Lighting & Electrical Technology Solutions

Troffer Specification (Session 1)
Lighting Energy Efficiency in Parking (LEEP) Campaign (Session 1)
Wall Pack Specification and Guidance (new!) (Session 2)
Exterior Lighting Controls Guidance (new!) (Session 2)
New Ideas and Discussion Questions for Industry (Session 2)

BBA All Member Efficiency Forum, May 29, 2013
Introductions

- Name
- Affiliation
- What is the **biggest challenge** when it comes to implementing high efficiency lighting at your facilities?
Troffer Specification (Background)

- **Huge savings potential!**
  - 50% of all commercial fluorescent lighting fixtures
  - Operate more than 10 hours per day
  - Estimated to use 87 TWh of electricity annually

- **BBA Specification updated 4/15/13**
  - Potential savings from applying the specification range from 15–45% on a one-for-one basis and up to 75% with the use of controls.

- **Prices**
  - Prices are coming down on LED products
  - Good time for field study (see next slide)
Opportunity for BBA members to receive technical assistance in field testing LED troffers that meet the BBA specification

- PNNL will assist with site identification, applying BBA specification, measuring performance (energy savings, light quality, etc.).
- Results will be documented in a Case Study.

Best candidates for a field test:

- New construction or major renovation
- Office, hospital, fast food, higher ed., retail.
- High energy prices
- Utility incentives

Webinar: *LED Troffers, Retrofit Kits, and Replacement Tubes*, Naomi Miller, PNNL. June 20. 1 PM ET
Troffer Specification
(Questions)

► Application:
  – Do you have experience with high efficiency troffers?
    • If so, please share those experiences.
  – What barriers are keeping you from adopting high efficiency troffers in your facilities?

► Field Study:
  – Would you be interested in pursuing a field test?
    • Why or why not?

► What questions should we pose to industry on Day 2 of the Efficiency Forum?
LEEP Campaign

Lighting Energy Efficiency in Parking Campaign

It's easy to take the LEEP

Join the team
Save electricity and money
Get recognized for success

Join
LEEP Campaign
(Background)

- BBA specs for parking lots or structures should deliver energy savings of 40% or more (when using controls), compared to incumbent technology.
- If all lots/structures switched to levels consistent with LEEP, savings of \textit{at least} 17 TWh per year could be achieved, and likely much more.
- Technical Assistance is available through PNNL.
LEEP Campaign (Participation)

- 67 Registered LEEP Participants as of May 1, 2013

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Building Authority</th>
<th>Company Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABM Facility Services</td>
<td>Georgia Building Authority</td>
<td>Shelor Motor Mile</td>
</tr>
<tr>
<td>AGC Banquet &amp; Event Center</td>
<td>Groupe Pacific</td>
<td>SNC Lavalin Inc.</td>
</tr>
<tr>
<td>Alexandria Real Estate Equities, Inc.</td>
<td>Grubb Ventures</td>
<td>Standard Parking</td>
</tr>
<tr>
<td>AllBright Management Professionals</td>
<td>Hines (3)</td>
<td>State of Missouri</td>
</tr>
<tr>
<td>Allentown Parking Authority</td>
<td>Horizon Solutions LLC</td>
<td>Stream Realty Partners, LP</td>
</tr>
<tr>
<td>American Realty Advisors</td>
<td>Jones Lang LaSalle</td>
<td>Sumner School District</td>
</tr>
<tr>
<td>AT&amp;T (2)</td>
<td>Julin Realty Services, LLC</td>
<td>Supervalu, Inc. (3)</td>
</tr>
<tr>
<td>Blue Hill Partners</td>
<td>M C Realty Group LLC</td>
<td>TES Engineering</td>
</tr>
<tr>
<td>Bradford Exchange</td>
<td>MD Anderson Cancer Center</td>
<td>Tetra Tech Inc./Oregon National Guard</td>
</tr>
<tr>
<td>Brookfield Office Properties</td>
<td>MGM Resorts International</td>
<td>The Hermitage Centre</td>
</tr>
<tr>
<td>Brookshire Brothers</td>
<td>Midwest Moving &amp; Storing</td>
<td>Tower Companies</td>
</tr>
<tr>
<td>CC Frost Properties, LTD</td>
<td>Miller-Valentine Group</td>
<td>Town of Amherst</td>
</tr>
<tr>
<td>CentraCare Health System</td>
<td>Morlin Asset Management</td>
<td>U.S. Army Reserve Parks Reserve Forces Training Area</td>
</tr>
<tr>
<td>City of Melrose</td>
<td>Newmark Grubb Knight Frank</td>
<td>U.S. Army - Army Test and Evaluation Command Sain Engineering Associates/Dugway Proving Ground</td>
</tr>
<tr>
<td>City of San Jose, Department of Transportation</td>
<td>Parmenter Realty Partners</td>
<td>US Air Force Lackland, AFB</td>
</tr>
<tr>
<td>Compass Properties, LLC</td>
<td>Perry CSD</td>
<td>Village of Great Neck Plaza</td>
</tr>
<tr>
<td>Crescent Real Estate Equities</td>
<td>Point Park University</td>
<td>Von Braun Center</td>
</tr>
<tr>
<td>Department of Defense Joint Base San Antonio</td>
<td>Prologis L.P.</td>
<td>Walmart</td>
</tr>
<tr>
<td>Dept. of Veterans Affairs (Perry Point, MD)</td>
<td>Providence Health &amp; Services</td>
<td>Wells Fargo Insurance USA</td>
</tr>
<tr>
<td>Downtown DC Business Improvement District</td>
<td>Prudential Real Estate</td>
<td>Wyndham</td>
</tr>
<tr>
<td>Ford Motor Company</td>
<td>PTP Management, Inc.</td>
<td></td>
</tr>
<tr>
<td>Franklin Resources Inc.</td>
<td>Santa Barbara County</td>
<td></td>
</tr>
</tbody>
</table>
LEEP Campaign

Chris Magee, Director of Sustainable Facility Development
MGM Resorts International
LEEP Campaign
(MGM Resorts International)

Parking Lot Pole Lighting & Garage Deck Retrofit

- MGM Resorts International issued a detailed technology neutral RFP to seven contractors for its Las Vegas properties:
  - Bellagio
  - Circus Circus
  - Excalibur
  - Luxor
  - MGM Grand
  - The Mirage
  - Monte Carlo
  - New York, New York
  - Call Center
  - Signature
  - MGM Corporate Services
  - Mandalay Bay

  - 1700 fixtures (preliminary area estimates are in the 160 acre range or nearly 155 football fields).
  - MGM selected induction for these sites.

- MGM is finalizing a bid award for 2.65 MSF of parking garage space at MGM Grand Detroit. This space will use LED’s (3,117 existing fixtures).

- MGM is also taking advantage of other DOE BBA resources on interior / exterior spaces.
Current Project Details

- The lamps, generators and complete fixtures are rated / warrantied at 100,000 hours. In a dusk to dawn application (4,380 hour or 12 hours a day x 365 days), the lamp is expected to last 22.5 years.
- Lumens per watt is improved, and wattage is generally cut in half.
- 3.4M annual kWh will be saved resulting in a 1.6 year simple payback.
- Additional maintenance cost savings (current lamps replaced every 1-3 years).
- Significant impact to our waste stream will be achieved
  - 1000's of former end of life lamps will be eliminated from our waste stream along with related packaging.
  - Transportation related emissions from the shipping of shorter life lamps will be reduced.
- In most installations, light output (foot candles) will be improved.
  - At the Monte Carlo and Corporate campus south, it has been shown to nearly triple the original lamps improving overall look and security concerns.
Do you have experience with high efficiency parking facility lighting?
   – If so, please share those experiences.

What barriers are keeping you from adopting high efficiency parking lighting in your facilities?

Are you interested in joining the LEEP Campaign?
   – Why or why not?

What questions should we pose to industry on Day 2 of the Efficiency Forum?
Wall Pack Specification and Guidance (Background)

- Wall packs are wall-mounted area lights
  - Operate dusk-to-dawn
  - Approx. 20% of site lighting energy
  - Estimated usage 7.67 TWh (site)

- Specification
  - Device efficiency of 60 LPW (matches other programs)
  - Recommended LPDs
  - Color qualities
  - Allows for a direct comparison to a product data sheet

- Guidance
  - Where to and **NOT** to light
  - Quantity and quality of light needed
  - How to find products, things to consider when buying…
Wall Pack Specification and Guidance (Questions)

- **Current draft**
  - A draft is complete and ready for review
  - We need your input

- **Application**
  - How will you use the specification & guidance?

- **Finding products**
  - How do you currently find products?

- **What questions should we pose to industry on Day 2 of the Efficiency Forum?**
Exterior Lighting Controls Guidance

**Sign lighting**
- Turned down by 30% after business hours (with additional conditions)

**Wall packs**
- Provide bi-level output.
- Incorporate occupancy sensor in wall pack.

**Site lighting**
- Reduce after site closes via a power line control signal or a site wi-fi signal.
Exterior Lighting Controls Guidance
(Background)

- Exterior Lighting
  - Operate dusk-to-dawn
  - Estimated annual lighting energy usage 60 TWh (site)
  - New sources and control technologies could save 30 – 50% of the energy usage

- Specification
  - Not market ready – still many products being developed

- Guidance
  - Questions to ask when deploying a controls system
  - Discussion of the different control types and things to consider
  - Basic one-line diagrams
  - Sample coverage diagrams
Exterior Lighting Controls Guidance (Questions)

- **Current Draft**
  - A draft is complete and ready for review
  - We need your input!

- **Next Steps**
  - What control technologies and/or luminaire applications are desired?
  - Is a specification desired?

- **What questions should we pose to industry on Day 2 of the Efficiency Forum?**
Open Discussion
New Lighting & Electrical Project Ideas
Questions for Industry
Accelerating Deployment of Adaptive Exterior Lighting Technologies
• Cooperation between LBNL & CLTC (UC Davis)
• Adaptive Exterior Lighting in Healthcare
• Hospital as key sector for adoption in other fields
• Efforts to include and capture ESCO process to promote similar projects
• Market survey & Project planning
  - Detailed research in healthcare market
  - Review of case studies & best practices
  - Locate a fitting demonstration site

• Technical Specification & Pre-Install Audit
  - Luminaire, Sensor & RF research
  - Site CAD mockup: light levels & sensor coverage
  - Pre-Install Audit, light & energy
  - Order / customization / pre-comissioning
  - Installation & Post – Install Audit

• Outreach & Technology transfer
• Project promotion
• User survey, Stakeholders perceptions
Executive Exchange with Commercial Building Stakeholders, May 30, 2013
Huge savings potential!
- 50% of all commercial fluorescent lighting fixtures
- Operate more than 10 hours per day
- Estimated to use 87 TWh of electricity annually

BBA Specification updated 4/15/13
- Potential savings from applying the specification range from 15–45% on a one-for-one basis and up to 75% with the use of controls.

Prices
- Prices are coming down on LED products
- Good time for field study (see next slide)
Opportunity for BBA members to receive technical assistance in field testing LED troffers that meet the BBA specification

- PNNL will assist with site identification, applying BBA specification, measuring performance (energy savings, light quality, etc.).
- Results will be documented in a Case Study.

Best candidates for a field test:

- New construction or major renovation
- Office, hospital, fast food, higher ed., retail.
- High energy prices
- Utility incentives
If you offer LED troffers, are sales meeting your expectations?
   – What do you see as the main barriers to increased sales?

Do you have customers that may be interested in pursuing a field test in coordination with the BBA?

What questions do you have for BBA members?
LEEP Campaign

Lighting Energy Efficiency in Parking Campaign

It's easy to take the LEEP

Join the team
Save electricity and money
Get recognized for success

Join
LEEP Campaign (Background)

- BBA specs for parking lots or structures should deliver energy savings of 40% or more (when using controls), compared to incumbent technology.
- If all lots/structures switched to levels consistent with LEEP, savings of at least 17 TWh per year could be achieved, and likely much more.
- Technical Assistance is available through PNNL.
**LEEP Campaign**
*(Participation)*

- 67 Registered LEEP Participants as of May 1, 2013

<table>
<thead>
<tr>
<th>ABM Facility Services</th>
<th>Georgia Building Authority</th>
<th>Shelor Motor Mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGC Banquet &amp; Event Center</td>
<td>Groupe Pacific</td>
<td>SNC Lavalin Inc.</td>
</tr>
<tr>
<td>Alexandria Real Estate Equities, Inc.</td>
<td>Grubb Ventures</td>
<td>Standard Parking</td>
</tr>
<tr>
<td>AllBright Management Professionals</td>
<td>Hines (3)</td>
<td>State of Missouri</td>
</tr>
<tr>
<td>Allentown Parking Authority</td>
<td>Horizon Solutions LLC</td>
<td>Stream Realty Partners, LP</td>
</tr>
<tr>
<td>American Realty Advisors</td>
<td>Jones Lang LaSalle</td>
<td>Sumner School District</td>
</tr>
<tr>
<td>AT&amp;T (2)</td>
<td>Julin Realty Services, LLC</td>
<td>Supervalu, Inc. (3)</td>
</tr>
<tr>
<td>Blue Hill Partners</td>
<td>M C Realty Group LLC</td>
<td>TES Engineering</td>
</tr>
<tr>
<td>Bradford Exchange</td>
<td>MD Anderson Cancer Center</td>
<td>Tetra Tech Inc./Oregon National Guard</td>
</tr>
<tr>
<td>Brookfield Office Properties</td>
<td>MGM Resorts International</td>
<td>The Hermitage Centre</td>
</tr>
<tr>
<td>Brookshire Brothers</td>
<td>Midwest Moving &amp; Storing</td>
<td>Tower Companies</td>
</tr>
<tr>
<td>CC Frost Properties, LTD</td>
<td>Miller-Valentine Group</td>
<td>Town of Amherst</td>
</tr>
<tr>
<td>CentraCare Health System</td>
<td>Morlin Asset Management</td>
<td>U.S. Army Reserve Parks Reserve Forces Training Area</td>
</tr>
<tr>
<td>City of Melrose</td>
<td>Newmark Grubb Knight Frank</td>
<td>U.S. Army - Army Test and Evaluation Command Sain Engineering Associates/Dugway Proving Ground</td>
</tr>
<tr>
<td>City of San Jose, Department of Transportation</td>
<td>Parmenter Realty Partners</td>
<td>US Air Force Lackland, AFB</td>
</tr>
<tr>
<td>Compass Properties, LLC</td>
<td>Perry CSD</td>
<td>Village of Great Neck Plaza</td>
</tr>
<tr>
<td>Crescent Real Estate Equities</td>
<td>Point Park University</td>
<td>Von Braun Center</td>
</tr>
<tr>
<td>Department of Defense Joint Base San Antonio</td>
<td>Prologis L.P.</td>
<td>Walmart</td>
</tr>
<tr>
<td>Dept. of Veterans Affairs (Perry Point, MD)</td>
<td>Providence Health &amp; Services</td>
<td>Wells Fargo Insurance USA</td>
</tr>
<tr>
<td>Downtown DC Business Improvement District</td>
<td>Prudential Real Estate</td>
<td>Wyndham</td>
</tr>
<tr>
<td>Ford Motor Company</td>
<td>PTP Management, Inc.</td>
<td></td>
</tr>
<tr>
<td>Franklin Resources Inc.</td>
<td>Santa Barbara County</td>
<td></td>
</tr>
</tbody>
</table>
LEEP Campaign

Chris Magee, Director of Sustainable Facility Development
MGM Resorts International
Parking Lot Pole Lighting & Garage Deck Retrofit

- MGM Resorts International issued a detailed technology neutral RFP to seven contractors for its Las Vegas properties:
  - Bellagio
  - Circus Circus
  - Excalibur
  - Luxor
  - MGM Grand
  - The Mirage
  - Monte Carlo
  - New York, New York
  - Call Center
  - Signature
  - MGM Corporate Services
  - Mandalay Bay

  - 1700 fixtures (preliminary area estimates are in the 160 acre range or nearly 155 football fields).
  - MGM selected induction for these sites.

- MGM is finalizing a bid award for 2.65 MSF of parking garage space at MGM Grand Detroit. This space will use LED’s (3,117 existing fixtures).
- MGM is also taking advantage of other DOE BBA resources on interior / exterior spaces.
Current Project Details

- The lamps, generators and complete fixtures are rated / warranted at 100,000 hours. In a dusk to dawn application (4,380 hour or 12 hours a day x 365 days), the lamp is expected to last 22.5 years.
- Lumens per watt is improved, and wattage is generally cut in half.
- 3.4M annual kWh will be saved resulting in a 1.6 year simple payback.
- Additional maintenance cost savings (current lamps replaced every 1-3 years).
- Significant impact to our waste stream will be achieved
  - 1000's of former end of life lamps will be eliminated from our waste stream along with related packaging.
  - Transportation related emissions from the shipping of shorter life lamps will be reduced.
- In most installations, light output (foot candles) will be improved.
  - At the Monte Carlo and Corporate campus south, it has been shown to nearly triple the original lamps improving overall look and security concerns.
LEEP Campaign (Questions)

- What do you see as the main barriers to increased sales of high efficiency site lighting?

- How might the LEEP Campaign better coordinate with industry?
  
  - We’ll also discuss this at lunch – look for the LEEP Campaign table.

- What questions do you have for BBA members?
Wall Pack Specification and Guidance
(Background)

- Wall packs are wall-mounted area lights
  - Operate dusk-to-dawn
  - Approx. 20% of site lighting energy
  - Estimated usage 7.67 TWh (site)

- Specification
  - Combination of Luminaire Efficacy (60 LPW) and LPD based on Lighting Zones
  - Color qualities
  - Allows for a direct comparison to a product data sheet

- Guidance
  - Where to and NOT to light
  - Quantity and quality of light needed
  - How to find products, things to consider when buying…
Exterior Lighting Controls Guidance

**Sign lighting**
Turned down by 30% after business hours (with additional conditions)

**Wall packs**
Provide bi-level output. Incorporate occupancy sensor in wall pack.

**Site lighting**
Reduce after site closes via a power line control signal or a site wi-fi signal.
Exterior Lighting

- Operate dusk-to-dawn
- Estimated annual lighting energy usage 60 TWh (site)
- New sources and control technologies could save 30 – 50% of the energy usage

Specification

- Not market ready – still many products being developed

Guidance

- Questions to ask when deploying a controls system
- Discussion of the different control types and things to consider
- Basic one-line diagrams
- Sample coverage diagrams
Exterior Lighting Controls Guidance
(Questions)

- Are you incorporating more controllability into your luminaires?
- Can you make control schemes at a lower cost?
- Do you have and can you share controls materials/guidance with BBA members?
What are the cost projections for LED products over the next few years?

Why do full cutoff luminaires cost so much more than partial cutoff (more than double)?

Do you plan to offer improved warranties given the lifetime claims of LED products (claimed longer life)?

What is your strategy for incumbent technologies?
- Can you share what technologies you’ll move away from (e.g. where will HID be in 5 years)?
If the BBA pursued a project to increase the uptake of efficient lighting in a particular application, what application do you believe would be the best candidate?

- What could BBA do to best support this?

Other ideas?