



High Performance Street, Area, and Parking Lighting Solutions

Nate Mitten

Kimco Realty Corporation

Marissa Thorne

Brookfield

Jennifer Young

Regional Energy Office
Michigan Suburbs Alliance

Paul Wessel (moderator)

Green Parking Council

May 28, 2015
Better Buildings Summit
Washington, DC

U.S. DEPARTMENT OF
ENERGY

This session

Presenters

- **Nate Mitten**
Manager of Energy Services
Kimco Realty Corporation
- **Marissa Thorne**
Property Manager
Brookfield
- **Jennifer Young**
Energy Programs Manager
Regional Energy Office
Michigan Suburbs Alliance

Perspectives

- The building
- A portfolio
- A region

Campaigns

- LEEP Campaign
- Green Parking Certification
- High Performance
Lighting Accelerator

High Efficiency Parking & Street Lighting

The Opportunity

- New lighting technology can cut parking lot and street lighting energy bills by 40%
- ...even more with controls
- ...and can deliver extended life and reduced maintenance costs

High Efficiency Parking & Street Lighting

The Opportunity

- If we installed high-performance lighting systems on half the nation's streets and in half of our parking lot and garages, we could save the amount of electricity consumed by 4.4 million U.S. households each year, equal to:
 - 48 Billion kWh
 - \$4.9 Billion

High Efficiency Parking & Street Lighting



High Efficiency Parking & Street Lighting

The Experience

- Some LEEP Phase 1 award winners achieved energy savings of over 80%. Reported paybacks of around 3 years were not uncommon.
- Municipal street lighting electricity savings typically exceed 50%, with simple paybacks less than 5 years common.
- The additional use of dimming controls is not yet widespread, but is expected to increase and can push these numbers to well over 70%.

High Efficiency Parking & Street Lighting

So why isn't it a no-brainer?

- Like smart phones and computers, the technology keeps changing: Next year it might be better and cheaper
- Crowded marketplace: “My brother-in-law says...”
- Ignorance of what I am doing now and dubiousness about the real benefits of making change
- First costs, capital budgets, financing approaches
- Success stories haven't been told successfully enough
- and ??????

BBA Tools

Lighting Energy Efficiency in Parking (LEEP) Campaign

- Joint DOE/industry recognition and guidance program helping facility owners and managers reap savings opportunities from high efficiency exterior lighting. www.leepcampaign.org

High Performance Outdoor Lighting Accelerator

- Accelerating the deployment of high performance street and outdoor lighting over the next few years by demonstrating best practices and improving system-wide replacement processes at the municipal level

www1.eere.energy.gov/buildings/betterbuildings/accelerators/lighting.html

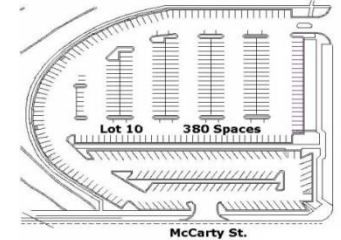
Interior Lighting Campaign

- The Interior Lighting Campaign, launching at the 2015 Better Buildings Summit, with an initial focus on troffer lighting and associated controls. (Info: Linda Sandahl, linda.sandahl@pnnl.gov)

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

Parking Garage | Parking Lot | Financing

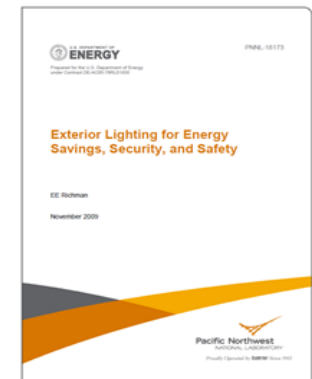
List of utility incentives and financing guidance & tools



Technical Assistance



Case Studies



M&V guidance



Specifications:

- LED parking lots
- Parking structures
- LED Street lighting
- Networked outdoor lighting controls

Presenter Introduction & Lighting Palette

Marissa Thorne: Brookfield Office Properties



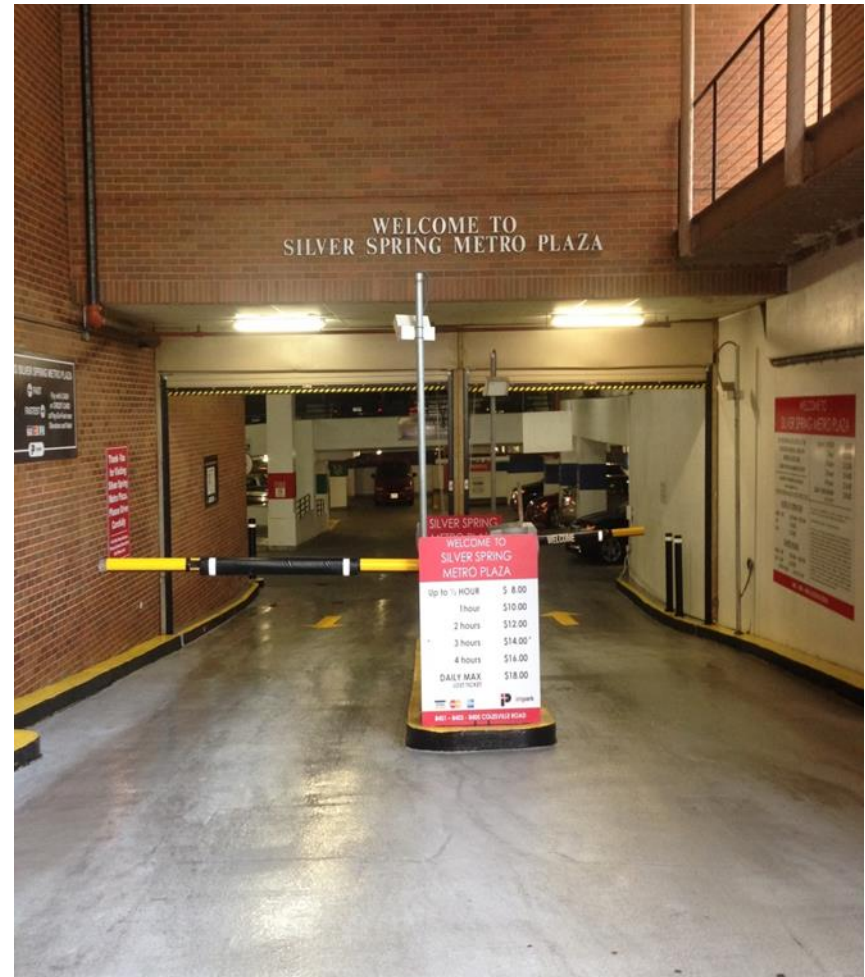
The Garage Perspective

Brookfield

- Brookfield owns, develops and manages a 118-million-square-foot global office property portfolio.
- Signature properties include New York, Washington, DC, Houston, Los Angeles, London, Toronto, Calgary, and Sydney
- Washington, DC encompasses 6.2 million square feet of Class A office buildings
- 43 LEED certifications in North America
- 79% of U.S. properties are Energy Star certified
- 1st Green Garage Certification pending

Lighting Palette

- From an Operational Perspective of a Single Parking Facility:
 - Silver Spring Metro Plaza, Silver Spring, MD
 - Single garage serving 3 office building complex: 707,517 square feet
 - 457 lighting fixtures
 - 825 bulbs
 - Operates 24/7



Nate Mitten:
Kimco Realty



The Portfolio Perspective

Kimco Overview

- Kimco is a publicly traded real estate investment trust (REIT) headquartered in New Hyde Park, NY who owns and operate over 750 neighborhood and community shopping centers across 39 states
- We are responsible for providing safe, efficient, and aesthetic lighting for approx. 175 million square feet of parking area (over 3,000 football fields)
- Outdoor lighting electricity is our largest operating expense at approximately \$25,000 per site annually
- Corporate sustainability goal of 5% energy reduction last year and this year



Kimco Lighting Palette

- Gateway Lighting Controls Program
- Lighting Assessment Program
- Illumi-Nation Lighting Retrofit Program



Jennifer Young:
Southeast Michigan
Regional Energy Office

The Regional Perspective



Southeast Michigan Regional Energy Office



A UNIQUE COLLABORATION

The Southeast Michigan Regional Energy Office was the first of its kind in the country—an opportunity for cities to share resources and expertise to help each other save energy.

The Regional Energy Office has grown from 5 founding cities to 26 participating communities with a total population of over 1.8 million.

We believe that broader collaboration brings better results, so [we encourage your community to join us.](#)



Join with cities and counties across southeast Michigan to transform our energy future.

BECOME A MEMBER

[LEARN MORE](#)



Can energy efficiency help your bond rating?

We help cities reduce their energy costs, which is good for their bottom line. Now, bond rating agencies are taking notice.

SEMREO KEY PROGRAMS

Bright Lights, Bright Futures: The Southeast Michigan Street Lighting Consortium

Our newest initiative aims to upgrade all public streetlights to LEDs throughout the metropolitan Detroit region by 2020, returning significant savings to local governments with fiscally constrained budgets while realizing environmental, aesthetic and public safety benefits.

Southeast Michigan Regional Energy Office

- 26 local governments, 4 county region
- Peer knowledge sharing
- Leveraging economies of scale
- Combined negotiating power



Motivation:
**What made lighting
improvements an
opportunity for you?**

SMREO: Why Outdoor Lighting?

- LED Street Lighting Consortium
 - Momentum for High-Performance Outdoor Lighting
 - Presidential Challenge for Advanced Outdoor Lighting
 - DOE mandate to replace mercury vapor;
 - Technology advances in LED street lighting;
 - 30-50% more efficient than incumbent technologies
 - DTE Energy goal to replace 40% of street lighting inventory within the next 5 years
 - Governor's Energy Message: Reduce Energy Waste
 - Public Lighting Authority of Detroit 65K LED streetlights

SMREO: Why Outdoor Lighting?

- **Local Government: Why street lighting?**
 - Fiscal Savings: 20-40% of municipal energy operations expense
 - Public Safety: Pedestrians and Drivers
 - Unifying cities around action on Climate Change
 - Goal to transform image of region from “Rust Belt” to “Green Belt”

Kimco: Lighting Goals and Motivation

- **Gateway Lighting Controls Program**
 - Safety and security enhanced from automated fault monitoring and call center
 - Energy savings through astronomical timing and night lighting
 - Operational effectiveness via remote control and monitoring
- **Lighting Assessment Program**
 - Objective and standardized assessment of current lighting conditions
 - Proposed retrofit design based on best strategies and technologies
 - Accurate project budget with thorough financial analysis
 - Detailed bid package for acquiring “apples-to-apples” bids
- **Illumi-Nation Lighting Retrofit Program**
 - Curb appeal and “stay appeal” due to improved light levels and quality
 - Enhanced safety and security from improved lighting and motion detection
 - Further energy and maintenance savings from high performance LEDs
 - Further operational effectiveness from future control and monitoring capability

Brookfield: Motivation For Change

- **Corporate Initiatives**
 - Provide high quality commercial office space while bringing responsible environment solutions and innovative energy-saving strategies
- **Energy Savings**
 - 24/7 operation
 - Identifying peak use
- **Costs Savings**
 - Reduce costs to pass through to tenants
 - Unregulated market. Looking for ways to help control
- **LEED Gold Certification for exiting buildings**
- **Green Garage Certification**

Action:
**What got done, why,
and how did it evolve
over time?**

Brookfield: Lighting Project Details

- **Retrofit – 32W, T8's**
 - Completed in 2008
 - Goal – Save energy, reduce pass-through costs
 - Reused all fixtures
 - Replaced and recycled 825 lights
 - All done internal
- **Motion Sensor Install**
 - Completed in 2010
 - Evaluate possible savings during non-peak hours
 - Goal – save energy, reduce pass-through costs
 - Burning hours without sensors = 8,760
 - Installed in zones for security and efficiency
 - 1 sensor controls 570 watts

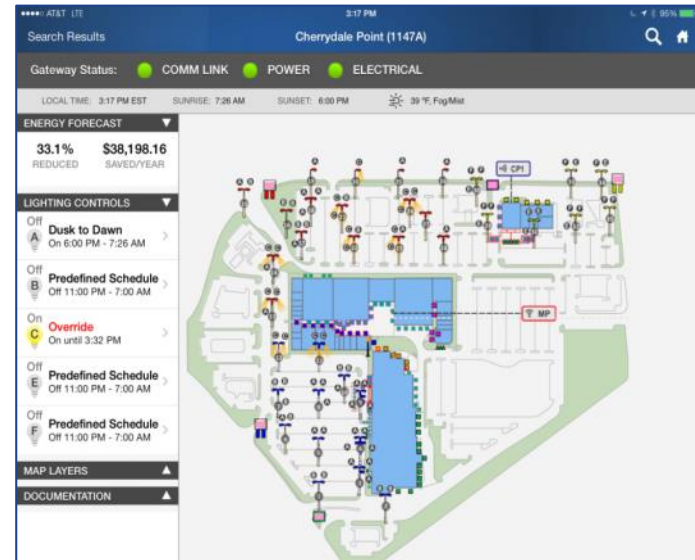


Brookfield: Lighting Project Details

- LED Light Install
 - To be completed in 2015
 - Motivation – LEED Gold, Green Garage
 - Goal – Save energy, reduce pass-through costs
 - Seeking to make garage look brighter and safer
 - Reusing all fixtures
 - Replace and recycled 825 lights
 - Replacement lights, no ballast change
 - Reusing existing fixtures
 - Hired contractor instead of internal

Kimco Lighting Program Details

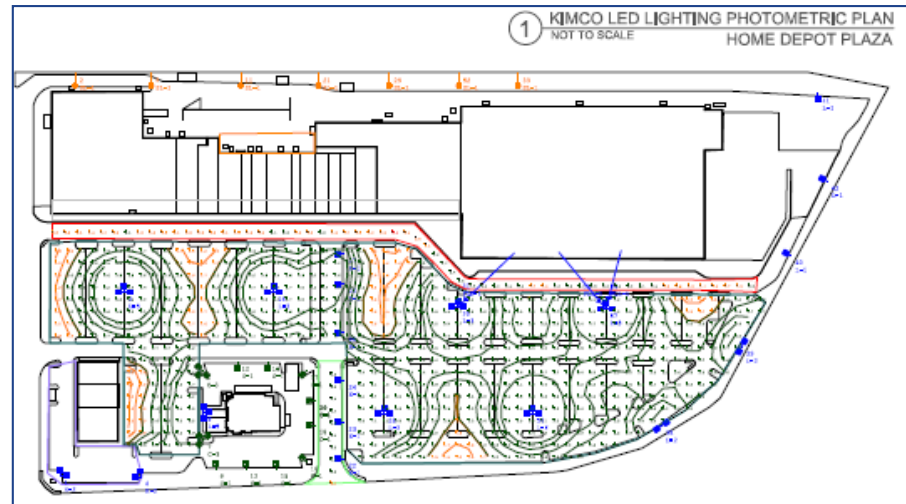
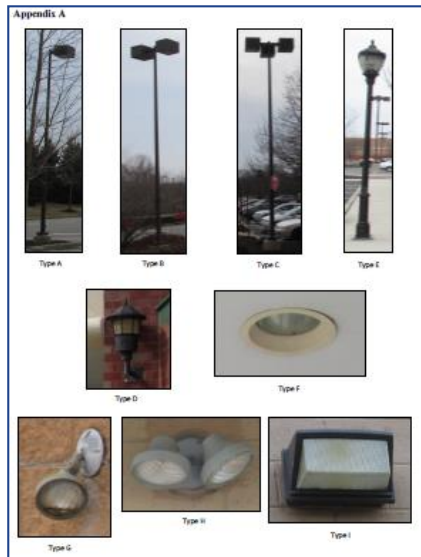
■ Gateway Lighting Controls



- Launched in 2011 with national vendor using open-source Tridium Niagara AX platform
- Now controlling and monitoring lighting systems at 310 sites through one central web-based platform and expanding to over 380 sites by end of this year
- Achieving zone-level control with night-lighting schedules
- Intuitive graphical dashboard available on web browser or iPad app
- Electrical fault monitoring with current sensors that automatically email PM
- Supporting approx. 50 in-house users and 20 regional maintenance vendors

Kimco Lighting Program Details

■ Lighting Assessments



- Launched in 2013 with national vendor after attempting to self-assess
- Have completed assessments and design reports for over 280 properties to date with several hundred more by 2017
- Includes details on all existing fixtures and poles (with pictures)
- Includes actual light measurements and a photometric model of the existing conditions
- Includes proposed photometric design and LED fixtures based on Kimco guidelines
- Provides project budget with detailed financial analysis on savings and payback

Kimco Lighting Program Details

■ Illumi-Nation Lighting Retrofit



- Piloted last year and officially launched this year after national RFP
- Strategy employees central vendor for material procurement, engineering, and project manager coupled with regional vendors for permitting and installation
- Plan to complete approx. 100 LED fixture retrofit projects across 19 states and Puerto Rico by year-end (some entire property / some only parking area)
- Have performed real world testing of approx. 35 different LED products

- Goal: 30-70K streetlights converted to LED by 2020
- Street Lighting Consortium
 - 2013 Convening – Urban Sustainability Directors Network “Breakthrough Convening”
 - 2014 Convening – Co-located with DOE’s Municipal Solid-State Street Lighting Consortium (MSSLC) in Detroit
 - DTE Energy’s Community Lighting
 - Southeast Michigan Municipal Street Lighting Consortium
 - 8 municipalities on Steering Committee
 - May 2014 – Present



Photo courtesy of the PNNL

Results: What we achieved

SMREO: What we're doing...

- Goal: 30-70K streetlights converted to LED by 2020
- Street Lighting Consortium
 - 2013 Convening – Urban Sustainability Directors Network “Breakthrough Convening”
 - 2014 Convening – Co-located with DOE’s Municipal Solid-State Street Lighting Consortium (MSSLC) in Detroit
 - DTE Energy’s Community Lighting
 - Southeast Michigan Municipal Street Lighting Consortium
 - 8 municipalities on Steering Committee
 - May 2014 – Present



Photo courtesy of the PNNL

Kimco: Lighting Program Results

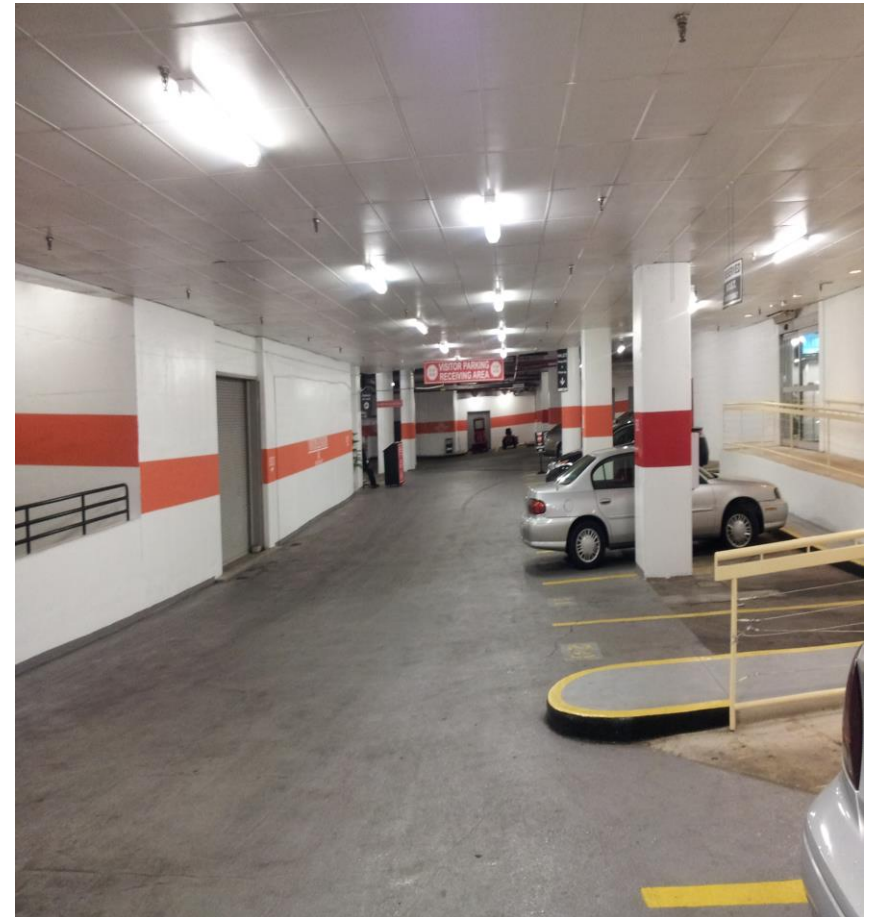
- **Gateway Lighting Controls Program**
 - Faster resolution of site lighting issues
 - Energy Savings of ~18% on sites with night lighting opportunities (11% overall)
 - 2014 LEEP Campaign Winner
- **Lighting Assessment Program**
 - National lighting project volume increased by 10x largely due to standardized and reliable assessment program
 - Assessment report is now the standard reference for lighting conditions and design
 - Proposed budgets have been within 10-20% of actual costs for most projects
- **Illumi-Nation Lighting Retrofit Program**
 - Performing approx. \$8 million in retrofits across approx. 100 properties
 - LED has become standard specification within the last year
 - Project energy savings are normally within 30-60%
 - Minimum light levels and uniformity are improved dramatically
 - Central distribution model is saving 20-40% of material costs
 - Local installation model is maintaining respect and ownership of local contractors
 - Integration of wireless controls is in progress but pilot is performing well

Brookfield: Internal Benefits

- T8's
 - Reduced energy
 - Reduced costs
 - Increased waste diversion rate
- Motion Sensors
 - 40% reduction in hours
 - Kw hours saved/yr = 145,772
 - Operational Cost Savings = \$18K
 - Paid itself off in 1.5 years
 - Reduced engineering time for burned out lights
- LED's
 - 75,165 KW hours saved 1st Year
 - \$90K energy cost savings during expected useful life, 7 years
 - Payback period of 1.3 years
 - Reduction in light bulb costs
 - Decrease in Lighting Power Density by 60%
 - Average Rated Lamp Life Increased
 - Potential increase points in Green Garage by 11-14 points
 - Reduced engineering time for burned out lights
 - Reduce carbon footprint

Brookfield: External Benefits

- Benefits Externally:
 - Brighter garage
 - Safer garage for users
 - Reduced pass through costs
 - Certifications
 - Marketing for Landlord & Tenants



Challenges and Opportunities

- Challenges
 - Ownership of street lighting assets
 - Tariffs for new technology LEDs
 - Capital investment needed upfront
 - Education of municipal staff and elected officials

- **Street Lighting Coalition**
 - Over a dozen municipalities and the Michigan Townships Association
 - Intervening in rate case U-17767 before the Michigan Public Service Commission (MPSC)
 - Consultant Team (legal, financial and regulatory analysis)
 - Requesting street lighting tariffs that reward investment in energy efficiency
- **U-M SNRE Master's Student Project Team**

Kimco Challenges and Lessons Learned

- **Gateway Lighting Controls Program**
 - Vendor selection
 - Balance of cost and features
 - Limitations of zone-based Control
 - Integration of legacy systems
- **Lighting Assessment Program**
 - Lighting evaluation methodology
 - Balance of simplicity and detail in report
 - Light levels and fixture conditions are moving targets
 - Changes in performance and pricing of fixtures (budgets)
- **Illumi-Nation Lighting Retrofit Program**
 - Adoption of new metrics / language around lighting performance
 - Synergy of central distribution with local installation
 - Rapid pace of advancement in LED technology and wireless controls
 - Integration of new systems

Brookfield: Challenges and Lessons Learned



- Conscientious of costs (pass-throughs)
- Create plan based on goals (LEED, Green Garage, cost reduction amount, etc.)
- Conscientious of effectiveness with users
- Use resources

What's next?

Kimco: Looking Ahead

- Maintaining and maximizing value of current systems while making strategic progress toward new systems
- By 2016, standardizing on LED with wireless controls or as “controls ready” for future upgrades
- Relying on standards in interoperability and hardware interfaces
- Controlling and monitoring at a more granular level and using “big data” to improve operational effectiveness
- Leveraging specialized software applications for intelligent control and fault detection
- Integrating systems to maximize value and expand features

Brookfield: What's Next?

- Lighting Analysis
- Green Garage – Gold Certification
- Assisting other Brookfield buildings with Green Garage
- Keeping pulse on the industry and it's fast energy efficiency developments



SMREO: Up Next

- **DOE Outdoor Lighting Accelerator – Partner**
- **The chance to strengthen our region...**
 - **\$60M saved**
 - **318,254 MtCO₂e avoided**
 - **Creating Dark Skies and Smart Cities**

Discussion

Tomorrow!

Outdoor Lighting Accelerator session

Group Forum – 10:30 am – 12:00 pm

This session is for OLA Partners and guest SMEs. This will be the first in-person meeting for Partners to network, conduct a mid-year progress review, and spotlight prevalent issues along their respective project life cycles. The expectation is to develop a list of actionable items for next steps leading to solution sets for each category of barriers to broad deployment of high-performance outdoor lighting.

Cities that are planning or implementing LED street light projects are encouraged to participate.

- **Special Presentation: Outdoor Lighting Legislative Landscape**
 - George Woodbury, President, LightSmart Energy Consulting, LLC
- **Perspectives:**
 - Jean Bonander, California Street Light Association (CALSLA)
 - Elizabeth Compitello, Delaware Valley Regional Planning Council (DVRPC)

TA Sessions – 8:30 – 10:00 am & 1:30 – 3:00 pm

Partners are invited to receive one-on-one technical assistance and should contact Crystal McDonald to schedule appointments in advance. There will an opportunity to meet and discuss deployment issues with guest presenters and PNNL lighting experts.

OLA Contact Information: Crystal T. McDonald, DOE Lead, crystal.mcdonald@ee.doe.gov

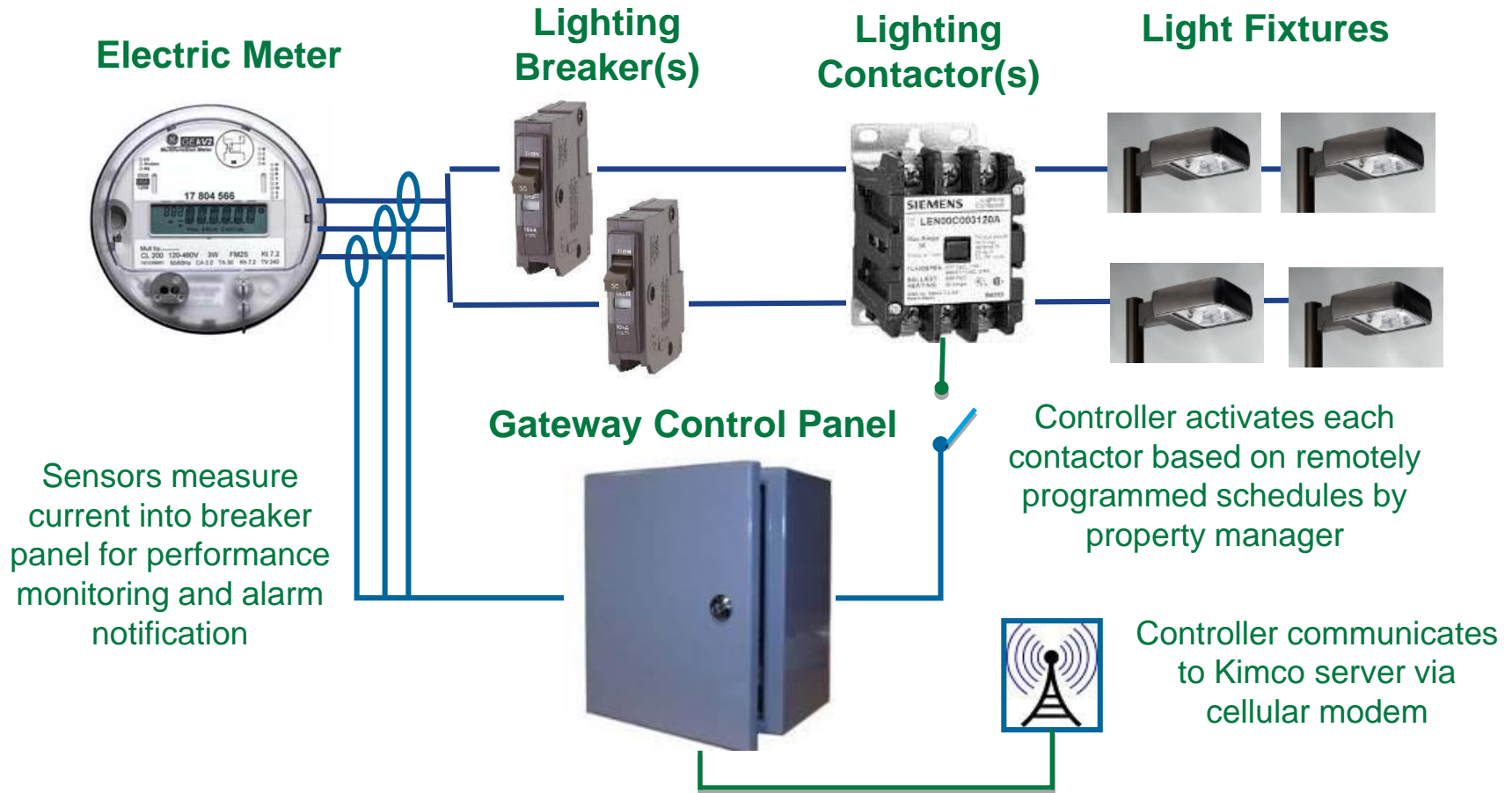
High Efficiency Parking & Street Lighting

- **Nate Mitten**
Manager of Energy Services
Kimco Realty Corporation
NMitten@kimcorealty.com
- **Marissa Thorne**
Property Manager
Brookfield Office Properties
Marissa.Thorne@brookfield.com
- **Jennifer Young**
Energy Programs Manager
Regional Energy Office
Michigan Suburbs Alliance
jennifer@suburbsalliance.org
- **Paul Wessel**
Executive Director
Green Parking Council
paul@greenparkingcouncil.org

Appendix

Kimco Appendix: Supporting Materials

Typical Installation: Gateway Panel Configuration



Kimco Appendix: Supporting Materials

Wireless LED Controls Pilot



Events for Dimming V3

Custom - Sunrise at 6:45 AM Sunset at 7:39 PM Update Events for this Profile

Weekday Events Weekend Events

Mon Tue Wed Thu Fri Sat Sun

Enable Event	Astronomical Time Adjustments	Time	Action	Options
<input type="checkbox"/> Diagnostic Event <input checked="" type="checkbox"/> Enable Current Measurement		11 :50 <input type="radio"/> AM <input checked="" type="radio"/> PM		
<input type="checkbox"/> Disable <input type="checkbox"/> Time of Day <input checked="" type="radio"/> Astronomical Time	0.0 Hours <input checked="" type="radio"/> Before <input type="radio"/> After <input type="radio"/> Sunrise <input checked="" type="radio"/> Sunset	07 :39 <input type="radio"/> AM <input checked="" type="radio"/> PM	Output 5.0V	<input type="checkbox"/> Photocell <input type="checkbox"/> Motion
<input type="checkbox"/> Disable <input type="checkbox"/> Time of Day <input checked="" type="radio"/> Astronomical Time	0.5 Hours <input type="radio"/> Before <input checked="" type="radio"/> After <input type="radio"/> Sunrise <input checked="" type="radio"/> Sunset	08 :09 <input type="radio"/> AM <input checked="" type="radio"/> PM	Output 0-10V	<input type="checkbox"/> Photocell <input type="checkbox"/> Motion
<input type="checkbox"/> Disable <input checked="" type="radio"/> Time of Day <input type="radio"/> Astronomical Time	0.5 Hours <input type="radio"/> Before <input type="radio"/> After <input type="radio"/> Sunrise <input type="radio"/> Sunset	12 :00 <input checked="" type="radio"/> AM <input type="radio"/> PM	Output 5.0V	<input type="checkbox"/> Photocell <input checked="" type="checkbox"/> Motion
<input type="checkbox"/> Disable <input checked="" type="radio"/> Time of Day <input type="radio"/> Astronomical Time	0.5 Hours <input type="radio"/> Before <input type="radio"/> After <input type="radio"/> Sunrise <input type="radio"/> Sunset	02 :00 <input checked="" type="radio"/> AM <input type="radio"/> PM	Output 2.0V	<input type="checkbox"/> Photocell <input checked="" type="checkbox"/> Motion
<input type="checkbox"/> Disable <input type="radio"/> Time of Day <input checked="" type="radio"/> Astronomical Time	0.5 Hours <input type="radio"/> Before <input type="radio"/> After <input type="radio"/> Sunrise <input type="radio"/> Sunset	06 :00 <input checked="" type="radio"/> AM <input type="radio"/> PM	Output 0-10V	<input type="checkbox"/> Photocell <input type="checkbox"/> Motion
<input type="checkbox"/> Disable <input type="radio"/> Time of Day <input checked="" type="radio"/> Astronomical Time	0.5 Hours <input checked="" type="radio"/> Before <input type="radio"/> After <input checked="" type="radio"/> Sunrise <input type="radio"/> Sunset	06 :15 <input type="radio"/> AM <input checked="" type="radio"/> PM	Output 5.0V	<input type="checkbox"/> Photocell <input type="checkbox"/> Motion
<input type="checkbox"/> Disable <input type="radio"/> Time of Day <input checked="" type="radio"/> Astronomical Time	0.0 Hours <input checked="" type="radio"/> Before <input type="radio"/> After <input checked="" type="radio"/> Sunrise <input type="radio"/> Sunset	06 :45 <input type="radio"/> AM <input checked="" type="radio"/> PM	Output 0.0V	<input type="checkbox"/> Photocell <input type="checkbox"/> Motion
<input checked="" type="radio"/> Disable <input type="radio"/> Time of Day <input type="radio"/> Astronomical Time	0.5 Hours <input type="radio"/> Before <input type="radio"/> After <input type="radio"/> Sunrise <input type="radio"/> Sunset	12 :00 <input type="radio"/> AM <input checked="" type="radio"/> PM	Output 0-10V	<input type="checkbox"/> Photocell <input type="checkbox"/> Motion

Kimco Appendix: Supporting Materials

Embedded Video Pilot

