

# ShopTalk

Plant Operations Support Consortium

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## Comparing Efficiencies of LED Fixtures, LED Retrofit Lamps, and Non-LED Lamps

By Eric Strandberg, Lighting Design Lab

When looking at the efficiency of LED systems, we commonly see efficiencies of 100% because the lumens are measured exiting the fixture, not at the lamp fixture, as is the case with conventional light sources. But, with a retrofit LED product or an integral LED lamp, we can't assume that the rated lumens will equate to delivered lumens. This is because some, or all, of the usual light loss factors must be applied to the system, particularly luminaire efficiency.

All luminaires affect the optical efficiency of the light source. Lenses, reflectors, baffles, or housing cause some loss of light, which is either converted to heat or directed somewhere unintended. Light is directed by the luminaire, and this "shaping" of the light is usually a good thing. A well-designed luminaire can direct light more effectively than an inferior one. But when we compare the raw lamp lumens to the total lumens directed to a

target (for aesthetic or utilitarian purposes), we find that some lumens are lost on their way to the target. This difference is the luminaire efficiency, and is often stated as a percentage (e.g., "This luminaire has 84% efficiency").

In contrast, the efficiency of LED fixtures is measured by total lumen output, which represents the delivered lumens of the system. Therefore, the luminaire efficiency is always 100%. This can give LED fixtures a perceived advantage when comparing them to non-LED fixtures.

The stated lumen output is delivered lumens. With a metal halide or a T8 fixture, we need to reduce the lamp lumens by the luminaire efficiency. This does not, however, account for variations in optical pattern. For example, Fixture A may be "less efficient" but more effective at delivering light where it's wanted, whereas Fixture B may be "more efficient" but has the wrong optics for the application.

With an LED retrofit, particularly omnidirectional screw-ins (whether for a small residential product or

See **LED** on page 7



*The Lighting Design Lab is an interactive commercial and industrial nonprofit facility that provides education and consultation assistance in support of lighting energy conservation. Visit them at [www.lightingdesignlab.com](http://www.lightingdesignlab.com).*

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*Shop Talk* is a electronic newsletter of the Plant Operations Support Consortium, providing information focused on facility operations.

We welcome feedback from readers. To provide feedback or to subscribe to the Consortium electronic Listserv, email us at [PlantOps@energy.wsu.edu](mailto:PlantOps@energy.wsu.edu).

Archived issues of *Shop Talk* are available at:

[www.energy.wsu.edu/PublicFacilitiesSupport/PlantOperations/ShopTalk.aspx](http://www.energy.wsu.edu/PublicFacilitiesSupport/PlantOperations/ShopTalk.aspx)

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## Shop Notes

By Edwin Valbert,  
Consortium Manager

I want to start out by saying that we at Plant Operations wish the best for those touched by the terrible wildfires in Eastern Washington. Some members have been directly affected by the fires and I know the entire Consortium membership stands ready to help them in any way as they clean up and begin to rebuild.

On a lighter note, I would like to say thank you to everyone who helped organize, made a presentation, or attended the 2014 Energy/Facilities Connection Conference (EFC) in May 2014. Feedback has been very positive overall as people continue to tell us that the EFC remains one of the best conference/educational events they attend. We recognize that training and support budgets are tight, and we remain committed to delivering the best educational experience possible at affordable rates.

We are always looking for timely conference topics and great presenters, so never hesitate to send us suggestions of topics and/or speakers – including you – because many of you have a lot of great experience that could be shared. Mark your calendars for May 5, 6, and 7, 2015, when we return to Leavenworth to host the 11th annual EFC – *Staying Smarter Than Your Buildings*.

On another note, I am periodically reminded that a Consortium membership is sometimes heavily used by just one or two people within the member organization. This, of course, limits the ability of the organization to take full advantage of their membership. Make sure to spread the word throughout your organization about



Edwin Valbert

the benefits that membership provides. And remember that we are always happy to come out and introduce the Consortium to other staff members, regardless of how long your organization has been a member.

Here are some recent ways members have utilized the Consortium:

- Secured pricing of used equipment being purchased to meet purchasing requirements
- Researched National Fire Protection Association alarm testing requirements
- Identified power factor charges on utility bill
- Assisted with fuel source conversions and future costs
- Completed an on-site review of workspace site safety concerns
- Located and arranged for member staff training on bed bug remediation
- Conducted custodial assessments

Additional examples are presented in greater depth in Recent Consortium Success Stories.

As always, we look forward to your calls and emails. ✖

# How Clean is Clean?

## Using Scientific Measurements in your Cleaning Operations

By Sue Brown, Consortium Staff

To better serve our members, the Plant Operations Support Consortium recently purchased an ATP (adenosine triphosphate) meter for use in testing member facilities.

Keeping your building looking clean is an important part of demonstrating the overall effectiveness of your facilities maintenance department. However, protecting your building occupants from unseen and potentially harmful pathogens is equally – or even more – important. Colds, flu, conjunctivitis, and other common touch-based illnesses can significantly hinder the productivity of any organization.

But how do you know if you are successfully cleaning for health?

Enter the ATP meter. Used by most hospitals, ATP meters provide a scientific way to measure just how clean surfaces are. While an ATP meter doesn't measure specific pathogens, the device can identify how much organic material is left on a surface, which could potentially support the growth of pathogens. Less organic material equates to cleaner surfaces. Cleaner surfaces equal healthier occupants.

ATP meters can cost anywhere from \$200 to over \$1,000, so they can be cost prohibitive for facilities to purchase. The Consortium is always trying to find ways to support members while making their lives easier by demonstrating new tools and methods to get

the job done. The ATP meter should help accomplish that goal.

Members interested in ATP meter testing can contact Consortium staff at 360-956-2058 or [plantops@energy.wsu.edu](mailto:plantops@energy.wsu.edu) to schedule a visit and demonstration testing. Staff member Sue Brown will come out and test a variety of surfaces/touch points in a facility to help identify and celebrate successful cleaning practices as well as to provide feedback where improved cleaning techniques might be employed. Depending on your location and membership fee, the testing might be totally covered by your membership or might require a limited fee for service.

Call or email the Consortium staff to discuss ATP meter testing to validate the great job currently being done by your facilities staff, or support process improvements to further protect your building occupants. ✖



# Celebrating Facilities Innovations

By Phil Partington, Consortium Staff

May 2014 marked the ten-year anniversary of the Energy/Facilities Connections Conference. The Consortium celebrated by implementing a new award to honor innovative thinking and implementations in public and nonprofit facility operations. Congratulations to this year's recipients: Pateros School District and Portland Public Schools.

## **Boosting Bus Communication: Pateros School District**

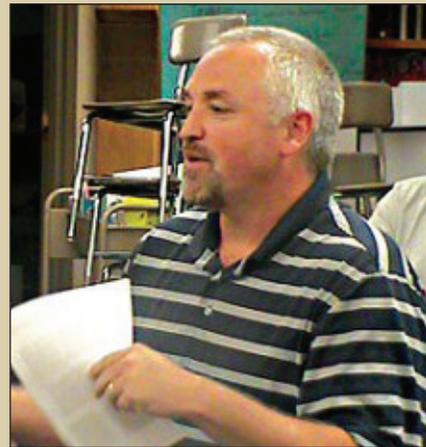
Because of its geographic area, Pateros School District faced a problem with a lack of communications between the central office and buses that were out on their routes. For example, if the central office needed to contact a bus driver to check the location of a child or if a child got off at the wrong stop, the office was unable to contact the driver via cell phone or radio except in a few select locations. And if the weather was bad enough, a cell signal wasn't available even in those spots.

In response to this dilemma, Paul Harris, maintenance/operations supervisor for the district, wrote a grant proposal that was accepted by the National Association for Pupil Transportation/Zonar Systems. Only seven grants were awarded nationally. This enabled the district to purchase the Electronic Fleet Management system, which includes a 10-inch GPS unit that tracks buses, bus stops, bus routes, bus trips, student participation, student numbers, communication between the school and bus via GPS, and pre-trip and post-trip documentation. For parents, the system also generates live information on student involvement.

"This system is just what we needed," said Harris. "And not only have we solved our problem, but we have been able to establish direct communication between the mechanic and transportation coordinator, not to mention track mileage, numbers of stops, and student counts."

“

**This system is just what we needed. And not only have we solved our problem, but we have been able to establish direct communication between the mechanic and transportation coordinator...**



Paul Harris  
Maintenance/Operations Supervisor  
Pateros School District  
Pateros, Washington

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Contact Pateros School District to learn more about their bus communication innovation: 509-923-2751 or [pharris@pateros.org](mailto:pharris@pateros.org).

See **Innovations** on page 5

## Innovations

Continued from page 4

### ***Saving Money with In-house Efforts: Portland Public Schools***

Portland Public Schools was paying a vendor \$250,000 annually to test and inspect emergency generators for 85 schools. Through no fault of the vendor, the district did not feel that they were getting the service profile they needed.

Steve Hoecker, electrician at the district, addressed this concern by developing a study showing the benefits that could be reaped by bringing the service back in-house, even though the conventional wisdom at the time supported outsourcing. The result was that, for the same \$250,000, the district was able to hire two FTE's – an electrician and a machinist – who could perform the required testing and inspection in six months rather than the full year required by the vendor, and return \$100,000 to the facilities budget.

"It was a big win for us," said Hoecker, "and I feel fortunate to work for an organization that supports out-of-the-box ideas."

Contact Portland Public Schools to learn more about their internal study that saved money and time, and even returned money to the budget: 503-916-3083 or [shoecker@pps.net](mailto:shoecker@pps.net).

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*The Consortium applauds these creative thinkers. These are the kinds of best practices that ought to be shared with and emulated by all.*

*If you have a story of innovation to share, contact your Consortium at [plantops@energy.wsu.edu](mailto:plantops@energy.wsu.edu) and learn how to apply for the EFC Innovations Award. ✖*

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**It was a big win for us,  
and I feel fortunate to  
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that supports  
out-of-the-box ideas.**



Steve Hoecker  
Electrician  
Portland Public Schools  
Portland, Oregon

”

# Tracking Your Energy Consumption Just Got Much Easier

By Phil Partington, Consortium Staff

As the saying goes, “You can’t manage what you don’t measure.” That’s the basis for the Environmental Protection Agency (EPA) ENERGY STAR Portfolio Manager® (PM), a free online tool you can use to compile and track energy and water consumption, and greenhouse gas emissions.

Over the past few years, Consortium staff traveled up the learning curve and became proficient with the tool. We even contributed to upgrades and fine-tuning by providing EPA with feedback and suggestions.

## What does this mean for Consortium members?

Many facilities manager might say, “Sure, I’d love to track our energy consumption and generate reports to upper management and end users, but I just don’t have the time.” That’s where your Consortium can help.

## The Consortium can set up accounts to automatically deliver your utility data to PM

We have already set up accounts for several members, which includes connecting with their utility providers to investigate automatically feeding energy consumption data directly into the PM account. If this option is available for your facility, it eliminates

the need to spend hours on data entry each month. If your utility provider has not set up a process to directly feed your monthly data into your PM account, we can assist with account setup and the monthly uploading process.

## The Consortium has created robust report formats

With PM, users can generate a series of basic reports. But to help tell the story the user really wants to tell in more detail, your Consortium has developed several more robust reports for your use.

## The Consortium can offer support and insights as you learn to use PM

The Consortium’s PM support can include a tutorial on setting up the tool, how to use it, and how to perform ongoing data entry and management, including regularly reporting energy consumption.

Your Consortium team has already helped several members track their energy consumption and cost savings. How can we help you? Depending on the level of assistance you need, the PM support might be covered under your current membership fees or it might require a minimum fee for service agreement. Contact [plantops@energy.wsu.edu](mailto:plantops@energy.wsu.edu) or call 360-956-2055 to learn more.

## Consortium Members Welcome: Emerging Energy Efficiency Technologies Webinars

The Bonneville Power Administration (BPA) Energy Efficiency Emerging Technology (E3T) Program presents monthly webinars to showcase new and emerging technologies that show promise in saving energy.

The E3T Showcase series is presented by the Washington State University Energy Program, and is sponsored by BPA with support from Western Area Power Administration.

View the current and previous webinars on the E3TNW website, <http://e3tnw.org/Webinars.aspx>.

## Community College Lands Smoking Shelter from Consortium Connections

By Phil Partington, Consortium Staff

The Consortium is a great conduit for used-equipment brokering among members. One such success occurred when Highline College contacted the Consortium saying they needed a fixed outdoor shelter for smokers to ensure that people did not smoke within 25 feet of any public building entrance. This need was posted to the Consortium Listserv and was quickly answered by Larry McCarty of Pierce County Transit, who knew that one of their bus stop shelters was set for demolition.

Consortium staff helped the two members get connected, and Highline and Pierce County Transit soon made plans to have the retired bus shelter transferred to the college. Several months later, it is clear that this was a win for both members: Highline enjoys its “new” shelter for smokers and Pierce Transit was able to find a good home for a sound structure they no longer needed.

“It was a nice win for us,” said Barry Holldorf, Facilities Director of Highline College. “We try to think outside the box whenever it makes sense in order to save the college money and Plant Ops is a great resource for that.” ✖



### LED

Continued from page 4



Eric Strandberg

a large HID replacement), the LED does not have the advantage of 100% luminaire efficiency. All of the optical losses associated with the existing fixture need to be applied to the LED retrofit. In addition, there may be additional optical losses because many LED screw-in retrofits are not shaped the same as the lamp that is being replaced. This optical loss problem occurs when converting HID fixtures to CFL because the HID is a point source and the CFL is a “blob” of light. However, if done right, the different shape (optic) can provide an advantage by directing more light out of a poorly designed fixture.

Before comparing the costs of various lighting strategies, remember to take the LED lamp lumens and apply all of the usual light loss factors.

Contact Eric with questions at 206-325-9711 ext. 128 or [eric@lightingdesignlab.com](mailto:eric@lightingdesignlab.com). ✖

## Consortium Members

### K-12 Schools

Bridgeport  
Camas  
Centralia  
**Conway**  
Delta, BC  
Enumclaw  
ESD 101  
ESD 114  
ESD 121  
Federal Way  
Forest Ridge School of  
the Sacred Heart  
**Highline**  
Hoquiam  
Inchelium  
North Thurston  
Odessa  
Olympia  
Orcas Island  
Orondo

Pateros  
Portland Public  
Schools, OR  
Reardan-Edwall  
Renton  
San Juan Island  
Selkirk  
**Shoreline**  
Wenatchee  
Wishkah Valley

### Universities/Colleges

Bates Technical College  
Bellevue College  
Clark College  
Columbia Basin College  
Community Colleges of  
Spokane  
Edmonds Community  
College

Everett Community  
College  
Highline Community  
College  
Lake Washington  
Institute of Technology  
Olympic College  
**Peninsula College**  
Pierce College  
Seattle Central College  
South Puget Sound  
Community College  
The Evergreen State  
College  
Washington  
State University  
Energy Program  
Wenatchee Valley  
College

### Municipalities

**City of Puyallup**  
City of Tumwater  
Clark County  
Jefferson County  
Lakehaven Utility  
District  
Lewis County  
Pierce County Library  
System  
Skamania County  
Snohomish County  
Thurston County  
Whatcom County

### Miscellaneous

Hopelink  
**Meydenbauer Center**  
Multicare System

### Washington State Agencies

Corrections  
Ecology  
**Enterprise Services**  
Health  
Licensing  
Natural Resources  
Parks & Recreation  
School for the Blind  
Social & Health Services  
State Patrol  
Transportation  
Veteran's Affairs

*Our warm welcome to  
new members in **bold  
blue** type. We look  
forward to serving your  
facility and operations  
needs. ✖*

## 2015 Energy/Facilities Connections Conference

# Staying Smarter Than Your Buildings

## May 5-7, 2015

Located at the beautiful  
Enzian Inn  
Leavenworth, Washington

### Mark Your Calendars!

Check out the EFC 2015 page at  
[www.energy.wsu.edu/efc](http://www.energy.wsu.edu/efc),  
call Consortium staff at 360-956-2057 or  
email [plantops@energy.wsu.edu](mailto:plantops@energy.wsu.edu) for  
additional information.

## ENERGY/FACILITIES CONNECTIONS

WASHINGTON STATE UNIVERSITY  
ENERGY PROGRAM

