identify & develop tools/resources to address market/technology barriers
 - Methods: monthly conference calls, webinars, and peer sharing
 - Recent topics addressed:
 - Next Generation Luminaire (NGL) Design Competition winners
 - Plasma Lighting
 - Flood Lighting
 - Exterior Occupancy Sensor Development
 - Interior Campaign planning
 - Industry review of tools and resources
- “Campaign” approach is built upon strong industry engagement
 - 103 LEEP Participants
 - Whose portfolios represent \approx 3% of existing parking lot and structure space in the U.S.*

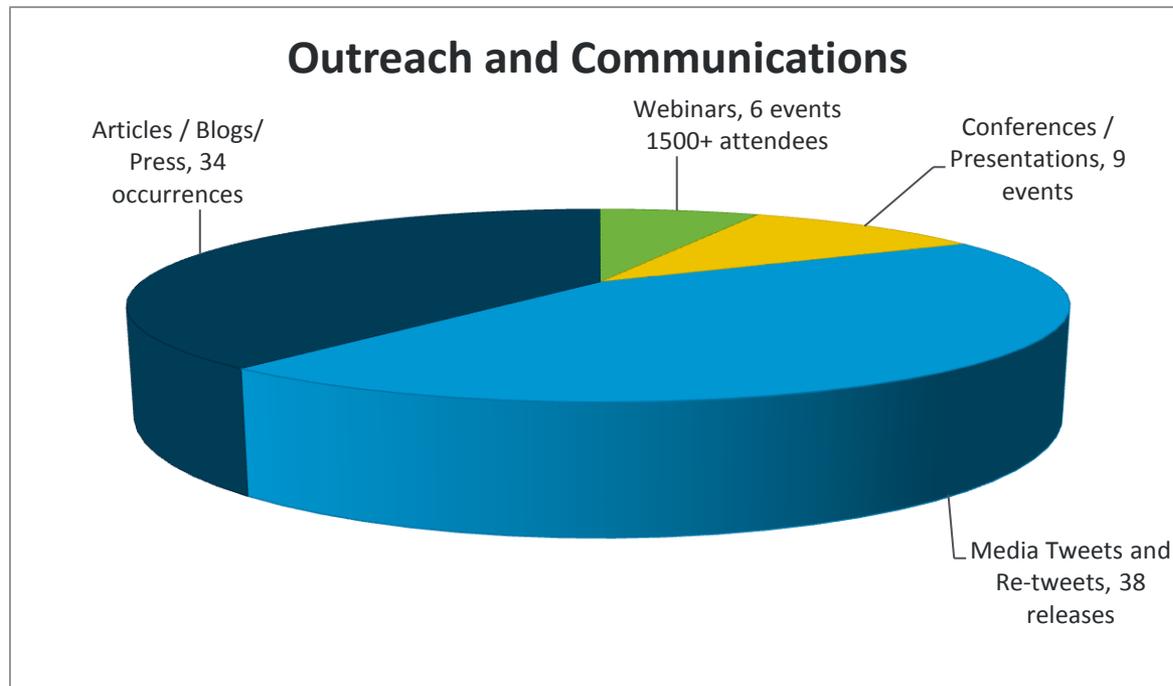
* Assumes 505 million parking spaces in U.S. (DOE 2011 Energy Savings Estimates of Light Emitting Diodes in Niche Lighting Applications)

Project Integration and Collaboration (continued)

Partners and Collaborators: BBA members, utilities and regional energy efficiency groups, lighting designers, ESCOs.



Project Integration and Collaboration (continued)



See Reference Slide for Outreach and Communications details

Subcontractors:

- Cline Bettridge Bernstein Lighting Design
- Aurora Lighting Design Inc.

Next Steps and Future Plans

Lighting & Electrical Team Leadership

- Reviewed annually by DOE to determine continued support
 - Decision to proceed dependent upon team's ability to recruit, retain, and demonstrate partner energy savings supported by team activities
- Team will continue to address barriers and gaps, and jointly develop tools/resources

LEEP Campaign

- Strong participation led to project extension and second phase of awards.
- 300M sq ft Phase 2 goal may be revised to 500M sq ft based on Phase 1 results
- LEEP Campaign could be extended or transitioned to others

Interior Lighting Campaign

- FY 2014 plan will identify lighting applications and practices, resources and tools, partners, collaborators, and project milestones
- Implement the plan in FY 2015
- If we demonstrate success we will have ___ participants impacting ___M sq ft of interior space and ___TBtu savings

REFERENCE SLIDES

Project Budget

Project Budget

Variations: No variations

Cost to Date: \$254K (41%)

Additional Funding: Strong industry collaboration and in-kind support, but no other direct funding sources.

Budget History

FY2008– FY2013 (past)		FY2014 (current)		FY2015 – TBD (planned)	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
\$1,670K	\$0K	\$618K	\$0K		

Project Plan and Schedule

Project Schedule												
Project Start: 10/1/2013	Completed Work											
Projected End: September 2015 (or later TBD)	Active Task (in progress work)											
	◆ Milestone/Deliverable (Originally Planned) use for missed											
	◆ Milestone/Deliverable (Actual) use when met on time											
	FY2013				FY2014				FY2015			
Task	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)
Past Work												
Quarterly Deliverable: Report on Lighting Team & LEEP Accomplishments	◆	◆	◆	◆	◆	◆						
Milestone: Define BBA exterior lighting controls resource needs	◆											
Deliverable: Update Troffer deployment plan	◆											
Deliverable: Develop controls guidance resources				◆								
Deliverable: BBA Troffer demonstration project case study report Walmart				◆								
Deliverable: BBA Wall Pack Specification and Guidance Document				◆								
Deliverable: LEEP Extension Project Plan					◆							
Deliverable: Project Plan - BBA Interior Lighting Campaign						◆						

Project Plan and Schedule (continued)

Project Schedule												
Project Start: 10/1/2013	Completed Work											
Projected End: 9/30/2015	Active Task (in progress work)											
Future work may involved an initiative or "campaign" focused on interior lighting	◆ Milestone/Deliverable (Originally Planned) use for missed											
	◆ Milestone/Deliverable (Actual) use when met on time											
	FY2013				FY2014				FY2015			
Task	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)	Q1 (Oct-Dec)	Q2 (Jan-Mar)	Q3 (Apr-Jun)	Q4 (Jul-Sep)
Past Work												
Deliverable: Assess opportunities to lock in BBA lighting specification energy savings via code updates; report on opportunities and next steps.							◆					
Current/Future Work												
Deliverable: LEEP Campaign impact assessment/Lighting Team Accomplishments							◆	◆				
Milestone: Project Team continuation or cancellation go/no-go decision point.							◆					
Milestone: Presentation at BTO Prog. Review							◆					
Milestone: BBA Efficiency Forum: Planning support and facilitation of Lighting Team sessions							◆					
Milestone: BBA troffer specification for NGL								◆				
Milestone: Comprehensive cost-effectiveness analysis for exterior LED lighting to support a code proposal								◆				

Project Integration and Collaboration

Communications:

- LEEP Campaign Webinars
 - LEEP Launch (Sept 2012)
 - LEEP Campaign Progress – presentations from Walmart, MGM, Hines and Green Parking Council (Feb 2013)
 - CBRE Green Knights webinar (April 2013)
 - OSRAM SYLVANIA's sustainable lighting solutions (April 2013)
 - Using the Street and Parking Facility Lighting Retrofit Financial Analysis Tool webinar hosted by the Better Buildings Alliance and FEMP (Aug 2013)
 - LEEP Campaign / Lighting Controls for Parking Facilities (Dec 2013)
 - High Efficiency Parking Lighting for Federal Agencies: The Time Is Now to Join LEEP and Get the Resources You Need (March 2014)
- Articles (print or web in Q2) by
 - Healthcare Environmental Resource Center, ParmenterGREEN, UCLA, Better Plants' Partners Newsletter, ENERGY STAR, BOMA and IFMA.

Project Integration and Collaboration (continued)

Communications:

- Better Buildings Efficiency Forum
- Greenbuild International Conference and Expo
- Lightfair International
- National Parking Association (NPA) Convention & Expo
- Defense Energy Summit
- International Parking Institute (IPI) Annual Convention
- Midwest Energy Solutions Conference
- Better Buildings Alliance, GPC, IFMA and BOMA e-newsletters
- 38 Tweets and re-Tweets (GPC, IFMA, BOMA and Better Building Alliance members)
- Several LEEP focused articles, blogs and press releases
- IFMA's Sustainability Chapter meeting

Progress and Accomplishments

LEEP Campaign Supporters (as of March 2014)

Action Electric	CS Lighting Inc.	Graftek Designs	Northeast Energy Efficiency Partnership
Acuity Brands Lighting	CTI Professional Services	Green Team Coalition, LLC	OSRAM Sylvania
Advanced Power Technologies	Danfoss	GreenrayLED	PG&E
Advanced Power Technologies LLC	Deco Lighting	Holt Electrical Supplies	Phillips Electrical Systems, Inc.
Aelux	Downtown DC Business Improvement District	Hubbell Lighting Inc.	Professional Retail Store Maintenance Association (PRSM)
All Star Lighting, Inc.	DuraComm Lighting	Icon International	RBC Partners
AllBright Management Professionals	E2SOL LLC	Illinois LED Products, Inc.	RenewAge Energy Solutions
Allumia Energy	Eco Engineering	Illuminating Engineering Society (IES)	Rexel
Ambient Energy	ECO Parking Lights	Illumination Logistic Services dba ILS	Sacramento Municipal Utility District
America Lighting Retrofit LLC	EES Consulting	Institute for Energy Efficiency and Renewable Energy	SAIC
American Green Technology	Efficiency Lighting Consultants	Intellenergy	San Diego Gas & Electric
American Green Technology AGT	Efficiency Vermont	Intelligent Energy Optimizers LLC	Sandpiper Services
American Wholesale Lighting, Inc.	Electrical Contractors, Incorporated	Johnson Controls	South-Central Partnership for Energy Efficiency as a Resource (SPEER)
Applied Energy Solutions LLC	Energy Efficiency & Sustainability Consulting	Joules Technology Inc.	Southeast Michigan Regional Energy Office
Baltimore Gas and Electric	Energy Efficient Buildings Hub (EEB Hub)	JP & Associates	Southern California Edison
bjornphoto	Energy Network LLC	La Selva Solutions	Sylvania
Breakwater Ventures	Energy Stewards, Inc.	LED Source	TEKCONN
Brighter World Lighting, LLC	Energy Trust of Oregon	LED Supply Co.	The Lighting Company
Bruce Wayne Kubena	EnergyR.co	Light Solutions, LLC	Ultra Solar & Wind Solutions, LLC
Business Art Design	Energize	Lighting Services Inc.	URT
CeeLite Technologies LLC	Englewood Electric Supply Company	Lumenistics, LLC	USA LED SOLUTIONS
Celtic Energy	ENVIRO ENERGY PARTNERS	LumiDon, LLC	Virescent Solutions Inc.
Chris Electric Company, Inc.	Everbrite, LLC	Mac Electric Company Inc.	Vision Lighting Corporation
CIC Energy Construction & Supply, LLC	Expert Energy Pty Ltd	Midwest Energy Efficiency Alliance	Walker Parking Consultants
Clear Blue Energy Corp.	Fulham	Mississippi Power Company	Watershed Installation Services
CoolLED, Inc.	Gloria Jaroff Design, A.I.A.	National Energy Solutions	Western Electricity Coordinating Council
Cooper Lighting	GoGreener LED Lighting, LLC	NG Builders	