



Lighting Solutions for Commercial Buildings

Wednesday, May 7, 1:00 - 2:15 PM

Moderator:

Linda Sandahl, PNNL

Speakers:

Nate Mitten, Kimco Realty Corporation

Chris Magee, MGM Resorts International

Session Overview

- Welcome and Introductions *Linda Sandahl, PNNL*
- BBA Lighting & Electrical Team
Resources and Initiative Highlights *Linda Sandahl, PNNL*
 - Exterior Resources
 - LEEP Campaign
- BBA Wall Pack Specification Application *Chris Magee, MGM*
- A Winning LEEP Campaign Approach:
Kimco's Gateway Program *Nate Mitten, Kimco*
- Discussion Topics *All*
- Next Steps *Linda Sandahl, PNNL*

Lighting & Electrical Technology Solutions Team

What we do

- Address market and technology barriers
- Develop tools/resources
- Share results

Strong participation

- (~60 active BBA members)
- Monthly Interior/exterior focused meetings
- Peer discussions

Foundation for launching larger initiatives

- (e.g. LEEP Campaign)

The screenshot displays the Better Buildings Alliance website. At the top, it features the U.S. Department of Energy logo and the text 'Energy Efficiency & Renewable Energy'. The main header includes the 'Better Buildings' logo and 'BETTER BUILDINGS ALLIANCE'. Navigation tabs for 'Sectors', 'Activities', 'Events', 'About', and 'Join' are visible. The 'Activities' section is expanded to show 'Technology Solutions Teams', with 'Lighting & Electrical' selected. A sidebar lists other teams like 'Space Conditioning', 'Plug & Process Loads', 'Food Service', 'Refrigeration', 'Laboratories', 'Energy Management', and 'Information Systems'. The 'Lighting & Electrical' section contains introductory text and a 'Take Action' table. The table lists various activities with associated resource icons (F, S, C, W, R, G).

Activities	Selected Resources
Adopt high-efficiency lighting for your parking lot	F S C W
Adopt high-efficiency lighting for your parking structure	F S C
LEEP into lighting and join the Lighting Energy Efficiency in Parking (LEEP) Campaign	
Participate in a field test for high-efficiency troffer lighting	F F S C W
Participate in a field test of Next Generation Luminaire downlight winners	
Adopt high-efficiency lighting for your wall packs	S
Adopt exterior lighting controls guidance	G
Demonstrate new adaptive exterior lighting technologies in your healthcare facility	R
Adopt the refrigerated display case lighting performance specification and start saving on your case lighting costs	F S
Implement LED surgical lighting in your healthcare facility for improved performance and energy savings	F



Application of BBA Wall Pack Specification

Chris Magee, MGM Resorts International



- 17 Resorts in Nevada, Michigan, Mississippi, and Macau (more in development stages)
- 350 Food & Beverage outlets
- 48,996 Rooms
- 61,000 Employees
- 3.0M Sq. ft. of Convention Space
- \$1.3 Billion dollar supply chain
- 8,000+ Suppliers



MGM RESORTS INTERNATIONAL®

Sustainability Strategic Plan

History: Corporate Sustainability Division Identifies Five Core Focus Areas in 2006



Energy
& Water



Recycling
& Waste
Management



Green
Building



Supply
Chain



Outreach
& Education

Wall Pack Specification

Scope of Work

- Total number fixtures in scope = 2,948
- Most applications will result in 50% + reduction in lamp wattage, further reduced by dimming.
- Over several large properties, fixture types were standardized reducing the fixtures types significantly.
- Added 0-10v dimming to all new fixtures. This feature allows for future smart light fixture software integration, as well as proximity/motion sensors.
- New fixtures utilized induction lighting technology for a sustainable multi location installation. Induction product is readily available ensuring that if service is needed there will not be delays in operation or replacement if necessary.

Wall Pack Specification

Scope of Work

- New fixture specification required metal, powder coated housings and glass lenses to ensure the fixture will last as long as the light sources and does not yellow reducing output.
- New induction fixtures have a wide range of operating temps. Previous installs have proven to be successful in Las Vegas desert conditions (-20°C to 60°C).
- New induction fixtures offered a wide range of input voltages from 120v to 480v. This flexibility allowed for no primary electrical rework to upgrade.
- Induction light sources provide high color rendering (CRI) improving the walk up appearance. This change is noticeably different when replacing high pressure sodium lights that have a yellow color and very low CRI.
- New fixtures are backed by 10 year warranty and will match recent pole project.

Wall Pack Specification

Request for Proposal

- **Purpose:** MGM Resorts International (MGM) is seeking to replace our properties currently installed exterior wall-pack High Intensity Discharge (HID) lighting fixtures. The intent of this Request For Proposal (RFP) is to award a firm fixed price, turn-key solution for the existing exterior wall-pack lighting from high-pressure sodium (HPS), Metal Halide (MH) fixtures to Induction lighting. This project is being accomplished in conjunction with the United States Department of Energy (DOE) Better Building Alliance (BBA) for the additional purpose of further demonstrating the viability of high performance lighting solutions to the commercial building market.
- The BBA has identified wall packs as an area in which the effective application of more efficient lighting and its application can dramatically improve lighting quality and energy performance. A BBA Project Team comprising members from the retail, commercial real estate, and hospital sectors, with support from the Pacific Northwest National Laboratory, developed technical specification and application guidance that prescribes equipment characteristics and application guidance including controls that support reduced energy use compared to common standard practice. MGM has incorporated a majority of the BBA High Efficiency Wall Pack Specification & Guidance language within this document / RPF. The complete specification can be found here:
<http://www4.eere.energy.gov/alliance/sites/default/files/uploaded-files/high-efficiency-wall-pack-specification.pdf>

Wall Pack Specification

Highlights

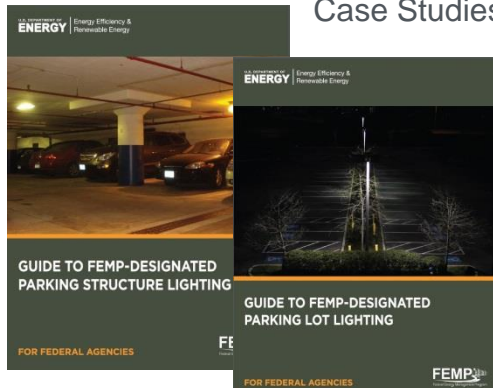
- Approximately 3,000 existing wall pack light fixtures at the Las Vegas area properties.
- \$1.1M in projected 2014 CAPX.
- \$162K in projected utility rebates.
- \$517K in initial annual operating expense savings (energy and materials).
- 54.5% first-year ROI.
- 1.8 years simple payback.
- 2.7M annual kWh saved.

Lighting Energy Efficiency in Parking (LEEP) Campaign

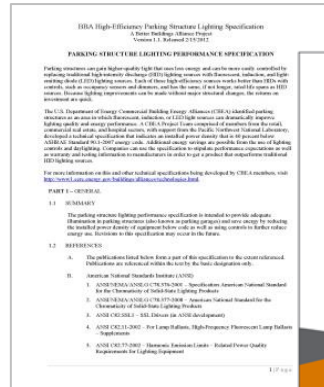
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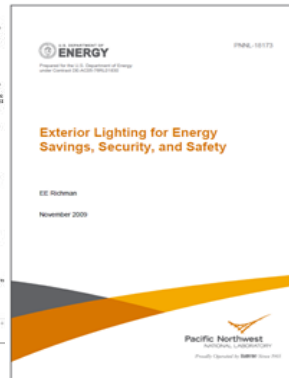
Resources:



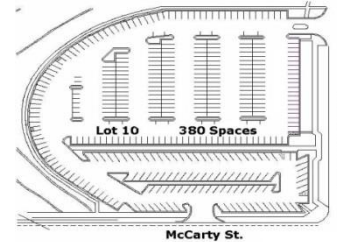
Case Studies



Specifications



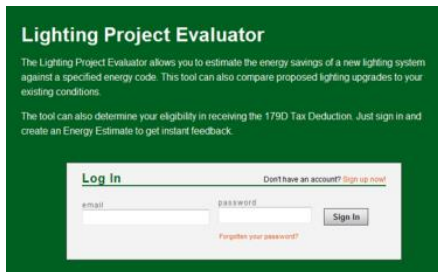
M&V guidance



Technical Assistance (limited)

List of utility incentives

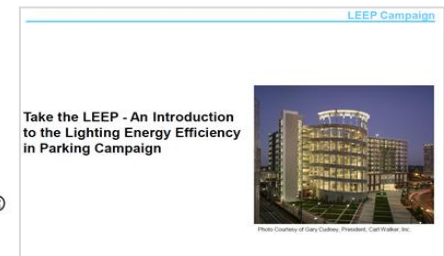
Parking Garage	Utility	State	Technology	Product	Rebate Amount
	Alliant Energy	IA	LED	Fixture	\$30
	Alliant Energy	IA	Controls	Occupancy Sensor	\$20
Parking Garage / Parking Lot / Financing					



Energy Estimator to compare against code



A Program of the U.S. DOE



Webinars

LEEP Award Winners - 2014

Awardee	Category
Cox Enterprises, Inc.	Highest Absolute Annual Energy Savings in a Retrofit at a Single Parking Area
MC Realty Group LLC	Highest Absolute Annual Energy Savings in a Retrofit at a Single Parking Structure
MGM Resorts International	Highest Absolute Annual Energy Savings in a Retrofit at a Single Parking Structure
MGM Resorts International	Largest Percentage of Facilities Upgraded (minimum of five facilities)
Regency Centers	Highest Percentage Energy Savings in a Retrofit at a Single Parking Area
Marine Corps Base Quantico	Highest Percentage Energy Savings in a Retrofit at a Single Parking Area
Walmart Stores, Inc	Highest Percentage Energy Savings in a Retrofit at a Single Parking Area
Walmart Stores, Inc	Highest Absolute Annual Energy Savings in a New Construction Single Parking Area
Walmart Stores, Inc	Highest Percentage Energy Savings in a New Construction Single Parking Area
Walmart Stores, Inc	Largest Portfolio-wide Annual Absolute Energy Savings
Thedacare	Highest Percentage Energy Savings in a Retrofit at a Single Parking Structure
University of Minnesota	Highest Percentage Energy Savings in a Retrofit at a Single Parking Structure
JBG Companies	Highest Absolute Annual Energy Savings in a New Construction Single Parking Structure
JBG Companies	Highest Percentage Energy Savings in a New Construction Single Parking Structure
California Lighting Technology Ctr	Best Use of Lighting Controls in a Single Facility
Howard Hughes Corporation	Best Use of Lighting Controls in a Single Facility
Kimco Realty Corporation	Largest Absolute Number of Facility Upgrades



A Winning LEEP Campaign Approach: Kimco's Gateway Program

Nate Mitten, Kimco Realty Corporation

Gateway Program Overview



Gateway Program Overview



Gateway Program Overview

Goals:

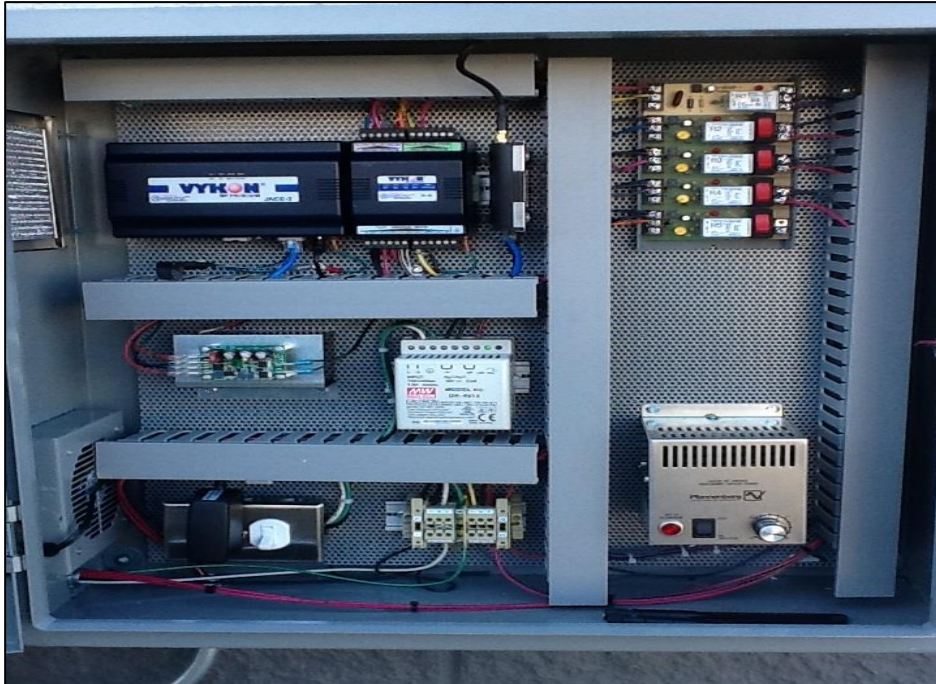
- ≡ Reduce CAM electricity consumption by 10-20% for the majority of Kimco sites through precise astronomical control and night-lighting opportunities
- ≡ Improve safety, security, and tenant experience through automatic notification of lighting outages that enable faster resolution
- ≡ Maximize property manager effectiveness through technology

Statistics:

- ≡ 160 projects completed by end of 2013 representing over 51 million square feet of parking area
- ≡ 150 additional projects underway in 2014
- ≡ Energy savings of 18% for sites that can implement night lighting and 11% for all sites installed to date (2 to 4 year simple payback at most sites)

Gateway Program Overview

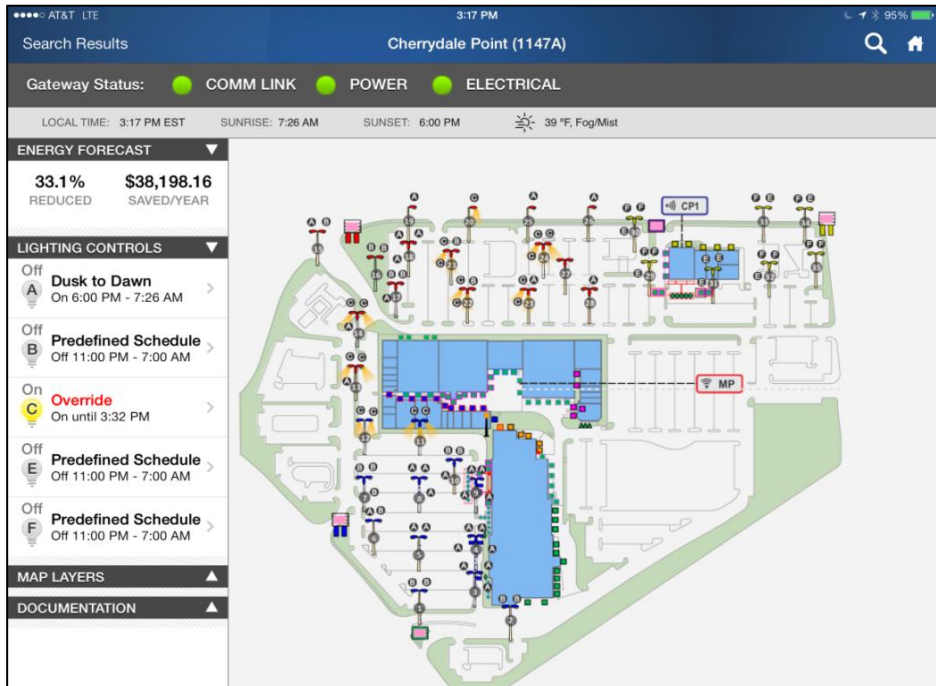
Hardware Features:



- Durable and weather tight enclosure
- Standard components for easy and reliable servicing through vendor network
- Manual override switches to bypass controller for servicing/testing lights
- Battery backup in event of power failure

Gateway Program Overview

Software Features:



- Accessible through any web browser or Kimco's custom iPad application
- Intuitive overrides and scheduling of lights
- Visual depiction of site lighting status, alarms, and schedule details
- Energy forecast feature dynamically shows financial impact of schedule selection

Gateway Program Overview

Contact:

Nate Mitten, Ph.D.

Manager of Energy Services

Kimco Realty Corporation

704-362-6142

nmitten@kimcorealty.com

www.kimcorealty.com

Discussion Topics

- What are the primary challenges you face when adopting high performance exterior lighting solutions?
- What resources/tools/assistance would be the most useful in overcoming these challenges?

Next Steps

1) Attend upcoming Lighting sessions at the Summit:

Today

- 2:15-3:45 PM Lighting Solutions for Commercial Buildings (Interior Lighting Focus)

Thursday

- 9:45-11:00 AM High Performance Street and Area Lighting Upgrades
- 3:30-5:00 PM It's Not Just About Technology: Accelerating Adoption of Energy Saving Approaches in Parking Facilities

2) Provide additional thoughts and feedback to

linda.sandahl@pnnl.gov

3) Join the BBA Lighting & Electrical Team (BBA members)

4) Participate in BBA lighting initiatives (e.g. LEEP Campaign)

THANK YOU!



Lighting Solutions for Commercial Buildings

Wednesday, May 7, 2:30 - 3:45 PM

Moderator:

Jeff McCullough, PNNL

Speakers:

Kathia Benitez, New York
Presbyterian

Session Overview

- Welcome *Jeff McCullough, PNNL*
- Introductions *All*
- BBA Lighting & Electrical Team Resources *Jeff McCullough, PNNL*
 - Interior Resources
- BBA Troffer Demonstration *Kathia Benitez, NYP*
- BBA Interior Lighting Initiative *Jeff McCullough, PNNL*
- Discussion *All*
- Next Steps *Jeff McCullough, PNNL*

Lighting & Electrical Technology Solutions Team

- Over 60 organizations participate
 - (150 people on listserv)
- Hold alternating monthly calls
 - Interior/exterior focus
- Address market and technology barriers
- Develop tools/resources
- Peer discussions
- Foundation for launching larger Campaigns

The screenshot shows the Better Buildings Alliance website. At the top, it features the U.S. Department of Energy logo and the text "Energy Efficiency & Renewable Energy". The main header includes "Better Buildings" and "BETTER BUILDINGS ALLIANCE". Below this is a navigation menu with "Sectors", "Activities", "Events", "About", and "Join". The "Activities" section is expanded, showing "Technology Solutions Teams" with "Lighting & Electrical" selected. Other options include "Space Conditioning", "Plug & Process Loads", "Food Service", "Refrigeration", "Laboratories", "Energy Management", and "Information Systems". The "Lighting & Electrical" section contains text about commercial lighting energy use and a list of activities with associated resources. The "Take Action" section lists various activities with resource icons (F, S, C, W, R, G). At the bottom, there are sections for "Tools & Resources" and "Members".

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

EERE Home | Programs & Offices | Consumer Information

Better Buildings
U.S. DEPARTMENT OF ENERGY

BETTER BUILDINGS ALLIANCE

Sectors | **Activities** | Events | About | Join

HOME > TECHNOLOGY SOLUTIONS TEAMS > LIGHTING & ELECTRICAL

Activities

Technology Solutions Teams

- Lighting & Electrical**
- Space Conditioning
- Plug & Process Loads
- Food Service
- Refrigeration
- Laboratories
- Energy Management
- Information Systems

Public Sector Teams

Market Solutions Teams

Lighting & Electrical

Commercial lighting uses about 4.0 quads of primary energy annually—more than 20% of total commercial building energy use in the U.S. Fortunately, lighting can often provide some of the easiest, most cost-effective energy-saving opportunities for building owners and occupants. Lighting & Electrical Team members reduce lighting energy use by sharing cost-effective solutions to interior and exterior lighting challenges and developing lighting specifications to build demand for higher efficiency technology.

Using the specifications developed by the Lighting & Electrical team, Better Buildings Alliance members as diverse as Safeway, Cleveland Clinic, USAA Real Estate, Walmart Stores, and BJ's Wholesale Club are already saving millions of dollars annually through lighting improvements that others can replicate.

[Contact us](#) to join the Lighting & Electrical team or for additional information.

Take Action

Activities	Selected Resources
Adopt high-efficiency lighting for your parking lot	F S C W
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Adopt high-efficiency lighting for your wall packs	S
Adopt exterior lighting controls guidance	G
Demonstrate new adaptive exterior lighting technologies in your healthcare facility	R
Adopt the refrigerated display case lighting performance specification and start saving on your case lighting costs	F S
Implement LED surgical lighting in your healthcare facility for improved performance and energy savings	F

Tools & Resources +

Members +

Home | U.S. Department of Energy | Contacts | Web Site Policies | Security & Privacy | FOIA | No Fear Act | USA.gov

Current Interior Lighting Resources

- BBA Troffer Specification v4.0 (April 2013)
 - 85 lpw
 - Considering adding a downlight spec. this summer
- Case Studies
- Webinars
- Leverage DOE's SSL Program
 - <http://www1.eere.energy.gov/buildings/ssl/>

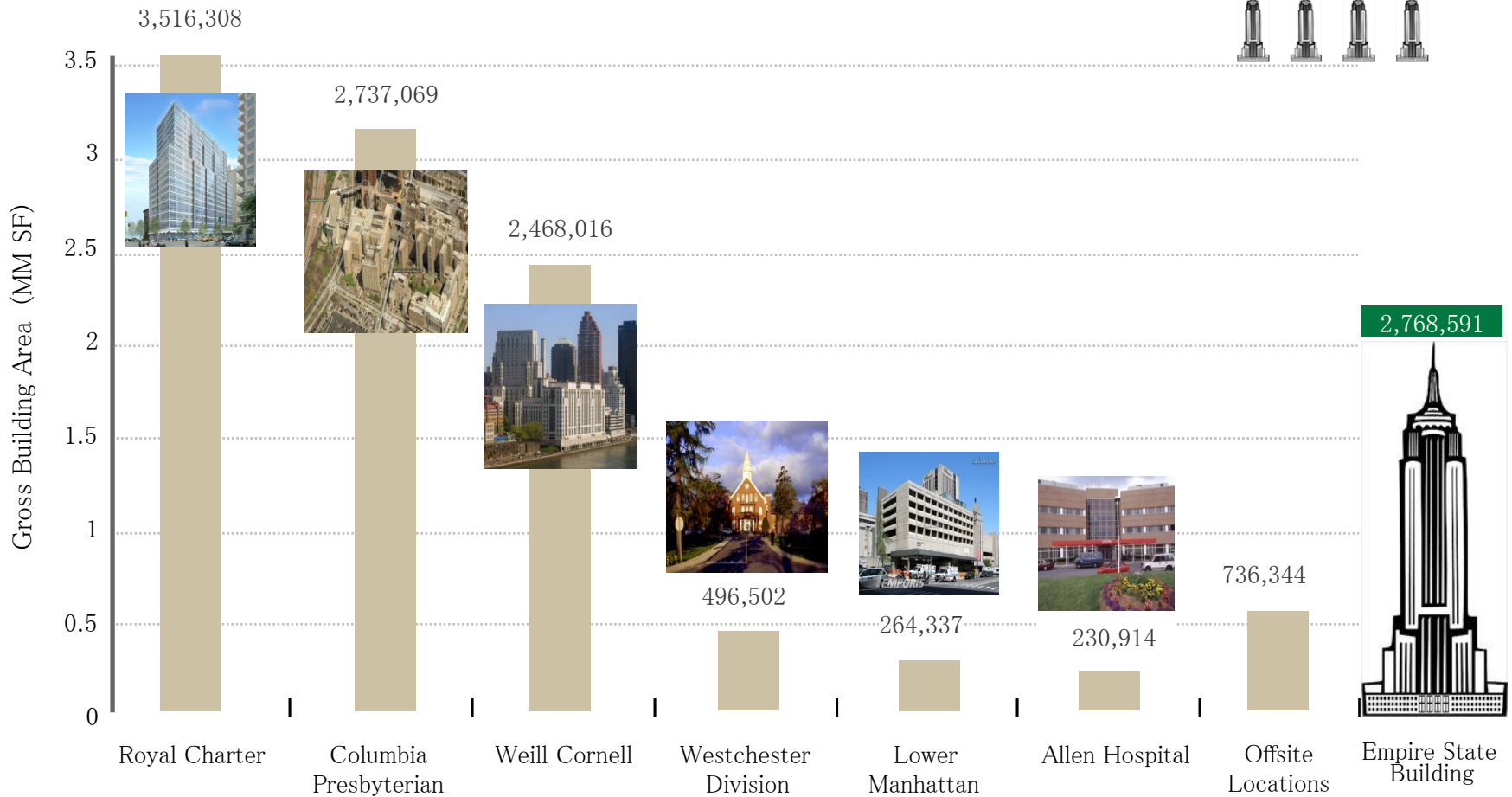


The Case for 2'x2' Luminaires

Kathia Benitez, New York Presbyterian

About NewYork-Presbyterian

Total NYP
10.4 million sq ft



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Lighting Guidelines

■ Focus:

- Update outdated lighting guidelines for 2x2 lighting fixtures
- Evaluate the Department of Energy's "High-Efficiency Troffer Lighting Specifications (HETLS)."
- Improve environment of care for outstanding **Patient Outcomes, Patient Safety** and **Patient Experience**



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Evaluation Criteria

- Five step review process to evaluate each product:
 1. Review manufacturers LM-79 and LM-80 for photometric performance, chromaticity, and lumen maintenance.
 2. Evaluate each product with campus electricians for performance, maintenance, durability and ease of installation.
 3. Product mock ups and online survey for feedback.
 4. In-Situ lighting measurements.
 5. Performance including pricing from selected manufacturers.



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LM 79 and LM 80 Product Review

Fourteen manufacturers submitted LM-79 and LM-80 for their product. These reports were evaluated photometric performance, chromaticity, and lumen maintenance.

Manufacturer	Product	Watts	Initial Lumens	Efficacy L/W	CCT	CRI
GE	Lumination	50W	3550	71	4000K	80
Philips	Ledelite Vectra	43W	3692	86	3500K	83
Philips	Day Brite 2DLG44	53W	4242	80	3500K	80
Cree	CR22-32L	35W	3200	91	3500K	90
Lithonia	2ALL2	37W	3700	100	3500K	82
MaxLite	MLFP22E4535	45W	3780	84	3500K	82
MaxLite	MLFP22DP4535	45W	3850	86	3500K	80
Philips	Lightolier SpecPlus	45W	3621	80	4000K	84
Lithonia	212XWE 2VTL2	36W	3600	100	4000K	82
Sylvania	RLC22	40W	3500	88	4000K	80
Philips	Day Brite Attune	45W	3423	76	4000K	80
FineLite	R HPR-A LED	35W	2987	85	3500K	85
Lithonia	2VTL2R	37W	3300	89	3500K	82
Philips	Day Brite SofTrace	54W	3810	71	4000K	80



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Electrician Preferences

Each product was evaluated by the campus electricians for **electrical performance, maintenance, durability and ease of installation**. Several products were eliminated at this step because of concerns over weight, inability to access components or functionality concerns.

Manufacturer	Product	Watts	Initial Lumens	Efficacy (L/W)	CCT	CRI
GE	Lumination	50W	3550	71	4000K	80
Cree	CR22-32L	35W	3200	91	3500K	90
Lithonia	2ALL2	37W	3600	100	4000K	82

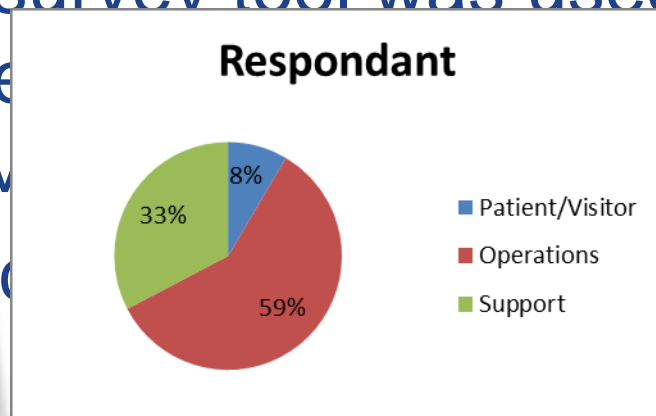


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Photometric Evaluation

- Each product was installed in a single corridor that was chosen because of its length, location and isolation from natural light.
- An on line survey tool was used to solicit



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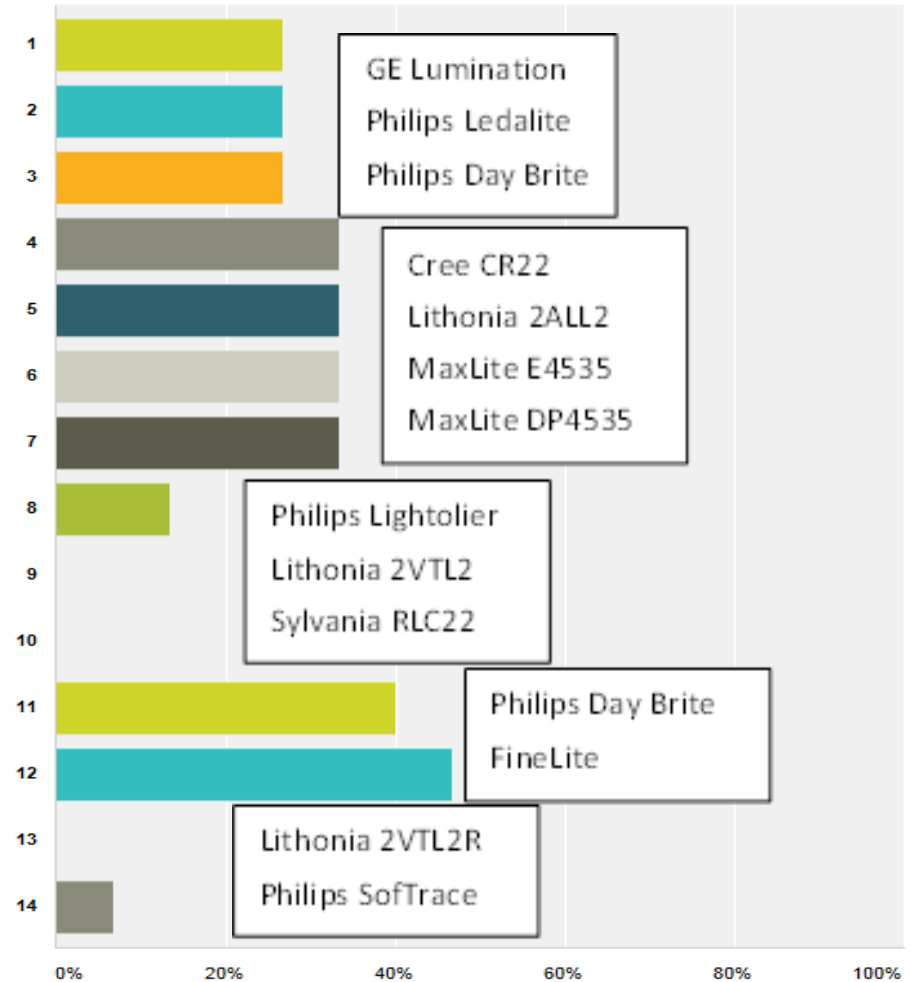
Fixture Preferences

Respondent Likes.

	Color	Housing	Light Level (floor)	Light Level (wall)	Light Quality
GE Lumination	33.33%	44.44%	66.67%	66.67%	33.33%
Philips Ledalite	75%	37.50%	37.50%	75%	62.50%
Philips Day Brite	85.71%	42.86%	71.43%	85.71%	28.57%
Cree CR22	66.67%	55.56%	44.44%	66.67%	77.78%
Lithonia 2ALL2	33.33%	22.22%	33.33%	66.67%	66.67%
Maxlite E4535	55.56%	55.56%	66.67%	77.78%	66.67%
Maxlite DP4535	55.56%	55.56%	66.67%	88.89%	66.67%
Philips Lightolier	20%	0%	40%	80%	80%
Lithonia 2VTL2	20%	40%	0%	60%	40%
Sylvania RLC22	50%	25%	25%	50%	0%
Philips Attune	70%	80%	60%	70%	60%
FineLite	77.78%	55.56%	77.78%	77.78%	66.67%
Lithonia 2VTL2R	20%	20%	20%	80%	20%
Philips SofTrace	57.14%	28.57%	42.86%	57.14%	28.57%

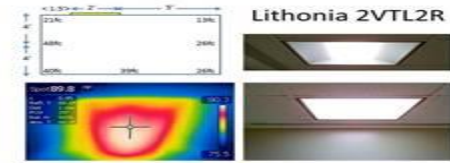
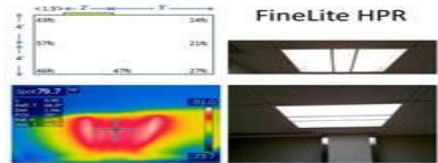
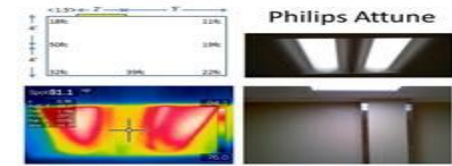
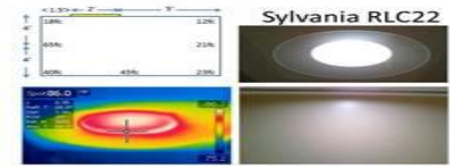
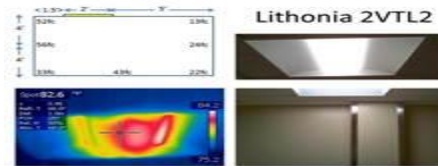
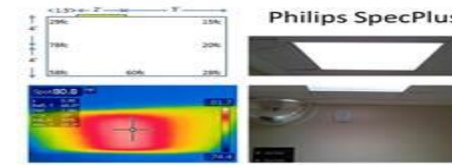
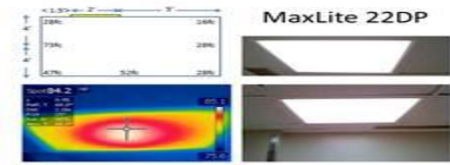
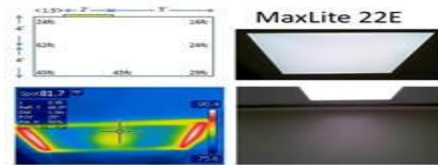
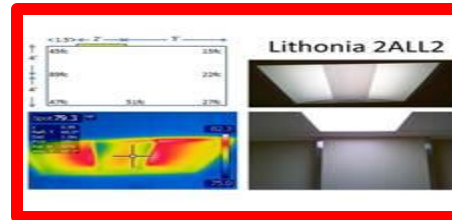
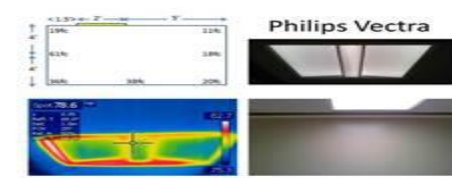
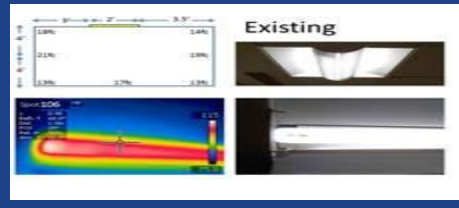
Respondent Dislikes.

	Glare	Color	Too Bright	Too Dim	Appearance
GE Lumination	70%	40%	50%	30%	60%
Philips Ledalite	40%	50%	50%	30%	60%
Philips Day Brite	50%	37.50%	50%	25%	87.50%
Cree CR22	63.64%	27.27%	72.73%	18.18%	72.73%
Lithonia 2ALL2	40%	50%	50%	20%	80%
Maxlite E4535	12.50%	25%	12.50%	25%	62.50%
Maxlite DP4535	16.67%	33.33%	16.67%	33.33%	50%
Philips Lightolier	53.85%	30.77%	61.54%	23.08%	92.31%
Lithonia 2VTL2	53.85%	38.46%	53.85%	15.38%	84.62%
Sylvania RLC22	69.23%	23.08%	61.54%	15.38%	76.92%
Philips Attune	20%	40%	20%	0%	100%
FineLite	30%	40%	60%	40%	50%
Lithonia 2VTL2R	50%	41.67%	66.67%	25%	83.33%
Philips SofTrace	40%	50%	60%	40%	60%



Viewers choose three favorite fixtures based on their individual taste and overall subjective responses.

In-Situ Measurements



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Survey Results

- **Glare.** Most “liked” the Maxlite E4535. Most “disliked” the GE. Both the Maxlite and GE are edge lit products with similar appearances and lumen output. The GE’s color at 4000K is the only significant difference from the Maxlite at 3500K.
- **Color.** Most “liked” the Philips Day Brite. Most “disliked” the Lithonia 2VTL2R. The data do not support conclusions or patterns. In general, 3500K products with a high CRI fared better than 4000K or low CRI products.
- **Quality of Light.** Most “liked” the Philips Lightolier followed by the Cree. Most “disliked” the Sylvania. **Fixtures with higher CRI ratings scored well.** The two Maxlite entrants and the Lithonia 2ALL2 also scored well even with a lower CRI rating.
- **Light Level.** Most “liked” the Maxlite DP4535. Most “disliked” the Lithonia 2VTL2R.



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Additional Criteria:

- LED performance evaluation against specific hospital needs.
- Purchasing costs – NYP negotiated directly with manufacturer through competitive bidding which resulted in a 2/3 discount of typical luminaire cost/unit.
 - The DesignLights Consortium (DLC) certification
 - Warranty of 5 years; Luminaire efficacy of 85 lm/w
 - Minimum CRI of 80 and 50,000 operating hours with lumen maintenance greater than 70% of initial lumens
- ENERGY STAR labeled
- State/Utility Incentive Qualification



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Project Sites

Sylvania T8-F38W-40K



Cree – CR22-32L-35K-S



Sylvania T8-F64Watts



Cree – CR22-32L-35K-S

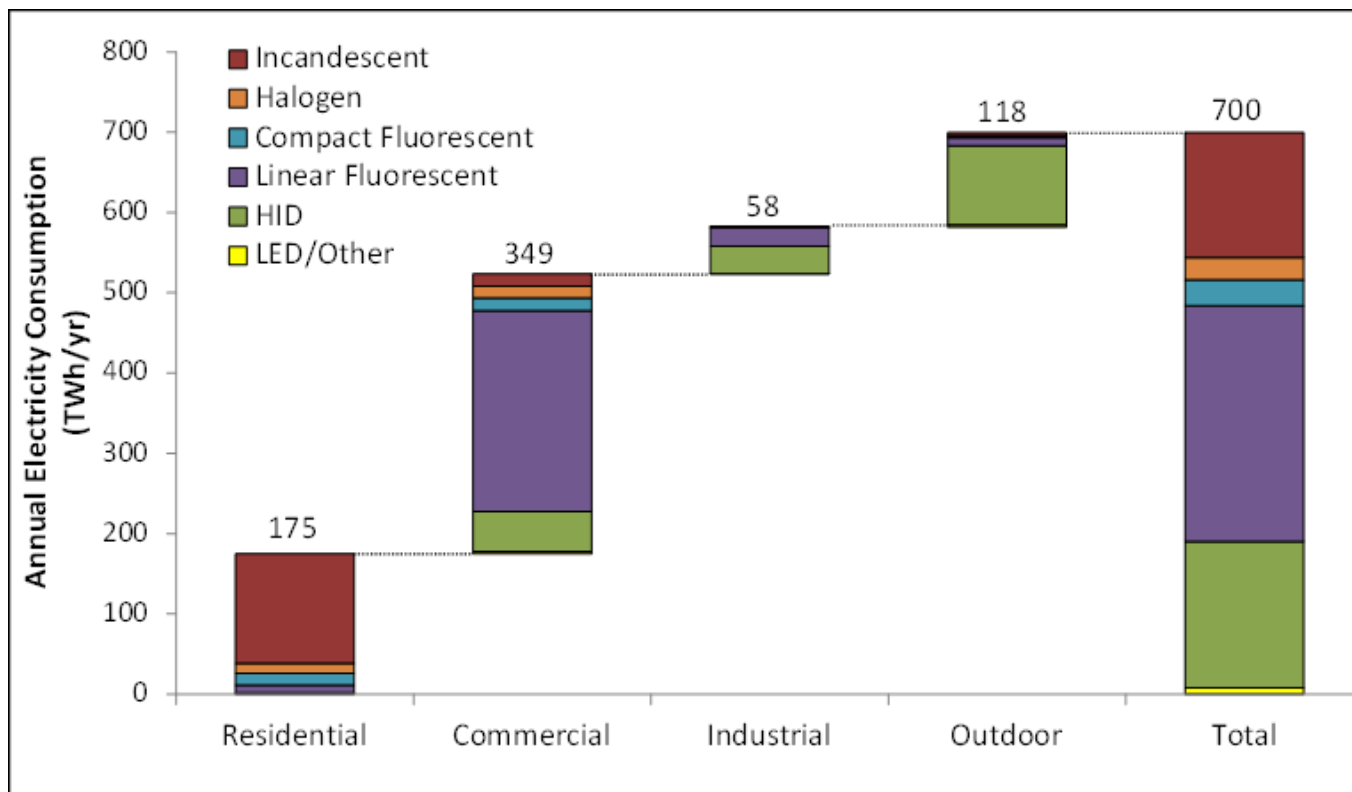
Kathia Benitez, CEM, CEP, CDSM, LEED GA
Energy Program Manager – Facilities
(212) 746-0204
keb9039@nyp.org



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Interior Lighting Market



U.S. Lighting Electricity Consumption by Sector and Lamp Type in 2010 (Source: DOE 2010).

Interior Lighting Campaign

- Considering Launch Oct. 1, 2014
- Two Phases
 - 10/1/14 – 10/1/15
 - 10/1/15 -10/1/16
- Partnerships
 - Federal
 - Industry/Professional Associations
 - Hospital, Retail, Commercial Office
 - Market Transformation/Advocacy Groups
 - Lighting Industry???
- Participants:
 - BBA members and supporters
 - Possibly Federal entities
- Potential Luminaire Types
 - Troffers
 - Downlights
 - Linear Suspended
 - High Bay

Possible Award Structure

- Based on BBA sector
- Savings, greatest:
 - Portfolio Annual
 - Best Use of Controls
 - Special Recognition
 - Retrofit absolute
 - Retrofit %
 - New absolute > ASHRAE 90.1
 - New % > ASHRAE 90.1

Over-arching Categories					
Largest Portfolio-wide Annual Energy Savings					
Best Use of Controls					
Special Recognition Categories					
Troffer/Downlight Sector Categories					
		Retrofit	New Construction		
	Metric	Watts	LPD		
	Baseline	Pre/Post	ASHRAE 90.1		
		Highest Absolute Savings	Highest % Savings	Highest Absolute Savings	Highest % Savings
Commerical Real Estate & Hospitality					
	Office (< 10,000 s.f.)				
	Office (> 10,000 s.f., < 20,000 s.f.)				
	Office (> 20,000 s.f.)				
Heathcare					
	< 15,000 s.f.				
	Office				
Higher Education					
	Classroom				
	Office				
Retail, Food Service & Grocery					
	< 15,000 s.f.				
	> 15,000 s.f.				

Discussion Topics

- What does “success” look like?
- How can we engage manufacturers?
- What are the primary challenges you face when adopting high performance interior lighting solutions?
- What resources/tools/assistance would you like to see be the most useful in overcoming these challenges?

Next Steps

1) Attend the upcoming Lighting sessions at the Summit:

Thursday

- 9:45-11:00 AM High Performance Street and Area Lighting Upgrades
- 3:30-5:00 PM It's Not Just About Technology: Accelerating Adoption of Energy Saving Approaches in Parking Facilities

2) Provide additional thoughts and feedback to:

jeff.mccullough@pnnl.gov

3) Join the BBA Lighting & Electrical Team (BBA members)

THANK YOU!