



BPA Energy Efficiency:

Adaptive Lighting Symposia Final Report

March 11, 2011

Background

Lighting has been identified as a viable and immediate opportunity for significant reduction in energy use for a variety of building types and outdoor facilities — from college dormitories and stairwells to parking garages and parking lots. Within the commercial and public sectors, the consensus has been to adopt and implement emerging light source technologies, such as LEDs, for both interior and exterior use. However, highly efficient lighting systems extend beyond consideration of the source — they also involve behavioral elements. The Adaptive Lighting Symposium challenges facility and energy managers to look deeper for opportunities to couple efficacious light sources with occupancy-responsive controls to maximize energy benefits and create a more desirable lighting environment for those who live and work within those spaces.

Members from the Washington State University (WSU) Extension Energy Program attended the 2009 Utility Energy Forum where they learned about the merits of bi-level lighting controls that save energy when higher lighting levels are unnecessary. This type of lighting, sometimes referred to as Adaptive Lighting, involves minimizing the use of unneeded lighting by utilizing bi-level lighting, occupancy sensors, and daylighting controls in applications with limited occupancy. It has potential additional applications in office buildings, expanding the use of this control technology from the well established applications of stairwells and parking areas to office settings, another ubiquitous application.

It was established that California Lighting Technology Center (CLTC) could provide the technical guidance needed to build on both their field assessment of bi-level lighting in offices, as well as provide their presentations on adaptive lighting to Northwest audiences. CLTC was thus identified as a subcontractor to assist with a field assessment as well as a series of symposia on adaptive lighting. It was determined that the symposia would be an excellent way to fulfill BPA's request to add projects that could be initiated quickly and produce useful information for distribution in the region.

Results

There were four Adaptive Lighting Symposia, each scheduled for 3½ hours including a networking break halfway through (elaborate more): (See Appendix A for a complete list of attendees)

- September 18, 2010: Portland, OR at the 800 Oregon Building (21 attended)
- September 26, 2010: Seattle, WA at the Lighting Design Lab (48 attended)
- November 2, 2010: Spokane, WA at Fairchild Air Force Base (AFB) with arrangements made by Erin Hope, BPA (34 attendees)
- November 17, 2010: Seattle, WA at the Lighting Design Lab (45 attended)

The first two events were arranged by WSU Extension Energy personnel and online registration was offered using the website www.regonline.com. A nominal fee of \$20 was charged for attendees to mitigate no-shows, and also offset some of the food, travel, and labor costs. Emails were sent to various organizations (see Appendix B for complete marketing list) to post the event on their websites and to notify their members. In addition, direct marketing was done to lighting designers and specific individuals that we thought would benefit from the symposia.

The event at Fairchild AFB was arranged by Erin Hope from BPA and most of the attendees were AFB personnel.

The final event at the Lighting Design Lab was coordinated by WSU Extension Energy Program personnel. Michael Huber from BPA invited members from the Port of Seattle, U.S. Navy, Coast Guard, Army, and other federal organizations and large account customers of BPA.

Evaluation

A survey of attendees at the first two symposia was generated using Survey Monkey. Thirty seven attendees responded to the survey; full results are in Appendix C. Feedback received included:

- Seventy eight percent thought the information was informative and liked the examples that were presented.
- Sixteen percent felt that it wasn't long enough.
- Would have liked information on the types of products that were used, but in a way that wouldn't be seen as endorsing the product.
- Some mentioned that they would like more time to network and talk to other professionals about their experiences.
- Future seminars would be enhanced by also having a tour of a facility that is incorporating bi-level lighting.
- Seventy eight percent ranked the symposia an eight or above on a scale of one to ten.
- All respondents are interested future presentations on emerging electrical energy efficiency technology.
- Ninety seven percent felt that the information presented would be beneficial to their organizations.

Conclusions and Recommendations

The events met our objectives of being well received and attended. The costs incurred were approximately \$29,000 (about \$7,250 per event) to hold all four events for 147 people from varying backgrounds.

We would recommend using the "symposia" platform to offer future education and training events that transfer knowledge about energy efficiency technologies that hold promise within BPA's service territory. This is a good way to introduce emerging technologies to a larger audience and to those who can make decisions about whether or not to use them in their facilities.

We would also recommend hiring a professional to record the symposia and to edit the recording. This would provide an improved experience for those who could not attend the actual seminars. Recordings were posted on www.E3TNW.org; however the audio was not up to our standards. For example, the speaker didn't consistently repeat questions from the audience so that they could be heard on the recording.

While the feedback was positive, the full benefit of the symposia cannot be estimated until a follow-up survey is conducted to determine what energy efficiency actions have been taken by the attendees. A proposal to conduct this survey will be included in future requests for funding. It would need about eight hours to generate a new survey that asks: what have they done with the information presented; were they in a position to make those changes; if they did, what were the results; do they plan to and what is their expected cost savings, etc. The time would also be used to analyze the results and compose a report based on the results.

The seminar also reinforced interest on the part of the U.S. Navy to further invest in energy efficient lighting. After the last Seattle symposium, Michael Huber of BPA escorted Dr. Michael Siminovitch (CLTC) and Rob Penney (WSU Extension Energy) to the Naval Station Everett to review their plans for an energy efficient lighting initiative. As a result of this meeting, a case study is being planned for the next funding period.

Appendix A: Adaptive Lighting Symposia Attendee List

Portland, OR: September 18, 2010

| | Name (Last, First) | Organization |
|----|---------------------------|---------------------------------------|
| 1 | Bond, Nancy | Portland Public School District #1 |
| 2 | Brown, Sue | WSU Energy Extension |
| 3 | Cantley, Jason | Light Doctor |
| 4 | Cartmill, Cathy | Columbia River PUD |
| 5 | Chase, Kyle | Energy Conservation Training Company |
| 6 | Christie, David | McMinnville Water & Light |
| 7 | Davis, Jeffrey | System Design Consultants, Inc. |
| 8 | Dearborn, Thomas | Dearborn Lighting Design |
| 9 | Diviney, Catherine | Portland Public School District #1 |
| 10 | Fitzgibbon, Blair | Portland Public School District #1 |
| 11 | Graugnard, Craig | Volant Strategies |
| 12 | Holland, Don | Beaverton Schools |
| 13 | Howard, B | PacifiCorp |
| 14 | Inman, Alex | IntelePoint |
| 15 | Montgomery, Mark | 200 Market Building |
| 16 | Oppedal, Doug | Evergreen Consulting Group |
| 17 | Polston, Jim | City of Springfield |
| 18 | Poplawski, Michael | Pacific Northwest National Laboratory |
| 19 | Rogers, John | System Design Consultants, Inc. |
| 20 | Vaccher, Joseph | Eugene Water & Electric Board |
| 21 | Whitney, Mark | Portland General Electric |

Seattle, WA: September 26, 2010

| | Name (Last, First) | Organization |
|----|---------------------------|--------------------------------------|
| 1 | Aksdal, Daniel | Olympic ESD 114 |
| 2 | Allen, Rick | Snohomish County PUD #1 |
| 3 | Andre, Joe | NEMA |
| 4 | Bartholomew, Edward | Bartholomew Lighting |
| 5 | Bates, Tawny | SCL |
| 6 | Brannon, Tina | Pacific Lighting Systems |
| 7 | Burcar, Mark | energy2equity |
| 8 | Clark, Corky | Bonneville Power Admin. |
| 9 | Clayton, Kristyn | Green House Effects |
| 10 | Darrat, Ahmed | Seattle Department of Transportation |
| 11 | Davis, Richard | The Evergreen State College |
| 12 | Esbrook, Thomas | Boeing |
| 13 | Eschenbach, Bretnie | Seattle City Light |

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|----|--------------------|--|
| 14 | Frasene, Lisa | Seattle City Light |
| 15 | Giacobbe, Antonio | McKinstry |
| 16 | Goldstein, Brian | Self employed |
| 17 | Gordon, Ellen | South Seattle Community College |
| 18 | Honkala, Willy | Light Doctor |
| 19 | Hoosein, Azeem | The Evergreen State College |
| 20 | Hostetter, Bruce | EarthSystemsNW |
| 21 | Huang, Lucie | Seattle City Light |
| 22 | Iacobazzi, Vito | Metro Parks Tacoma |
| 23 | Johnson, David | Orcas Island School District |
| 24 | Kajfasz, Bob | City of Port Angeles |
| 25 | Karbus, Kim | Philips |
| 26 | Kreuter, Craig | Seattle City Light |
| 27 | Kunesh, Dave | North Coast Electric Co |
| 28 | Lokan, Kim | Kim Lokan LLC |
| 29 | Marsten, Vicki | Seattle City Light |
| 30 | McDougal, Jim | Snohomish PUD |
| 31 | Meyer, Peter | Tacoma Power |
| 32 | Morris, Mike | Tacoma Power |
| 33 | Nielsen, Kurt | Light Doctor |
| 34 | Novak, Ed | Federal Way Public School District |
| 35 | Peery, Roger | Tacoma Power |
| 36 | Plein, Paul | SOW Dept of Natural Resources |
| 37 | Potter, Barton | Department of General Administration |
| 38 | Raitzer, Jerry | Seattle City Light |
| 39 | Rice, Toni | T. Rice Engineering PLLC |
| 40 | Schmutzler, Joe | Puget Sound Energy |
| 41 | Schwenke, Jonathan | McKinstry |
| 42 | Skov, Thor | Seattle City Light |
| 43 | Swindle, Clarence | Tacoma Pierce County Health Department |
| 44 | Watkins, John | PES |
| 45 | Watson, John | Puget Sound Energy |
| 46 | Woltjer, Tom | North Coast Electric |
| 47 | Wright, Jerry | Seattle City Light |
| 48 | Yagi, Victor | Seattle City Light |

Fairchild AFB: November 2, 2010

| | Name (Last, First) | Organization |
|---|---------------------------|---------------------|
| 1 | Cook-Coyle, Jeff | Fairchild AFB |
| 2 | Jacques, Stacy | Fairchild AFB |
| 3 | Boyer, Erik | BPA |
| 4 | Evans, Mary Beth | BPA |
| 5 | Hulsizer, Bryan | BPA |
| 6 | Rea, Dexter | Fairchild AFB |

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|----|-------------------|------------------|
| 7 | Elliot, Ryan | Fairchild AFB |
| 8 | Failano, Andrew | Fairchild AFB |
| 9 | Doran, Steve | Fairchild AFB |
| 10 | Ousley, Brent | Fairchild AFB |
| 11 | Retcher, Dusten | Fairchild AFB |
| 12 | Grimes, Roger | Fairchild AFB |
| 13 | Roh, Shondel | Fairchild AFB |
| 14 | Apperson, Sean | Fairchild AFB |
| 15 | Lynch, Michael | Fairchild AFB |
| 16 | Nisbet, Ben | Fairchild AFB |
| 17 | Smith, Ames | Fairchild AFB |
| 18 | Dolar, Jon | Fairchild AFB |
| 19 | Haughn, Nicholas | Fairchild AFB |
| 20 | Allred, Jason | Fairchild AFB |
| 21 | Mercer, Mason | Fairchild AFB |
| 22 | Ehrman, Michael | Fairchild AFB |
| 23 | McCoy, Darius | Fairchild AFB |
| 24 | Joudan, Douglas | Fairchild AFB |
| 25 | Prestero, Chris | Fairchild AFB |
| 26 | Huber, Michael | BPA |
| 27 | Martin, Camille | Avista Utilities |
| 28 | Doege, Leona | Avista Utilities |
| 29 | Shafer, Robert | Fairchild AFB |
| 30 | Appleton, James | GSA |
| 31 | Davis, Robert | Fairchild AFB |
| 32 | Wallace, Jennifer | Fairchild AFB |
| 33 | Peck, Steve | Fairchild AFB |
| 34 | Hope, Erin | BPA |

Seattle, WA: November 17, 2010

| | Name (Last, First) | Organization |
|----|---------------------------|-----------------------------------|
| 1 | Alsin, Greg | Navy Personnel |
| 2 | Amin, Sakhawat | JBLM, Energy Program |
| 3 | Braden, Dan | Navy Personnel |
| 4 | Brooks, Michelle | BPA |
| 5 | Broustis, David | Seattle City Light |
| 6 | Cates, Nick | Navy Personnel |
| 7 | Christopherson, John | Navy Personnel |
| 8 | Clark, Corky | BPA |
| 9 | Demyanovitch, Bob | Navy Personnel |
| 10 | Disch, Frank | ERW |
| 11 | Drury, Chris | Navy Personnel |
| 12 | Dunbar, Dana | Navy Personnel |
| 13 | Emtman, Trevor | Port Of Seattle (Sea-Tac airport) |

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|----|------------------|-----------------------------------|
| 14 | Frey, Dan | JBLM |
| 15 | Gabrielson, Mark | USCG |
| 16 | Gisselberg, Jim | Navy Personnel |
| 17 | Hrovat, Jeff | Navy Personnel |
| 18 | Huber, Michael | BPA |
| 19 | Jones, Rick | BPA |
| 20 | Juhasz, Steve | VA Hospital |
| 21 | Jung, Lee | JBLM |
| 22 | LaBelle, Ray | Navy Personnel |
| 23 | Locke, Scott | Port Of Seattle (Sea-Tac airport) |
| 24 | Mathews, John | USCG |
| 25 | Matthes, Steve | VA Hospital |
| 26 | Meith, Kit | |
| 27 | Miller, Brad | BPA |
| 28 | Nichols, Curt | BPA |
| 29 | Owen, Randy | NEW |
| 30 | Payne, John | Navy Personnel |
| 31 | Rogers, Randy | BPA |
| 32 | Sample, Chris | Navy Personnel |
| 33 | Sandborn, Paul | Navy Personnel |
| 34 | Sanford, Pete | Navy Personnel |
| 35 | Sawyer, Robert | Seattle City Light |
| 36 | Scott, Timothy | USCG |
| 37 | Shokri, Iraj | USCG |
| 38 | Smalley, Ray | Navy Personnel |
| 39 | Solis, Jose | JBLM |
| 40 | Swann, Robert | Seattle City Light |
| 41 | Todd, Mary | Port Of Seattle (Sea-Tac airport) |
| 42 | Trimble, Rich | Navy Personnel |
| 43 | Turpin, Troy | Port Of Seattle (Sea-Tac airport) |
| 44 | Weber, Robert | BPA |
| 45 | Wilson, Wesley | USCG |

Appendix B: Adaptive Lighting Symposia Marketing List

Energy Experts Events Calendar (www.EnergyExperts.org)
Northwest Environmental Business Council (NEBC) Member List
Energy Trust.org
Northwest Trade Ally Network
Lighting Design Lab
Illumination Engineering Society-Portland Chapter
Illumination Engineering Society-Puget Sound Chapter
American Institute of Architects
Technical Advisory Group (TAG) Members
Building Owners and Managers Association (BOMA) International -Seattle Chapter
Association for Facilities Engineering
Northwest Energy Efficiency Alliance (NEEA) Regional Training Calendar
Lockheed Martin Corporation (LMCO)
Bonneville Power Administration (BPA) (for distribution by Sarah Gabel, EE Program Marketing)
Northwest Energy Education Institute
Washington State General Administration's Office : Energy & Resource Conservation
Better Bricks
International Association of Lighting Designers (IALD)
Oregon Energy Coordinators Association
Ocean Wave Energy Trust
Oregon Cities (A website that lists all city officials in each county)
University of Oregon
Luma Lighting Design
Dearborn Lighting Design
Washington State University (WSU) Plant Operations Consortium Listserv

Appendix C: Adaptive Lighting Symposia Survey Results

Q: Was three hours long enough?

83.8% replied yes, 16.2% said no.

Comments:

1. More hr would have allowed more depth in some topics
2. More in-depth on the actual lighting installations would have been helpful.
3. A full half day 4 - 4.5 hours with more time for audience members to not only ask questions but to share from their experience.
4. It was too long for an introductory presentation but not long enough to provide sufficient detail to adopt the practice on an ongoing basis. If the goal was for lighting professionals to immediately begin incorporating bi-level exterior lighting into our practices, then more training is required.
5. I believe there was more information to be covered and more questions that needed to be answered.
6. Longer would have allowed more discussions, which would be useful, but may not be practical for most people
7. It was fairly tight, and Michael had to cut out some of the presentation in order to get it all in. Because he did that, though, it did not feel rushed or cut short, though we went over time about 10 minutes.

Q: On a scale of 1 to 10, how would you rate the symposium? (1 being the worst and 10 being the best)

| Scale | Percentage |
|-------|------------|
| 10 | 13.5% |
| 9 | 21.6% |
| 8 | 43.2% |
| 7 | 10.8% |
| 6 | 8.1% |

Q: What did you like the best?

Comments:

Information was interesting.

- ▶ The presenter and his projects with sensors were very interesting and timely.
- ▶ Location was good; speaker had lots of info.
- ▶ Q and A.
- ▶ Cutting edge content on a hot topic.

- ▶ Results from actual projects.
- ▶ The UC Davis Study.
- ▶ I liked the emphasis on simple control systems that should result in more long-term savings.
- ▶ Well organized, super engaging speaker.
- ▶ Presenter really knew the subject matter
- ▶ Knowledgeable presenter.
- ▶ I like the real-world examples, i.e., strategies for not lighting empty rooms and parking lots, etc.
- ▶ I trust Mike and appreciate his honesty and insights, directly tied to his experience with the topic.
- ▶ Speaker - knowledgeable and entertaining.
- ▶ The power point presentation showing real life pictures of examples.
- ▶ I liked that the course was taught from practical experience and not all theoretical.
- ▶ Real world approach.
- ▶ The outdoor examples.
- ▶ The speaker was knowledgeable and interesting.
- ▶ Speaker was knowledgeable and entertaining.
- ▶ Slides of actual sites.
- ▶ The before and after shots of the changes that were made.
- ▶ The photos, the discussion of various barriers to adaptive lighting such as the concerns of different constituencies (e.g. police/security services, dark sky folks, architects, etc.), and the policy initiatives around LED streetlamps. Also, there was excellent Q&A/discussion after the presentation.
- ▶ Quality and relevance of content and presenter.
- ▶ The ideas presented were of great value.
- ▶ Instructor was not a sales person. Instructor was able to show costs and benefits in real examples.
- ▶ Photo examples.
- ▶ Speaker was engaging.
- ▶ Dynamic presenter. Good food.
- ▶ Great speaker, very informative.
- ▶ Good amount of case study information.
- ▶ Case studies and evidence of successful implementations of the technology.
- ▶ Q & A period.

- ▶ Clear, informative, and animated presentation, great responses to Q&A.
- ▶ Good introduction into use of controls.
- ▶ The depth of experience he brought to answering the questions, and the enthusiasm he has for his field.
- ▶ The presentation by Michael Siminovitch.

Q. What did you like the least?

Comments:

- ▶ I know that the presenter is very proud about what he has been able to accomplish but I felt that the presentation was a little bit too much about himself.
- ▶ Much of the information was not new to me.
- ▶ Speaker not particularly engaging
- ▶ Still waiting to get the soft copy of the content.
- ▶ The BPA Presentation; it did not cover anything new or exciting developments in lighting.
- ▶ The handouts were PowerPoint of the presentation. I could use some resources like names of the products as well.
- ▶ The pace was a little fast...would have liked some more time to dig into certain applications of bi-level lighting for example.
- ▶ Presentation focused on only a single example.
- ▶ The question & answers.
- ▶ Would like early morning and not on a Friday.
- ▶ The preliminary info. Re. sponsors, etc. (although I understand that it's necessary!)
- ▶ No blueberry muffins.
- ▶ Maybe not enough time?
- ▶ No complaints
- ▶ Everything was fine, including the snacks.
- ▶ I would have liked a more in-depth class.
- ▶ Acoustics.
- ▶ I'd like more real world contractor level information on how the work got done.
- ▶ Not enough details of specific product and technology application.
- ▶ It would have been helpful to get detailed information on the specific products that were used. While I understand the desire to be product neutral, it would save us a great deal of search time to be able to contact and work with vendors that have successfully implemented the technology.

- ▶ Not enough time to cover it all.
- ▶ Industrial vegetable snacks
- ▶ A little more detail on installation issues regarding control sensors.
- ▶ Not having quite enough time for questions.
- ▶ Nothing.

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| Q: What recommendations would you make for future events? |
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Comments:

- ▶ I'm interested in the very newest of the new lighting technology and in what various applications those might be installed.
- ▶ Make sure the content will be available to participants in electronic format - public web site?
- ▶ More advertisement to get more people in. Combine with local IESNA luncheon.
- ▶ More publicity - it is hard to get to everything but a lot of people missed it.
- ▶ Broaden the range of examples.
- ▶ To look creatively at the areas that are not part of the research presented, how to go beyond the topic.
- ▶ Same type of hands-on experience from the instructor.
- ▶ More difficult problem solving and stats.
- ▶ Perhaps testimonials from clients/customers impacted by the changes.
- ▶ I'd like a little discussion of standout products for various applications.
- ▶ Keep them coming.
- ▶ Three hours is about right for those of us visiting from Seattle from Thurston County. Shorter seminars cause difficulty for us in justifying the trip.
- ▶ More question answer time.
- ▶ Various lighting controls approaches and case studies of their success/failure.
- ▶ Also allow time for group building - in addition to the content, allow enough time, perhaps in 5-10 breakout groups for audience members to share about their work in this area and perhaps to make more solid connections with other lighting professionals.
- ▶ Some detailed application descriptions (e.g. "here's a way to control XYZ lighting configuration with widget ABC").
- ▶ Incorporating daylight into interior lighting projects. - More information on various lighting technologies and appropriate application of the technologies.
- ▶ Include something physical, such as a tour of Michael's office that used bi-level and some outdoor bi-level applications.
- ▶ Half hour longer.

Q: Are Continuing Education Unit credits important to you when considering attending events such as the Adaptive Lighting Symposium?

48.6% replied yes, 51.4% replied no.

- ▶ I have a LC certification and I have CEU requirements to maintain certification from the NCQLP.
- ▶ Learning more about lighting is important. I am a professional engineer; continuing education is not a license requirement yet.
- ▶ Nice to have but not necessary
- ▶ Sort of...I keep track of my professional development hours for my PE licenses, so I can determine on my own what is applicable.

Q: Would you be interested in a future presentation on emerging electrical energy efficiency technology? If yes, what three topics would you most like to learn about?

100% replied yes.

- ▶ 1. Public sector procurement best practices. 2. "Green" procurement. 3. High-energy-efficiency/new technologies.
- ▶ Applicability in small commercial and residential.
- ▶ Data Centers, Compressed Air and Emerging HVAC Efficiency Technologies.
- ▶ Effective behavior change programs including measurement.
- ▶ Energy monitoring technology for both home and commercial use building energy monitoring/analysis how well does wireless monitoring technology perform in commercial bldgs?
- ▶ Existing infrastructure upgrades. How to best utilize the various new lighting and control technologies. What criteria to use when evaluating technologies and where to find verifiable information.
- ▶ Heat pumps, Lighting options, and Controls.
- ▶ HVAC controls (esp. DCV), heat pump water heaters, computer efficiency opportunities (hardware, software, multiuser).
- ▶ I'm not sure but whatever helps us meet energy codes (lighting) and save energy (LEED credits).
- ▶ Interior LED retrofit options. Outdoor LED streetlight options. Small commercial retail lighting upgrade options.
- ▶ LED lighting, Motion Sensors and new products.
- ▶ LED Lighting best applications (gee I bet you are shocked ;-) Power factor correction EV Charging infrastructure.
- ▶ LED, induction, plasma lighting technologies.

- ▶ Lighting (especially OLED and PLASMA!), conservation voltage regulation at both the level of the feeder line and the individual building (e.g. MicroPlanet products), controls, whatever else is emerging.
- ▶ Lighting controls, relationship between daylight modeling and actual monitored results, tied to total energy use for operation.
- ▶ Lighting for low watts per sq ft, ambient/task.
- ▶ Lighting, HVAC, and energy management emerging technologies.
- ▶ Lighting.
- ▶ More on controls/adaptive lighting, Compressor Analysis and HVAC Analysis.
- ▶ More on the lighting. Solar applications, lessons learned, Heat pumps.
- ▶ Nothing specific at the moment.
- ▶ Packaging controls and lighting case studies including data on costs and installation hiccups. Integrating natural lighting
- ▶ Plasma, LED, Induction.
- ▶ Remote controls and monitoring systems.
- ▶ Retrofitting buildings to for energy conservation.
- ▶ Smart Grid enabled devices, Motor Controls, Advances in Heat Pumps, and control strategies.
- ▶ Wireless Lighting Controls, streetlighting, DOE caliper test cases.

Q: Do you feel that the information presented will help your organization?

97.3% replied yes and 2.7% replied no.

- ▶ Again, the results from actual projects/studies.
- ▶ As we update our buildings, effective and efficient lighting is best practice.
- ▶ Because I will apply adaptive lighting thinking to everything I do, it's the kind of thinking we need to embed in designers.
- ▶ Gives me good ideas to present to potential clients.
- ▶ I can help steer customers toward effective lighting strategies.
- ▶ I do energy efficiency for Seattle City Light.
- ▶ I had not previously considered all of the control opportunities for street lighting.
- ▶ I have focus on practical solutions that move towards ambitious energy efficiency goals .This was a substantive presentation.
- ▶ I saw some slightly different uses for bi-level switching. We may be able to use some of those options.

- ▶ I will be able to use some of the information. Much of it I knew already. It was interesting to hear about their testing setup.
- ▶ I work for a utility and my primary focus is rebates for lighting retrofits for my customers.
- ▶ I'm a Commercial/Industrial Efficiency Engineer for a public utility and I work with all types of customer loads and processes.
- ▶ I'm gathering as much information as I can about the lighting industry to be able to offer a state contract for fluorescent lighting that has the best balance of reasonable cost and responsible environmental/energy efficiency.
- ▶ I'm more informed and can pass this information on to our customers so that they can make good lighting retrofit decisions.
- ▶ It gave me a great level of comfort in my understanding after hearing from someone with that much experience and authority.
- ▶ It will help to clarify where we should be pushing customer to go for increased energy efficiency.
- ▶ It's a fast moving target, it represents the future, we need to be informed.
- ▶ It's right up our alley.
- ▶ Lighting is a definite interest.
- ▶ Potential data source on occupancy savings.
- ▶ Several of the control strategies covered in the UC Davis study presented by Dr Siminovitch will probably be implemented and added into our lighting controls strategy.
- ▶ Showing the energy reductions put into place helped me understand the actual savings that can be achieved with the new products on the market.
- ▶ We already had most this information.
- ▶ We are already incorporating bi-level controls on many exterior lighting projects but private sector customers and utilities have been more reluctant to adopt the technology and additional initial costs.
- ▶ We have been looking for ways to reduce parking lot lighting. We have 3 one-thousand watt fixtures on each pole, and will likely reduce the lighting between midnight and 5 A.M using bi-level lighting.
- ▶ We will definitely continue or goals of installing motion sensors and may add dimming ballast for daylighting.

Would you like to opt in?

- ▶ This is the question that we asked: "By opting in, you are requesting that we keep your contact information for future use.

We would contact you to notify you of similar events in your area, to announce Energy Efficiency Emerging Technology program developments, or to solicit your help to identify new technologies you are encountering in your work. We would not provide your information to any other than the partners who brought you the Adaptive Lighting Symposium – Bonneville Power Association, Washington State University, and the California Lighting Technology Center.

Should you choose not to opt in we will delete your information from our contact list.”

- ▶ **Out of 37 people that responded to the survey, 36 opted in.**

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| Final comments: |
|------------------------|

- ▶ Well done seminar.
- ▶ I thank the LDL for reaching out beyond state lines and bringing in real talent. Seattle w/ all of its talent can be insular, somebody needs to reach out, thanks for doing that for our design community.
- ▶ It was good to have a reasonably-priced option to obtain Professional Development Hours as well as learn some things.
- ▶ Symposium covered a great topic, and drew an excellent audience. Kudos!
- ▶ Enjoyed the Symposium...well done.
- ▶ Thank you for offering this symposium.
- ▶ Good job!
- ▶ Is there a way to receive CEU's from the previous class?
- ▶ Well done.
- ▶ Thanks for hosting this!