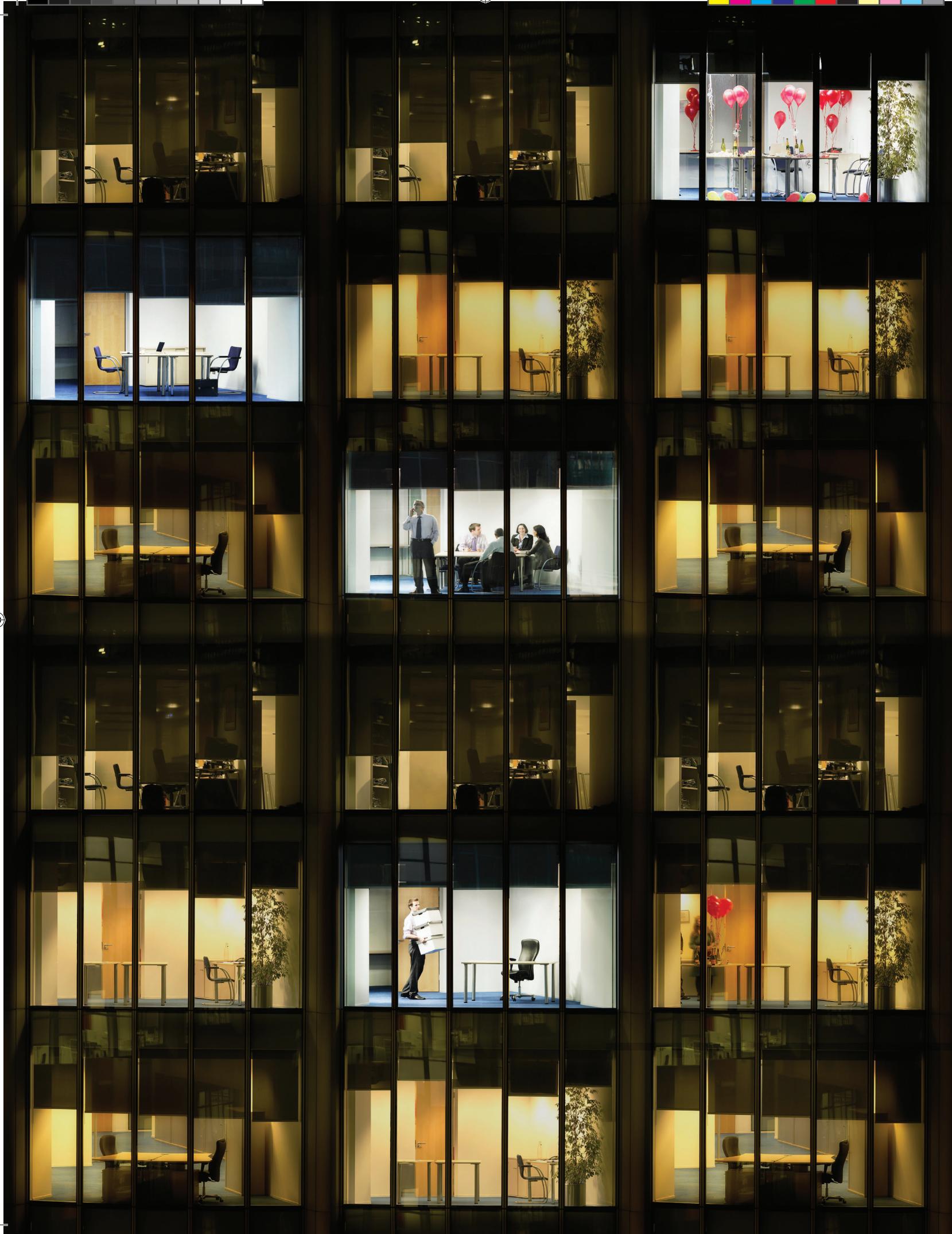




Northwest Trade Ally Network **FIELD GUIDE 2014**

Commercial & Industrial Lighting





Welcome to the 2014 Northwest Trade Ally Network Field Guide. This guide accompanies our workshop series and provides you with tools and resources to take back into the field to help enhance your business. You'll find utility contact lists, tips and tools, sample documents, industry resources and more – all here in one easy-to-use handbook. Our plan is to update this guide each year to tie into our workshops and provide you with fresh, relevant information about lighting efficiency.

We know that your time is valuable and that's why we've changed our approach to make our workshops more focused. The hands-on training from experienced professionals, networking opportunities, and deep dive into industry best practices, coupled with this Field Guide, will help align you with the resources and support you need to better serve your customers, close more deals and work more efficiently.

Your participation in NWTAN is also important to the health and vitality of our region. Over the next 20 years, 85 percent of future regional load growth will be achieved by energy efficiency. This investment in energy efficiency is just one-third the cost of building new power plants and has none of the negative environmental impacts. You may ask, "How does this apply to me?" Commercial and industrial lighting makes up the single largest block of low-cost energy savings, not just in the Pacific Northwest, but also across the entire nation.

By working with your customers and your local utility to find and implement energy-efficient lighting projects, you are doing your part to keep regional power prices lower for decades to come. The work you do matters and we are grateful for your support.

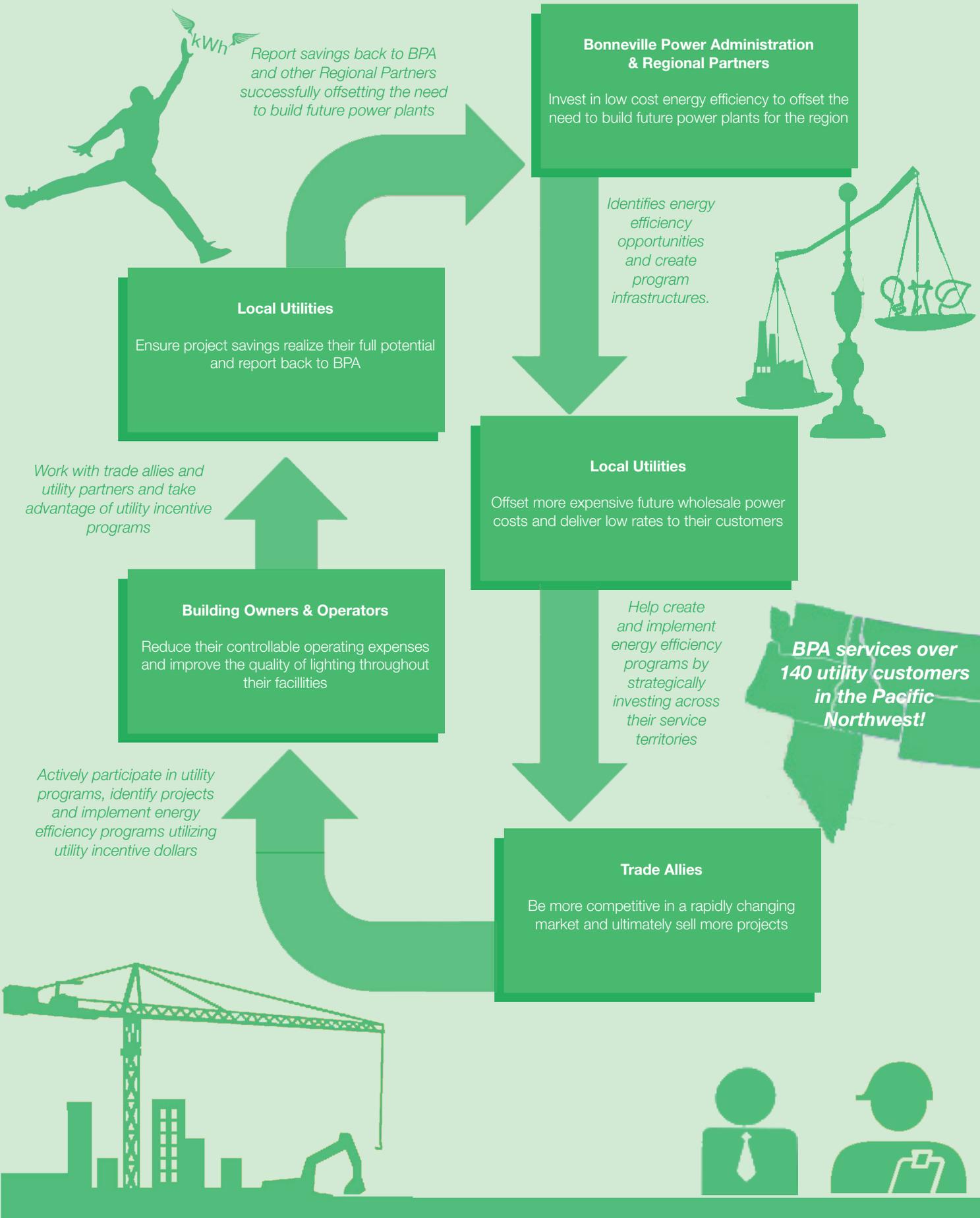
On behalf of the Bonneville Power Administration, thank you.



Sincerely,
John A. Wilson
C&I Lighting Program Manager
Bonneville Power Administration



The Big Picture







ENERGY EFFICIENCY PROGRAMS IN THE NORTHWEST

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Annual Lighting Survey

Note: While certain products may be used in this handout and during the demonstrations, in no way do NW TAN or BPA endorse those products in relation to other competing products. It is recommended that each contractor use products from manufacturers they know and trust.



LIGHTING PROJECT LIFECYCLE

Lighting Project Lifecycle

Entity	PHASE I Introduction	PHASE II Scoping	PHASE III Implementation	PHASE IV Project Inspection	PHASE V Incentive Processing
Trade allies Electric contractor, distributor, manager, representative	Identifies potential project with customer	Assists with completion of utility lighting calculator Provides project cost estimate	Completes all work scoped in utility lighting calculator	Makes any corrections or project modifications as suggested	Provides lighting specialist and utility with final documentation
NWTAN Lighting specialists supported by BPA	*Conducts initial audit-lite in order to estimate project potential Recommends local lighting trade allies	*Assists in completion of audit with trade ally and lighting tool Ensures owner and trade ally both understand the project specifications *When project is ready, lighting specialist engages the utility to confirm proper paperwork is in place	Not responsible for project management or job oversight	*Provides final project audit based on request from utilities *Updates calculator and submits to utility for BPA reporting/invoicing	Ensures utility has complete paperwork for incentive processing
Business owner or facilities manager	Shows interest in potential project Contacts local utility	Participates in initial project scoping activities Reviews trade ally proposals	Signs agreement with utility (and sometimes trade ally)	Signs off on completed project	Receives incentive payment within estimated 6-8 weeks
Utility Your local utility	Identifies potential project with customer	Ensures any pre-project paperwork is complete Approves non-standard measures & incentives	Signs agreement with business owner or facilities manager (and sometimes trade ally)	Directly completes audit Signs off on lighting specialist audit	Processes incentive payment (estimated 6-8 weeks)

*Some NWTAN services may not be available for all projects and are made available based on requests from utility program staff. Actual incentive payments vary by project & utility. For more information contact your local utility or lighting@bpa.gov

BEST PRACTICES FOR SITE AUDITS

Effective site audits can make all the difference between a successful project proposal and an unsuccessful one.

BEFORE THE AUDIT

1

Research the company you are auditing so you can be knowledgeable about their business.

2

Ask for resources before you arrive: make sure they know it will be best if you have someone to walk the facility with you or provide a layout of their facility.

3

Make sure all your audit tools are assembled in a handy bag:



- ✓ Foot-candle meter
- ✓ Audit check off sheets
- ✓ Digital camera
- ✓ Discriminator
- ✓ Safety glasses
- ✓ Ladder
- ✓ Tape measure or laser equivalent
- ✓ Clipboard
- ✓ Counter
- ✓ Hard hat
- ✓ Ear plugs
- ✓ Extra batteries
- ✓ Anything else?

TECH TIP

Use free resources at nwlightingnetwork.com to make sure your audits go smoothly.



DURING THE AUDIT

1

Make sure you ask lots of questions to ensure you propose the correct solution.

2

Utilize the Lighting Retrofit Guidelines for Energy Audits at <http://tinyurl.com/1489ppe> to help cover all your bases. See example on pages 10 –11.

3

Utilize other available resources to assist with collecting information in an efficient way, such as tablet apps or ready-made audit sheets.

AFTER THE AUDIT

1

While the audit is still fresh in your mind, review the information you collected and ask any additional questions.

2

Enter the information into a lighting calculator and follow up with the local utility to answer any questions they may have about the proposed project.

3

Get back to your customer as soon as possible to show them you are interested in meeting their needs.



SALES TIP

Be prepared for a site audit to show prospective customers you are serious about earning their business.

ENERGY AUDIT TEMPLATE

Lighting Retrofit Guidelines for Energy Audits

These Energy Audit Guidelines can help you streamline your retrofit by providing several key questions to consider throughout the process, line-item checklists to reference, and important final steps to remember while wrapping up. Use the retail and industrial companion guidelines to help you with application specific audits.

Facility Information Checklist

Legal Business Name _____
Facility Address _____
Hours of Operation _____
Facility Type _____
Sq. Ft./Ceiling Ht. _____
HVAC Type/Fuel _____
Utility/Acct # _____

Walkthrough Tools Checklist

- Pen & Audit Sheets
- Ballast Discriminator
- Digital Camera
- Light Meter
- Counter
- Monocular (Binocular)

Don't forget to include necessary safety equipment!

Consider the Space

What is the age of building and of existing light fixtures?
Bldg. _____ Fixtures _____

What about exterior lights; what are they (if any)?

Is there an existing lighting control system?
 Yes No What is it? _____

Will they use company labor or outside contractors for installation? _____

What tasks are being performed in each space?

Will they use outside contractor or vendor to do the audit?

What is average age of workers? _____

Will there be more than one bid?
 Yes No

Any natural light: windows or skylights? _____

Do the fixtures need to be removed or relocated?
 Yes No

BEST PRACTICES FOR SITE AUDITS

Sales Details

- Confirm potential utility program eligibility. _____
- Is there a budget for energy upgrades? If so, what is the figure for the lighting/controls? _____
- What is the approximate time frame of lighting retrofit decision process? _____
- Who is the decision maker? _____
- Is there an opportunity to install samples for customer to see? Yes No
- What is the owner's main motivation for the retrofit? Energy savings? Better quality lighting?

- Satisfying a green initiative? _____
- Have I shown direct energy savings benefits and the indirect financial benefits? (i.e. better sales in a retail environment, better security...) _____
- Have I shown before and after picture from previous jobs from similar spaces? _____
- Do I have references from past satisfied customers? _____
- Why should the customer use my company? How can I communicate that in as few as words as possible?

Project Details

- Count all the fixtures in the building by location and include hours they are "on" for each space.
- What condition are the fixtures in? Consider new or retrofit options.
- Verify fluorescent ballasts - magnetic or electronic. Use your discriminator!
- Verify each lamp type - wattage, color and size. Snap photos if possible!
- Do not forget exit signs!
- Measure light levels at the task level of each space.
- What are the recommended light levels for key spaces? Check IES lighting level recommendations.
- What new lighting technology should be considered for retrofit or redesign?
- What color temperature should new lighting system be?
- Make note of switch locations for each space to determine controls style and quantity.
- As you walk through each space, get a picture of main fixtures types, or anything unusual.
- Talk to employees - are they satisfied with current light levels? Make note of any employee comments. They will be helpful in what you propose.
- Talk to managers about any upcoming changes within the spaces. Discuss future needs.

Final Steps...

- Take all information and thoughtfully create a list of proposed fixtures.
- Refer to the IESNA Lighting Handbook 10th Edition for guidelines and light levels recommendations.
- Input audit into utility provided spread sheet.
- Provide customer with options based on feedback from site audit. Always provide owners more than one option.
- Utilize lighting reps and distributors if assistance is needed in gathering specification sheets, technical data and assisting with design layouts.

EMERGING LIGHTING TECHNOLOGIES

OBJECTIVE Attendees will be able to use products demonstrated in this session and similar products in order to provide proper light levels while saving more energy.

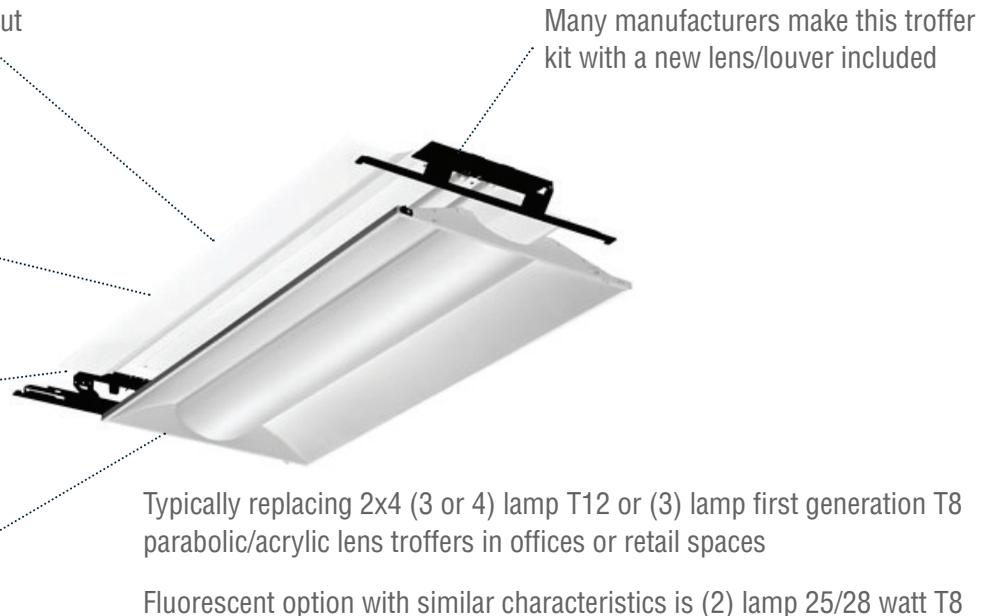
LED RECESSED TROFFER KIT (WITH OR WITHOUT NEW LENS)

Average expected lumen output range = 3500 to 4500

Average expected wattage range = 40-50 watts

Uses existing fixture housing

New LED module and driver included in kit



NEW LED RECESSED TROFFER (WHOLE FIXTURE)

Average expected lumen output range = 3500 to 4500

Average expected wattage range = 39-45 watts



Typically replacing 2x4 (3 or 4) lamp T12 or (3) lamp first generation T8 parabolic/acrylic lens troffers in offices or retail spaces

Fluorescent option with similar characteristics is (2) lamp 25/28 watt T8

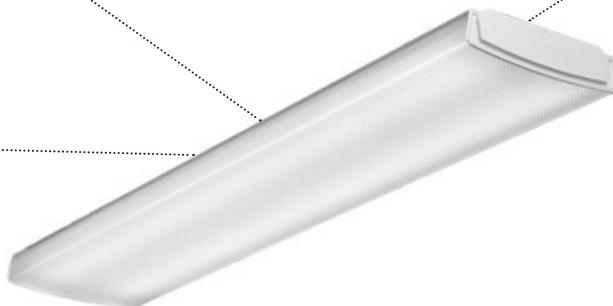
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NEW LED WRAP AROUND FIXTURE

Average expected lumen output
range = 3500 to 4500

Looks identical to a common
fluorescent wrap

Average expected wattage
range = 40-50 watts



Typically replacing 1x4 (2) lamp T12 or (2) lamp first generation T8 wrap fixtures in hallways or older office complexes with surface ceilings

Fluorescent option with similar characteristics is (2) lamp 25/28 watt T8



TECH TIP

Manufacturers report they are reducing their prices every three to six months to keep up with the market.



SALES TIP

Stay up to date on the latest technologies to differentiate yourself from the competition. You'll look more knowledgeable and be able to provide more options.

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TUBULAR LEDS (TLEDS)

Average expected lumen output range = 1600 to 2700 per lamp

Typically replacing T8 lamps in existing luminaires in offices, retail, task lighting, hallways or other applications

Fluorescent option with similar characteristics is 25/28 T8 lamp

Average expected wattage range = 16-24 watts



Available in three common driver configurations:

External Driver: Involves removing the fluorescent ballast and replacing it with an external LED driver.

Internal Driver: Involves removing or bypassing the fluorescent ballast and bringing line voltage directly to the tombstones.

Existing Ballast: Commonly referred to as plug and play, this approach involves a fluorescent to LED lamp change out that continues to use the existing fluorescent ballast. This options should only be considered if the existing fluorescent ballasts have <50% of their rated life remaining.

LED SURFACE MOUNT 4' STRIP FIXTURE

Average expected lumen output range = 4000 to 5000

Typically replacing 1x4 (2) lamp T12 fixture or a 1st gen 2 lamp T8 strip often found in older warehouses with lower ceiling heights, some smaller retail stores, or as task lighting in manufacturer facility

Average expected wattage range = 40-45 watts



Options available with or without a lens

Fluorescent option with similar characteristics is (2) lamp 25/28 watt T8

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LED HIGH-BAY FIXTURE

Average expected lumen output range = 18,000 to 25,000

Average expected wattage range = 160-225 watts

Some versions look very similar to a fluorescent high-bay fixture



Typically replacing 400 watt HID approximately 36,000 lumens often found in warehouses, manufacturing facilities and even some retail spaces with high ceilings

Fluorescent option with similar characteristics is (4) lamp T5HO at 234 watts with approximately 18,000 lumen output



TECH TIP

Check page 34 for information on Illuminating Engineering Society (IES) recommended light levels.

LIGHTING CONTROLS

OBJECTIVE Attendees will be able to use controls demonstrated in this session and similar products by having a better understanding of the full controls landscape.

OCCUPANCY SENSOR TYPES

Fixture Mount

Most manufacturers offer interchangeable lenses for area, aisle or directional sensing



Knockouts exist on most fixtures for easy installation

Great applications for low occupancy, low use areas such as warehouses, storage areas, and mechanical rooms

Wall Mount

Dual technology depending on manufacturer (ultrasonic and passive infrared)



1,000 to 1,600 square feet of coverage area

Direct sensor to cover entry to the space while not capturing movement in the hallway

Great applications in open offices, private offices, hallways, dining areas, and other spaces where a wall switch sensor may be obscured

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Ceiling Mount

Dual technology depending on manufacturer (ultrasonic and passive infrared)



500 to 2,000 square feet of coverage area

Make sure the main coverage pattern overlaps the walkways to avoid false timeouts

Great applications in open offices, retail, restrooms, and other large open spaces

Wall Switch

Includes passive infrared sensing



Can be set as a vacancy sensor

Great application in private offices, individual restrooms, and other smaller spaces without much obstruction



TECH TIP

OCCUPANCY SENSOR

Occupancy sensors automatically turn lights on when the sensor detects the presence of a person and will automatically turn lights off when no presence is detected for a specified period of time. These sensors are great for rooms that are often entered while carrying things or where the switch location may be inconvenient.

VACANCY SENSOR

Vacancy sensors require someone to manually turn on the lights when required. The sensor will then automatically turn lights off when no presence is detected for a specified amount of time. These sensors ensure the highest level of energy savings since the lights will never turn on automatically.

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SENSOR CHEAT SHEET

Type of Space	Typical recommended Sensor
Small open office	Switch infrared
Large open office	Ceiling infrared
Small office with partitions	Switch dual technology
Large office with partitions	Ceiling/wall dual technology
Open restrooms	Switch infrared
Restrooms with stalls	Ceiling dual technology
Hallways and aisles	Wall mount infrared
Individual high bay	Fixture mount infrared
Zonal high bay	Wall infrared

TECH TIP

Location matters! PIR sensors should not be within four feet of an air vent, and ultrasonic sensors should not be within six feet of an air vent.



WIRELESS CONTROLS

- Easy installation, no new wiring
- Replace wall switch; sensor sends signal to switch
- Can be easily moved if space changes
- Typically passive infrared, but can also be dual technology
- Up to 10-year batteries
- Some include small PV panel
- Great for hard ceilings
- Easy to commission

SALES TIP

Keep one or two wireless occupancy sensors in your truck or van to do a quick demonstration at a customer site.





TECH TIP

Controls manufacturers have developed daylight sensing technology for the retrofit market. These new controls can be added to your projects to help dim or shut off lighting fixtures along window walls.

DAYLIGHTING CONTROL

- Daylight sensors combined with lighting controls can dim overhead lights to save electricity.
- Zones or fixtures that already receive daylight can be controlled separately from zones or fixtures that need to be lit to normal levels.
- Side lighting and top lighting should both be included when considering daylighting options.
- Most common technology options include step dimming and full dimming ballasts/drivers.

DATA LOGGING

- A battery-powered device that monitors an area and logs the lighting and occupancy of a space or a room.
- Can monitor up to eight rooms each of which can have an independent data log.
- The collected data is downloaded over USB cable to a windows based PC for display, analysis and reporting.
- The logger observes the lighting level and automatically adjusts to ambient light levels.
- The logger memory can hold up to 30,000 log entries. Each log entry details the date, time and status. All of this information is kept in the logger's memory until the user retrieves it using a PC.



SALES TIP

Light loggers provide accurate energy savings calculations and payback analyses to allow users to see how much energy and money occupancy sensors save them. Most controls manufacturers have light logger programs available for loan to help you make the sale.

SALES TECHNIQUES AND TIPS

OBJECTIVE Attendees will be able to convert more project proposals to implemented projects through improved sales and communication techniques.

1 Gather information about your customer's project

1. LEARN THE CUSTOMER'S MOTIVATION. IS IT:

- Energy savings?
- Satisfying a green initiative?
- Cost reduction?
- Better quality lighting?
- A corporate mandate?
- Something else or a combination?

2. SHOW BEFORE AND AFTER PICTURES OF PAST PROJECTS

- Pictures can help sell the job for you.

3. PROVIDE REFERENCES OF SATISFIED CUSTOMERS

4. EXPLAIN WHY A POTENTIAL CUSTOMER SHOULD USE YOUR COMPANY

5. CREATE A LIST OF PROPOSED FIXTURES

- Focus on what is best for your customer, not what works best for you.
- Include controls in all possible applications to improve the project

6. USE THE BPA LIGHTING TOOL

- Make yourself familiar with the customer proposal form to communicate the value of the project

7. PROVIDE THE CUSTOMER WITH OPTIONS

- Consider offering "good, better and best" options to help customers make a decision.

SALES TIP

Word choice can make a difference in selling your project.

SAY THIS:

Reduce controllable operating costs
Investment
Approve paperwork
Rate of return

NOT THAT:

Save money
Cost
Sign contract
Simple payback



2 Develop a solid presentation to sell the project

FOLLOW THESE SIX STEPS TO BREAK YOUR PRESENTATION INTO SECTIONS.



3 Be prepared to handle objections

IF A CUSTOMER PRESENTS AN OBJECTION . . . Listen carefully to what they have to say as you may have missed a clear signal early in the process.

IF YOU MISSED SOME CRITICAL INFORMATION . . . Don't try to answer immediately. Ask questions to get into the details of the issue, and if they want the project but are concerned about budget, then help them:

- Break the project into phases.
- Provide information and connections to third-party financing.



SALES TIP

Remember that it may take multiple attempts and consistent follow-up before a customer is ready to move forward with your proposal. Try offering a new idea or alternative each time you follow up.

4 Get to the decision-maker

- Ask questions in a way that helps your contact use you as a resource to secure approval from the decision-maker.
- Offer your assistance, no matter how small.
- Try to be a part of the team that presents to the decision-maker.



Tools You Can Use

BPA-PROVIDED TOOLS INCLUDE

- Lighting Tool
- Customer proposal form— See example customer proposal form on pages 40-41

INDUSTRY PROVIDED TOOLS

- Cost of waiting calculators
- Lifecycle cost analysis
- Dimming/controls savings estimators
- Maintenance savings calculators
- Environmental impact estimators

SALES REVENUE VS ENERGY COST SAVINGS

Ask you customer: What amount of sales revenue must be generated to equal annual cost savings from this project?

Annual utility cost savings: \$1,000.

Company average profit margin: 5%.

What sales volume is needed to generate equal profit?

Answer: $\$1,000/5\%$ or \$20,000

SALES TIP



Remember: Communicate the benefits of the project to your customer

- Improved aesthetics and light quality
- Increased productivity and happy employees
- Increased safety and security
- Increased property value

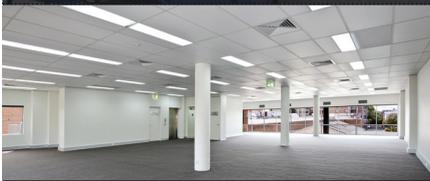
BEYOND ONE FOR ONE

OBJECTIVE Attendees will learn to implement strategies that will improve the quality of the lighting system as well as the energy savings. Consider a “systems approach” in lieu of the common “fixture for fixture/lamp for lamp” approach.

SAMPLE PROJECTS

It is easy to tackle new lighting projects with a comfortable, tried-and-true approach. By thinking differently and going beyond one for one, you can provide greater value to your customer by delivering the right light levels and greater energy savings.

By moving away from the practice of replacing lamps and ballasts or fixtures for fixtures, the overall project may cost a bit more upfront, but the rate of return and payback can easily make up the difference if done correctly. Following are several different scenarios of how to go beyond one-for-one project by using basic design principles.

Type of Space	Using One for One Approach	Going Beyond One for One
 Retail with small warehouse office attached	Change out lamps/ballast or replace fixtures one for one, no use of auto controls	Use software to create a design using IES recommended light levels and possibly decreasing fixture quantity installed; include controls as if it were a new building to meet code
 Medical office building with exam rooms, offices and waiting area	Change out lamps/ballast or replace fixtures one for one, no use of auto controls	Use software to create a design using IES recommended light levels and possibly decreasing fixture quantity installed; include controls as if it were a new building to meet code
 Large office building with open and private offices	Change out lamps/ballast or replace fixtures one for one, no use of auto controls	Use software to create a design using IES recommended light levels and possibly decreasing fixture quantity installed; include controls as if it were a new building to meet code
 Parking lot for office building	Change fixtures one for one using basic wattage reduction method	Use software to use an LED fixture with same amount of poles, but positioned/directed appropriately

Remember:

- Review IES recommended light levels for various spaces and apply this concept to your project to determine if the existing fixtures are over-lit.
- Purchase simple lighting design software, such as Visual software by Acuity Brands, Light Pro, or other.
- Use your local lighting rep or distributor to assist with lighting layouts. They often do this at no charge when using their product.
- Use kits on existing fixtures when applicable and remove excess fixtures by adding tile as needed.
- Use controls as if you were meeting or exceeding energy code requirements in a new building. Review the energy code guidelines from your state or city code office.

SALES TIP

Going beyond the one for one replacement in a lighting project is easier than you might believe and can help gain an advantage over the competition.



TECH TIP

Using available tools and basic design principles will maximize savings for your customers.



TECH TIP

See page 34 for a list of IES recommended light levels for common spaces.



SAMPLE LIGHTING LAYOUT OPPORTUNITY

WHAT would you do if going beyond one for one?

RETAIL AND WAREHOUSE SPACE

The following scenario depicts a discount store that sells common household goods such as kitchen supplies, personal care products and office supplies at low prices. The store has basic white racking throughout although no refrigerated goods. All of the light fixtures in the retail space are identical and light levels are much higher than IES recommends. The lights in the store remain on for cleaning crew and for re-stocking the shelves (hint: maybe dual-light levels for this time period).

The warehouse section in the back of the building is used in the early morning and again after the store closes for unloading trucks and restocking the shelves. Light levels are high and the lights stay on all day because of the restock time.

EXISTING CONDITIONS

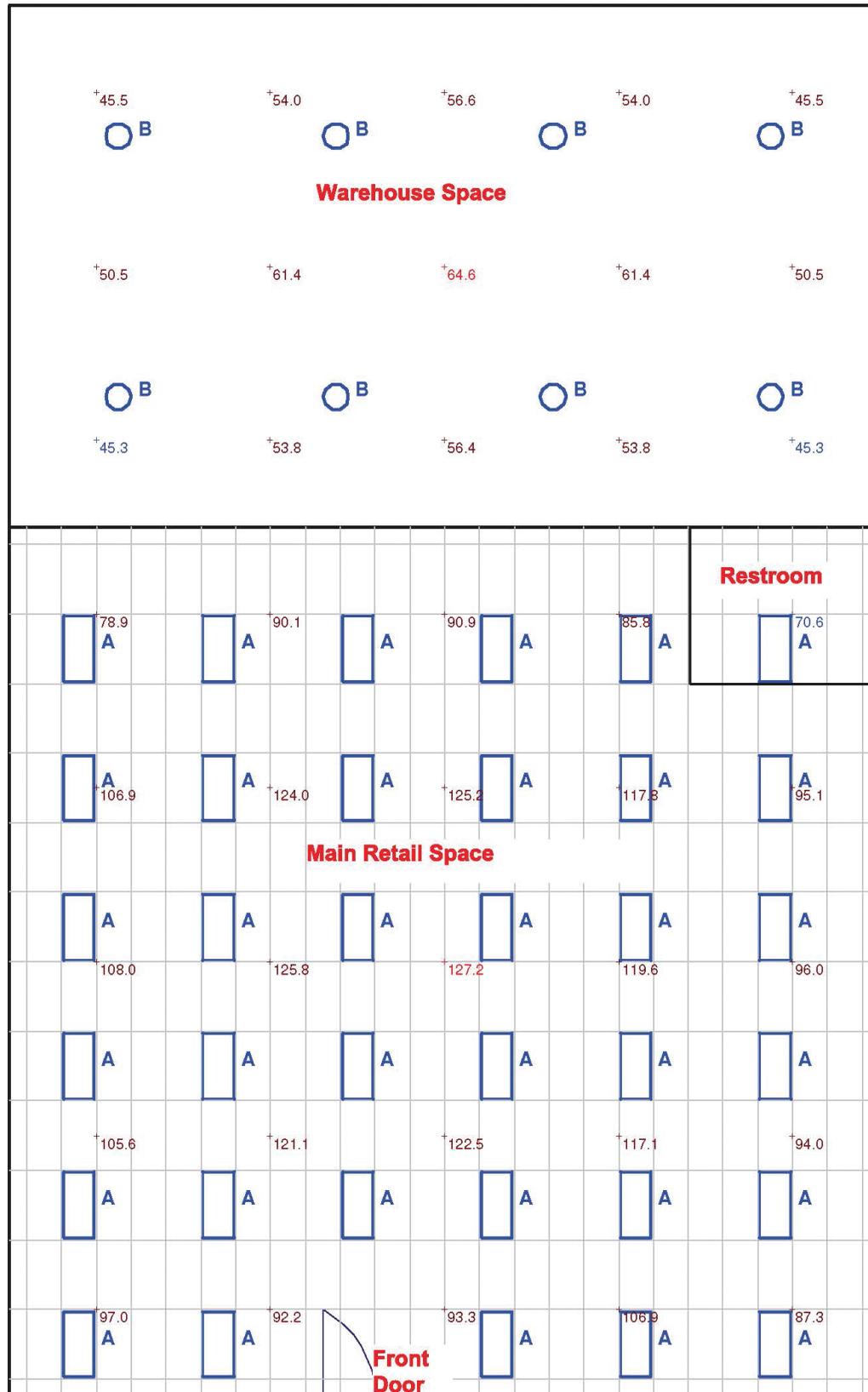
- 4-lamp T8 A19 parabolic troffers in retail areas
- Existing spaces are over-lit according to current IES standards
- Retail space 50' X 50' X 12' (2,500 sq/ft)
- Warehouse space 30' X 50' X 20' (1,500 sq/ft)
- Hours – 14/7 (98 hours per week)
- Existing manual controls (all wall switch)
- Lighting power density (watts per sq ft) is 2.1 in retail area
- Lighting power density (watts per sq ft) is 2.4 in warehouse

Symbol	Label	Qty	Description
	A	35	2'x4' 4 LP T8 Parabolic
	B	8	400W MH 16" High Bay

TARGET FOOT CANDLE AVERAGE FOR THIS SPACE

Area	Horizontal FC	Vertical FC
General Merchandise Retail Area	40 to 50	10
Restroom	5	3
Warehouse – Shipping/Receiving Medium Labels	20 to 25	10

WORKSHOP LEARNING AIDS



General Merchandise Retail Space with Warehouse

How would you go beyond one for one?:

The form consists of a large outer rectangle. The top half of this rectangle is a blank white space. The bottom half is a grid of 15 columns and 15 rows. A small curved line is drawn in the bottom-left corner of the grid, starting from the bottom-left corner and curving upwards and to the right.



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today for all your information and resource needs.

You'll find

Utility contact information

Access to utility lighting program information and tools

Easy-to-use lighting design templates

Regional lighting workshop and training information and registration links

Online trainings for trade allies of all experience levels

Relevant and timely market information

Access to experienced lighting specialists throughout the region

Bookmark "nwlightingnetwork.com" today!





LIGHTING LAYOUT GUIDES

Lighting layout guides are available to help you provide your customer with recommended light levels and appropriate fixture spacing. You will be able to improve your customer's return on investment and differentiate yourself from competitors.

Guides are available for:



TECH TIP

Using available tools and basic design principles will maximize savings for your customers.



To download these guides, visit nwlightingnetwork.com.

Each guide describes the space being considered and products used for the example.

LIGHTING LAYOUT GUIDE SERIES

OFFICE GUIDE 3

ROOM CHARACTERISTICS

Length: 60'
Width: 25'
Height: 9'
Reflectivity:
Ceiling = 80%
Walls = 50%
Floor = 20%

PRODUCT SPECIFICATIONS



Courtesy: Columbia Lighting

Dimensions: 24" x 48"
Lenses: Refractor
Lamps: (2) F32T8 HP
Lumens per Lamp: 3100
Ballast Factor: 0.88*
Lamp Lumen Depreciation: 0.95
Total Fixture Efficiency: 91%
Watts: 54.5

* If the light levels are higher than required, consider a lower ballast factor (BF) for greater savings (see options on back).

OPEN OFFICE

T8 HP FLUORESCENT HIGH PERFORMANCE RETROFIT KIT



THE OPPORTUNITY

In a typical space with a 9' high, lay-in type ceiling, it is possible to retrofit existing luminaires with a kit providing high quality lighting that illuminates both horizontal and vertical surfaces, while greatly reducing energy consumption. Unlike the luminaires they replace, this layout directs light in a manner that evenly illuminates the ceiling, walls and tasks—producing a broader and brighter distribution pattern for occupants. Traditional, flat-lensed troffers or parabolic louvered fixtures cannot achieve this type of evenly distributed lighting.

THE SOLUTION

Install 2' x 4' high performance retrofit kits that replace existing lamps and ballasts (typically 3 or 4 lamps) with a high performance electronic ballast and (2) T8 32w high performance lamps. This combination should meet the target 35 average maintained footcandles. This solution will not eliminate all glare on traditional computer screens, but works especially well with LCD monitors.

DESIGN CONSIDERATIONS

In these examples, the highest light levels are possible only if the luminaires are placed over desks and work areas. Partitions can have a large impact on light levels. Their vertical surfaces absorb and block light creating shadows if installed off-center of the luminaires. However, these high performance lenses minimize this effect. Task lights may still be needed to provide additional illumination, and eliminate shadows in high task areas.



The Lighting Design Lab is a Northwest utility funded lighting education facility promoting commercial and industrial energy conservation. Additional guides are available at the Lighting Design Lab website.

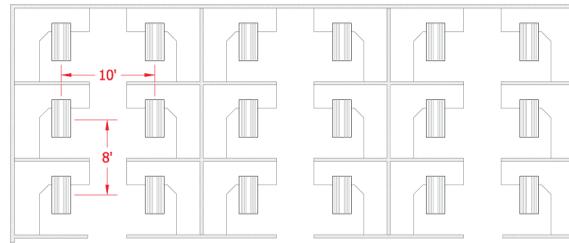
WWW.LIGHTINGDESIGNLAB.COM
(206) 325-9711 or Toll Free: (800) 354-3864
2915 4th Avenue South, Seattle, WA 98134

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you by 

Most guides offer more than one layout option.

LAYOUT OPTIONS

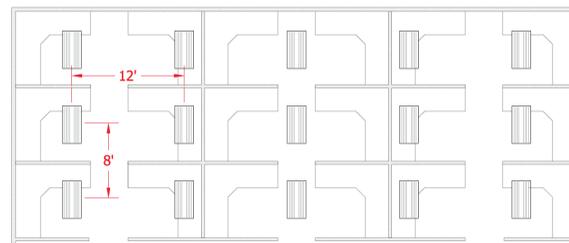
Open Office (2) T8 HP Fluorescent High Performance Retrofit Kit | 8' x 10' Spacing



INSTALLATION SPECS

Number of Luminaires: 18
 Luminaire Spacing: 8' x 10'
 Mounting Condition: Recessed
 Average Illumination:
 ~36 fc (30" AFF)
 Watts/sq. ft.: ~0.65

Open Office (2) T8 HP Fluorescent High Performance Retrofit Kit | 8' x 12' Spacing



INSTALLATION SPECS

Number of Luminaires: 15
 Luminaire Spacing: 8' x 12'
 Mounting Condition: Recessed
 Average Illumination:
 ~30 fc (30" AFF)
 Watts/sq. ft.: ~0.54

IES Recommended
 Footcandles (fc):
 30 - 50 fc (30" AFF)

ADDITIONAL ENERGY SAVING STRATEGIES

STRATEGY	WATTS/LUMINAIRE	SAVINGS	LIGHT LEVELS
Daylight dimming ballasts (Primary daylight zone)	~30w (dim to 50%)	50%	Maintained from daylight
Lower ballast factor	~48w (BF of 0.77)	12%	10% lower

ENERGY CODE INFORMATION

JURISDICTION	CODE	LIGHTING POWER ALLOWANCE (OFFICES)
Seattle	2009 Seattle Energy Code	0.90 w/sq. ft.
Washington	2009 WSEC	0.91 w/sq. ft.
Oregon	2010 OEESC	0.91 w/sq. ft.
Idaho	2009 IECC	0.91 w/sq. ft.
Montana	2009 IECC	0.91 w/sq. ft.

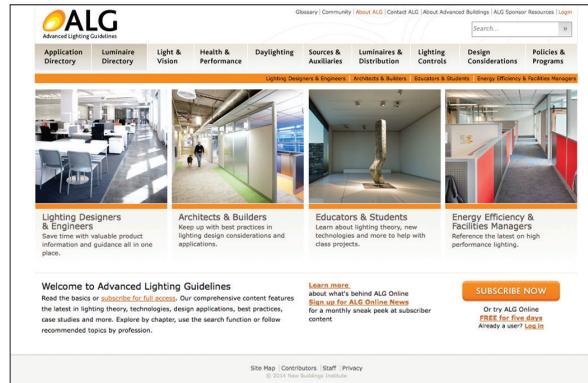
LIGHTING LAYOUT GUIDE SERIES: **OPEN OFFICE** | T8 HP HIGH PERFORMANCE RETROFIT KIT

ONLINE LIGHTING RESOURCES

ADVANCE LIGHTING GUIDELINES ONLINE

ALG Online is written and updated by expert lighting industry professionals for practicing professionals and provides a comprehensive, one-stop resource for advanced lighting theory, design guidance, real-life applications, lighting technologies and more. Developed by the nonprofit New Buildings Institute. NEEA provides trade allies free membership to the full ALG Online site by using coupon code NEEA2014.

Visit ALG online at <http://www.algonline.org/index.php>



LIGHTING CONTROLS

The Lighting Controls Association, administered by the National Electrical Manufacturers Association, is dedicated to educating the professional building design, construction and management communities about the benefits and operation of automatic switching and dimming controls. These benefits include energy savings, flexibility and higher-quality building environments. As the lighting controls authority, the Lighting Controls Association is proud to offer free, comprehensive online education about lighting controls technology and application.

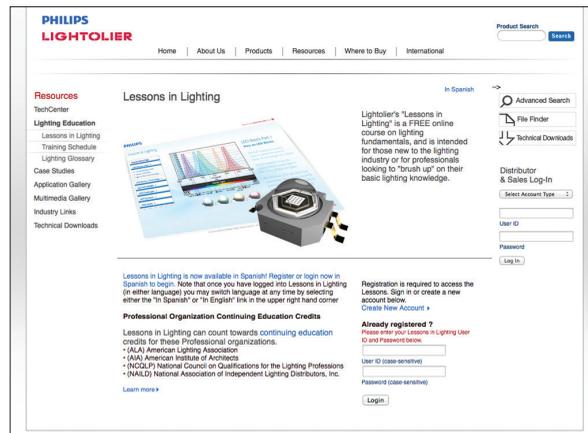
Visit <http://lightingcontrolsassociation.org/>



BASIC LIGHTING KNOWLEDGE

Lightolier's Lessons in Lighting is a free online course on lighting fundamentals, and is intended for those new to the lighting industry or for professionals looking to brush up on their basic lighting knowledge.

Visit Lightolier online at http://www.lightolier.com/resources/edu_lessons.jsp



IES LIGHTING LEVEL GUIDELINES

WHAT IS IES?

The Illuminating Engineering Society of North America (IES) provides recommended lighting level guidelines for various lighting applications such as office, hospitality, exterior, retail, restaurant, educational, sports and many others. Trade allies who understand and consistently use these guidelines will give their clients assurance that the recommendations they receive are well-informed and in their best interest.

IES LIGHTING LEVEL GUIDELINES**	AVERAGE MAINTAINED FOOT-CANDLES (HORZ.)	LOCATION (AFF = ABOVE FINISHED FLOOR)
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BANK

ATM - walk up (indoor)	20	at 3' AFF
Lobby	10	at 0' AFF
Teller Window/Writing Table	30	at 0' AFF/writing surface

BAR

General Seating	5	at 2' AFF
Lounge/Work Surfaces	10	at 2' AFF or work surface

CORRIDOR/INDEPENDENT PASSAGEWAY	10	AT 0' AFF
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DINING (NON HOSPITALITY)

Cafeteria	15	at tabletop
Coffee Shop	10	at tabletop

EDUCATIONAL

General Classroom*	40/5	General/AV Modes at 2.5' AFF
Whiteboard	15/30	Vertical - Reference/Presented

*See IES 10th Edition Handbook for specialty classes/complete guidelines

ELEVATOR (PUBLIC)

Interior/Cab/Threshold	5	at 0' AFF
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EXTERIOR — SEE IES 10TH EDITION HANDBOOK

RESOURCES

IES LIGHTING LEVEL GUIDELINES**

AVERAGE MAINTAINED FOOT-CANDLES (HORZ.)

LOCATION (AFF = ABOVE FINISHED FLOOR)

LIBRARY

Stacks	20	0' AFF (Vertical 10 f.c. at 1' AFF, 20 f.c. at 2.5')
Reading	50	at 2.5' AFF
General	15	at 2.5' AFF

MAIL

General	10	Floor
Security Inspection	100	3.5' AFF
Sorting	30	2.5' AFF

MALL

Concourse	10	at 0' AFF
Information Desk/Kiosk	30	at 3.5' AFF
Dressing Rooms	30	at 0' AFF
Retail	See Below	

OFFICE

Workspace	30	at 2.5' AFF
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READING & WRITING

Handwritten:		
Graphite Pencil	30	at 2.5' AFF
Red Pencil	50	at 2.5' AFF
Black Pen	30	at 2.5' AFF
Other Pen	40	at 2.5' AFF
Print Media:		
6-pt font	50	at 2.5' AFF
8 & 10-pt font	30	at 2.5' AFF
12-pt font	20	at 2.5' AFF
Xerograph:		
Color	30-50	at 2.5' AFF
B&W	20-30	at 2.5' AFF

RESTAURANT

Casual Dining	10	at tabletop
Fast Food Dining	20	at tabletop
Fine Dining	3	at tabletop

RECEIVING/SHIPPING

Dock	10	at 0' AFF
Receiving/Staging	30	at 0' AFF

RESOURCES

IES LIGHTING LEVEL GUIDELINES**

AVERAGE MAINTAINED FOOT-CANDLES (HORZ.)

LOCATION (AFF = ABOVE FINISHED FLOOR)

RESTROOM

Fixtures	15	at top of plumbing fixture
Showers	10	at floor
Lockers	5	at floor

RETAIL* — GENERAL HORIZONTAL (2.5' AFF) CIRCULATION HORIZONTAL (0' AFF)

Automotive	50	10
Department Store	40	15
Designer Boutique	20	7.5
Discount	50	20
Drug & Convenience	50	20
Fine Jewelry	40	15
Furniture	20	7.5
Grocery	50	20
Warehouse Store	50	20

Sales Transactions

*See IES 10th Edition Handbook for Display Lighting

SPORTS — SEE IES 10TH EDITION HANDBOOK

STAIRS

High Activity	10	at 0' AFF
Typical	5	at 0' AFF

VESTIBULE (INDOOR)

High Activity	15/10	Day/Night (0' AFF)
Low Activity	10/5	Day/Night (0' AFF)

WAREHOUSING & STORAGE

	HORIZONTAL (AT 0' AFF)	VERTICAL
Inactive	5	2
Inactive: bulky items; large labels	10	5
Active: small items; small labels	30	15

**At least half of users are in the 25-65 age range.

**Consult handbook for more detailed information on above or other applications.

** Horizontal - horizontal plane that average maintained foot-candles are measured.

** Vertical - vertical plane that average maintained foot-candles are measured.

** It is the responsibility of the specifier to determine and provide appropriate lighting levels for each space.

**This is a guide that was created from the IESNA 10th Edition Handbook. It is highly recommended that specifier/user own a copy of this.



TECH TIP

By providing appropriate light levels, your customer will have the light they need while maximizing energy and cost savings.

FREQUENTLY ASKED QUESTIONS

Q WON'T THE LIGHT FIXTURES GO ON AND OFF ALL OF THE TIME IF I INSTALL OCCUPANCY SENSORS?

A When the area is active the sensors continually reset to 15 minutes. Once the last movement is detected there is another 15 minutes before the lights turn off. Your savings will come at the beginning and end of shifts and the fixtures will not need to be manually turned off.

Q DO YOU NEED TO DO ANY MAINTENANCE SINCE LEDS LAST SO LONG?

A The LED components that produce light just get dimmer over time and do not typically burn out. The driver or ballast may need replacing, however, and the fixture should be cleaned like any other piece of equipment to operate at peak performance.

Q WHAT ARE THE QUALIFIED PRODUCT LISTS AND HOW DO THEY APPLY TO MY PROJECT?

A Energy Star, Design Lights Consortium and Lighting Design Lab maintain qualified product lists, which help to determine if the LED product meets certain minimum requirements to be considered "high-performance". Utilities use these lists to determine which LED products qualify for incentives.

Q WHY DO LEDS NEED TO BE ON A QUALIFIED PRODUCT LIST?

A If the LED is on an approved list, you know your customer is getting a better quality product because it meets a set of standard specifications.

Q WHAT IF I HAVE AN LED PRODUCT THAT'S NOT ON A QUALIFIED PRODUCT LIST? CAN I STILL USE IT?

A For the most part utilities prefer that your LED product be on one of the qualified product lists. If you feel that you have an LED product that would meet high-performance standards but is not listed, check with your lighting specialist to see if the LED product can receive special approval from both BPA and your utility.

Q WHAT IS THE B/C RATIO AND WHY IS IT IMPORTANT?

A B/C ratio stands for benefit to cost ratio, which is the formula that determines if the project is cost effective. It's a requirement that all projects meet a minimum standard for cost effectiveness to qualify for incentives. The BPA lighting calculator has this feature built in so that you know that your project is meeting this standard.

NWTAN's team of experienced lighting specialists are always available to assist you with lighting calculators, technology questions, and for general trade ally support. See pages 42 and 43 for the lighting specialist serving your region, or visit nwlightingnetwork.com and click on "contact us" for a list of lighting specialists.

Q HOW DO I KNOW IF MY PROJECT IS COST EFFECTIVE?

A Most projects are cost effective, but it's always a good idea to double check. When using the lighting calculator, look on the "Measures" tab and on the upper right side of the user form you will find "Project Level Alerts". If your project isn't meeting the cost effectiveness standard there will be a note letting you know that the project is "ineligible... the B/C ratio is less than...". If you don't see this note then your project should be cost effective.

Q I'VE NOTICED THAT SOME OF THE INCENTIVE LEVELS HAVE GONE DOWN. WHY?

A BPA is always reviewing the incentive program to make sure that the funds are being allocated to provide the best value to the overall program. At times BPA makes adjustments based on market trends or on new efficiency standards that may cause some measures to have a lower incentive and for other measures to see an increase in the incentive level.

Q HOW AM I SUPPOSED TO SELL PROJECTS IF INCENTIVES HAVE GONE DOWN?

A There are many benefits to investing in lighting projects including energy savings, quality of light, reduced maintenance, correct light levels for the space or other non-energy features that make an impact on the customer's space. The incentive, while important, should be one of the last things that you use as a sales point with your customer.

Q CAN YOU RECOMMEND A GOOD FIXTURE FOR MY PROJECT?

A NWTAN, BPA and the lighting specialist team are here to support all trade allies and distributors. As such we keep a neutral stance and don't recommend specific fixtures. If you are already working with a distributor they will usually have someone on staff that can show you fixtures that will be appropriate for your project.



TECH TIP

Using products on the Qualified Product Lists can streamline the application process. Make sure you have specification sheets and know where the products are listed.



SALES TIP

Use these FAQs to help you be proactive and answer customer questions.

EXAMPLE CUSTOMER PROPOSAL LETTER

Lighting Project Proposal

John Doe
 1979 Championship Drive
 Aberdeen, WA 98520

This project is pending utility approval. All figures should be considered estimates.

Dear John Doe,

Based on the lighting retrofit proposal that has been prepared by Lights R Us at 1979 Championship Drive, we have estimated the project's energy savings and the incentives that would be available from City of Port Angeles for this proposed project. These are estimates only, as actual savings and incentives may vary based on final installed measures and investment costs. The incentives provided by your local utility cover 49% of the total installation costs of the project. The following tables display the project's estimated energy savings, simple payback, and return on investment.

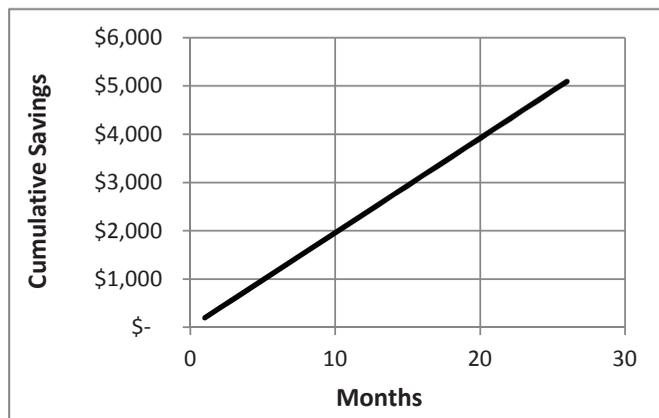
Project Overview

Estimated Project Cost:	\$9,900	Estimated Yearly Utility Savings: (from consumption and demand)	\$2,054
Est. Utility Incentive:	\$4,863	Estimated Yearly O&M Savings**:	\$297
Customer Balance:	\$5,037	Estimated Simple Payback:	2.1 years
Estimated kWh/Yr Saved:	31,170	Return On Investment (ROI):	46.7%
Estimated kW Reduction:	7.50		

Cost of Waiting

The longer you wait to replace your out-of-date equipment, the more savings you miss out on. Upgrading your lighting system now will reduce your costs and energy consumption. How much money are you losing waiting to upgrade?

Time	Costs
6 Months	\$ 1,175
1 Year	\$ 2,351
3 Years	\$ 7,052
5 Years	\$ 11,753



How quickly will you recoup your investment in energy efficient lighting? With an estimated monthly savings of \$196, it would take approximately 26 months to pay off your investment with a utility incentive.



Project Name: Green and Gold

Project Detail Summary*

Measure	Measure Description	Quantity***	Units	Incentive per Unit	Total Incentive
Decommissioning	Decommissioning	1,521	kWh	\$0.18	\$274
Fixture Increase	Increased fixture count	1,246	kWh	\$0.18	\$224
F3-75%	LED Screw In & Small Fixtures	5	fixture(s)	\$30	\$150
G1-50%	LED Tubes and Troffers	8	fixture(s)	\$30	\$240
G1-60%	LED Tubes and Troffers	30	fixture(s)	\$40	\$1,200
H3-60%	LED Exterior	22	fixture(s)	\$120	\$2,640
Non-standard	Non-standard	364	kWh	\$0.18	\$65
N1	Controls	2	controller(s)	\$35	\$70
Total					\$4,863

Explanation of Utility Incentive

A. Itemized Incentive Total:	\$4,863
B. Total Estimated Project Costs:	\$9,900
C. 70% of Estimated Project Costs Incentive Cap:	N/A
D. Maximum \$0.50 per kWh (Project Level) Incentive Cap:	N/A
E. Total Incentive = Lesser of "A", "C", and "D" above:	\$4,863

* The dollar amounts listed in the Project Detail Summary are estimated based on the available utility incentives for which this project may qualify. Actual incentives paid may vary based on, but not limited to, the following factors: 1) all non-standard and advanced control measures must be approved by BPA; and 2) utility incentives may be capped based on a predetermined maximum incentive per project.

** The default value for annual O&M savings is 3% of the project cost. Your utility can override this value.

*** The kWh savings reported in the Project Detail Summary may differ from those reported above in the Project Overview due to adjustments made to savings in the Project Detail Summary. Savings figures in the Project Overview are estimated on-site savings that a customer may realize, while savings figures in the Project Detail Summary have been adjusted for federal standards and BPA busbar.



SALES TIP

Follow-up with your customer in six months to discuss the costs they've incurred by not implementing the project sooner.

LIGHTING SPECIALIST CONTACT INFORMATION

The NWTAN team of lighting specialists is here to support the Northwest lighting community. Please contact the specialist serving your geographic region if you have any questions or need information.

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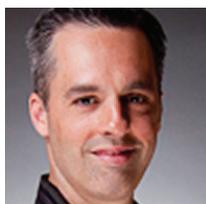
OREGON



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SOUTHEAST IDAHO, NEVADA AND WYOMING



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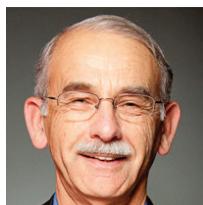


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NORTHWEST TRADE ALLY NETWORK



Eric Wilson, Program Manager
503.893.4955
eric.wilson@northwest-lighting.org



Mike Porter, Operations Manager
503.730.3122
mike.porter@northwest-lighting.org

UTILITY PROGRAM MANAGER CONTACT LISTS



IDAHO

UTILITY NAME	CITY	ST	REP	PHONE	EMAIL
Albion, City of	Albion	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com
Avista Utilities	Spokane	WA	Camille Martin	(509) 495-4276	Camille.martin@avistacorp.com
Bonnors Ferry, City of	Bonnors Ferry	ID	Steve Boorman	(208) 267-3105	sboorman@bonnorsferry.id.gov
Burley, City of	Burley	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com
City of Plummer	Plummer	ID	Debbie Argelan	(208) 686-1641 x22	debbie@cityofplummer.org
Clearwater Power Co.	Lewiston	ID	Greg Hansen	(208) 743-1501	ghansen@clearwaterpower.com
Declo, City of	Declo	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com
East End Mutual Electric Co., Ltd	Rupert	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com
Fall River Rural Electric Co-op	Ashton	ID	Jan Dean	(208) 652-7431	jan.dean@fallriverelectric.com
Farmers Electric Co., Ltd	Rupert	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com
Heyburn, City of	Heyburn	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com
Idaho Falls Power	Idaho Falls	ID	Doug Purcell	(208) 612-8143	dpurcell@ifpower.org
Idaho Power	Boise	ID	Shelley Martin	(208) 388-5872	smartin@idahopower.com
Inland Power & Light	Spokane	WA	Kristen Florez	(509) 789-4249	kristens@inlandpower.com
Kootenai Electric	Hayden	ID	Don Crawford	(208) 292-3213	dcrawford@kec.com
Lost River Electric Cooperative	Mackay	ID	Denise Johnson	(208) 588-3311	denise@lrecoop.com
Lower Valley Energy	Jackson	WY	Wid Ritchie	(307) 885-6122	writchie@lvenergy.com
Northern Lights, Inc.	Sagle	ID	Elissa Glassman	(208) 263-5141	elissa.glassman@nli.coop
Riverside Electric Company	Rupert	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com
Rocky Mountain Power	Echo	OR	William Gatchel	(541) 377-7943	william.gatchel@evergreen-efficiency.com
Rupert, City of	Rupert	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com
Soda Springs, City of	Soda Springs	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com
South Side Electric Lines	Delco	ID	Barbara Anderson	(208) 654-2313	barbaraa@atcnet.net
United Electric Coop., Inc	Heyburn	ID	Chris Seibold	(208) 679-2222	cseibold@unitedelectric.coop
Weiser, City of	Weiser	ID	Paul Rich	1(888) 883-9879	paul@esgroupplc.com

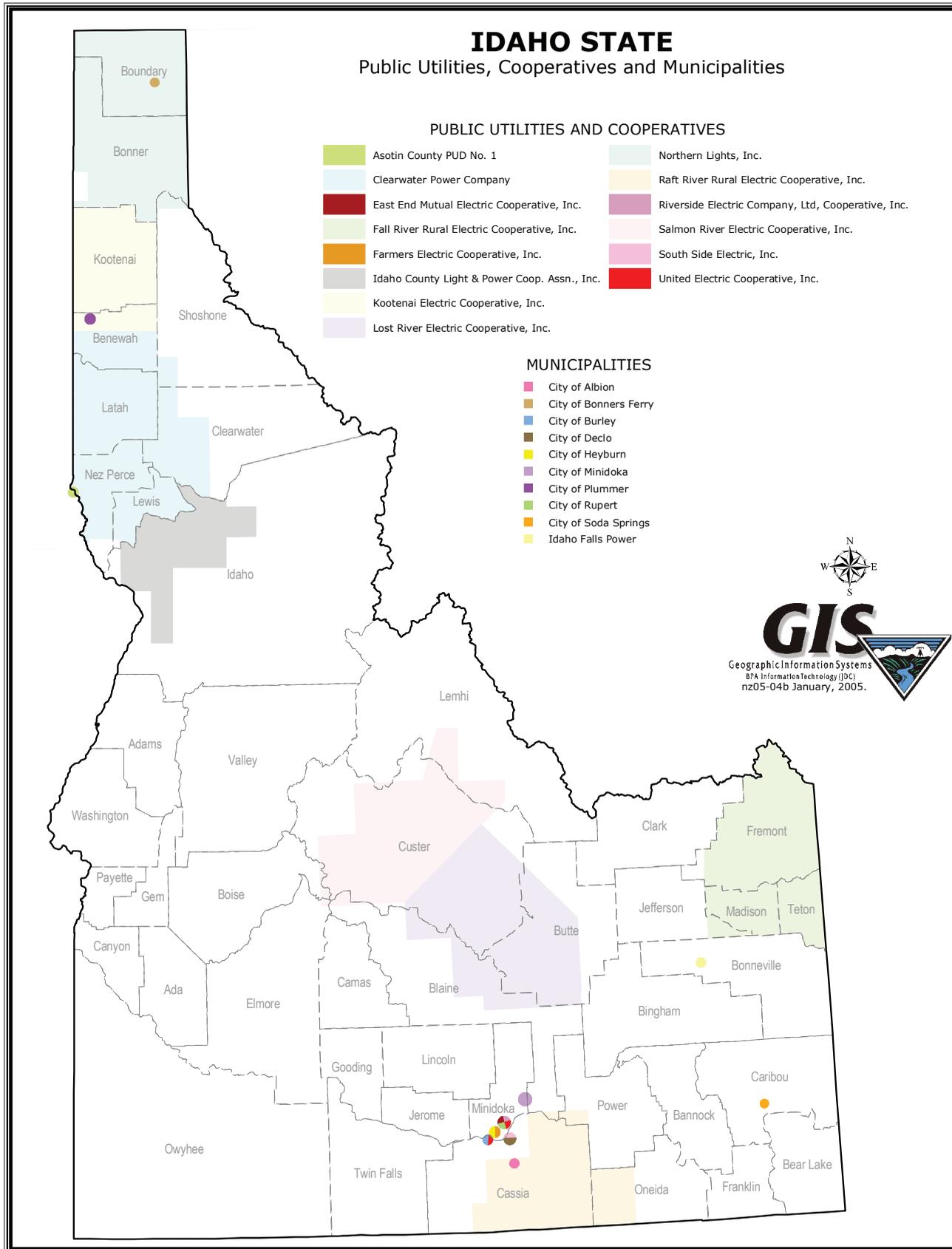
IDAHO LIGHTING SPECIALIST:

Dan Kuhl

Southeast Idaho

John Wilmoth

Northern Idaho



RESOURCES



WASHINGTON

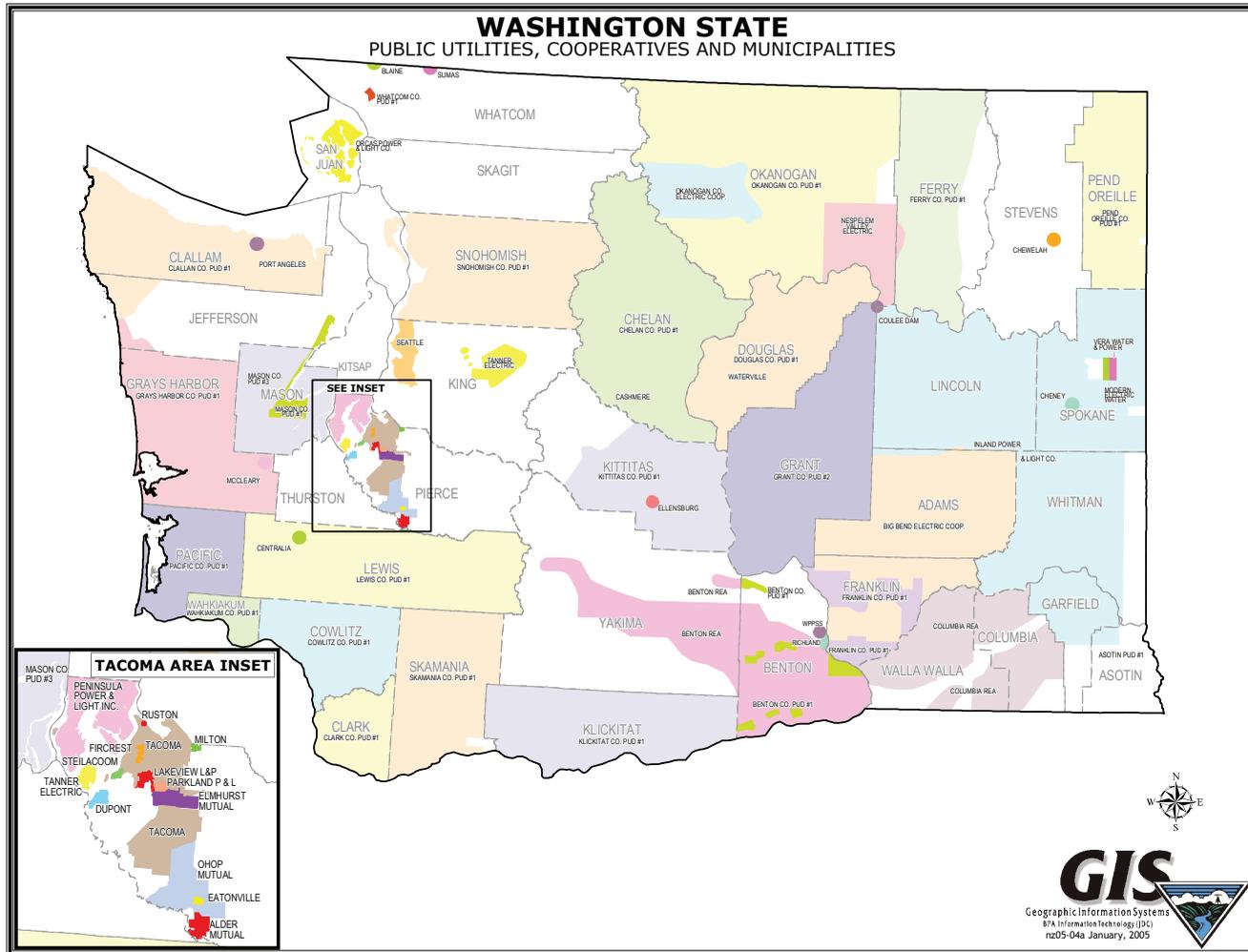
UTILITY NAME	CITY	ST	REP	PHONE	EMAIL
Avista Utilities	Spokane	WA	Camille Martin	(509) 495-4276	Camille.martin@avistacorp.com
Benton PUD	Kennewick	WA	Kevin Fischer	(509) 585-5395	fischerk@bentonpud.org
Benton Rural Electric Association	Prosser	WA	Eric Miller	(509) 786-2913	emiller@bentonrea.org
			Ron Mitchell	(509) 786-2913	rMitchell@BentonREA.org
Blaine, City of	Blaine	WA	Cheri Testa	(360) 332-8820	ctesta@ci.blaine.wa.us
Big Bend Electric Cooperative, Inc.	Ritzville	WA	Dale Anderson	(509) 659-1700	danderson@bbec.org
Centralia, City of	Centralia	WA	Curtis Roe	(360) 330-7512	croe@cityofcentralia.com
Chelan County Public					
Utility District No. 1	Wenatchee	WA	Jim White	(509) 661-4829	james.white@chelanpud.org
Cheney, City of	Cheney,	WA	Daryce Hoffman	(509) 498-9230	dhoffman@cityofcheney.org
Chewelah, City of	Chewelah	WA	David Park	(509) 935-8330	david@chewelah.wa.us
Clallam County PUD No. 1	Port Angeles	WA	Mattias Jarvegren	(360) 565-3263	mattiasj@clallampud.net
Clark Public Utilities	Vancouver	WA	Bill Hibbs	(360) 992-3053	bhibbs@clarkpud.com
Clearwater Power Co.	Lewiston	ID	Greg Hansen	(208) 743-1501	ghansen@clearwaterpower.com
Columbia Rural Electric Association	Walla Walla	WA	Doug Case	(509) 526-4041	DCase@columbiaream.com
Cowlitz County PUD	Longview	WA	Rob Salberg	(360) 577-7555	rsalberg@cowlitzpud.org
			Doug Swier	(360) 577-7544	dswier@cowlitzpud.org
Ellensburg, City of	Ellensburg	WA	Shan Rowbotham	(509) 962-7251	rowbothams@ci.ellensburg.wa.us
Elmhurst Mutual Power & Light Co.	Tacoma	WA	Dan Brooks	(253) 531-4646	dan@elmhurstmutual.org
Ferry County PUD	Republic	WA	Ed Forsman	(509) 775-3325	eforsman@fcpud.com
Franklin PUD	Pasco	WA	Victor Hubbard	(509) 542-5904	vhubbard@franklinpud.com
Grant County PUD No. 2	Moses Lake	WA	Scott Stanford	(509) 766-2506	Sstanford@gcpud.org
Grays Harbor PUD No. 1	Aberdeen	WA	Jacob Henry	(360) 538-6416	jhenry@ghpud.org
	Aberdeen	WA	Kevin Howerton	(360) 538-6325	khowerton@ghpud.org
Inland Power & Light	Spokane	WA	Kristen Florez	(509) 789-4249	kristens@inlandpower.com
Klickitat PUD	Goldendale	WA	Sharon Ohnstad	(509) 773-7622	sohnstad@klickpud.com
Lakeview Light & Power Co.	Lakewood	WA	Alan Kakaley	(425) 785-7709	alandse@comcast.net
Lewis County PUD No. 1	Chehalis	WA	Norm Goodbla	(360) 740-2430	norm@lcpud.org
Mason County PUD 1	Shelton	WA	Greg Kester	(360) 877-5249	gregk@hctc.com
Mason County PUD No. 3	Shelton	WA	Kevin Nelson	(360) 426-8255	kevinn@masonpud3.org
Modern Electric Water Co.	Spokane Valley	WA	Terri Richey	(509) 928-4540	Trichey@mewco.com
Nespelem Valley Electric Co-op, Inc.	Nespelem	WA	Cortney Tillman	(509) 634-4571	cortney@nvec.org
Okanogan County PUD	Okanogan	WA	Debra Peters	(509) 422-8427	DebraP@okpud.org
Okanogan Electric Cooperative	Winthrop	WA	Gina Monteverde	(509) 996-2228	gmonteverde@oceec.coop
Orcas Power & Light Cooperative	Eastsound	WA	Elisa Howard	(360) 376-3571	ehoward@opalco.com
Pacific County PUD No. 2	Raymond	WA	Jim Dolan	(360) 942-2411	jim@pacificpud.org
Pacific Power	Yakima	WA	William Gatchel	(541) 377-7943	william.gatchel@evergreen-efficiency.com
Parkland Light & Water Co.	Tacoma	WA	Alan Kakaley	(425) 785-7709	alandse@comcast.net

RESOURCES

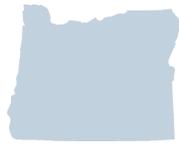
Peninsula Light Company	Gig Harbor	WA	Jim Bellamy	(253) 853-1386	JimB@penlight.org
Port Angeles, City of	Port Angeles	WA	Bob Kajfasz	(360) 417-4718	rkajfasz@cityofpa.us
Puget Sound Energy	Bellevue	WA	Michael Lane	(425) 424-6458	Michael.Lane@pse.com
Richland Energy Services, City of	Richland	WA	Dawn Senger	(509) 942-7436	dsenger@ci.richland.wa.us
Seattle City Light	Seattle	WA	Art Conrad	(206) 684-3870	art.conrad@seattle.gov
Skamania County PUD No. 1	Carson	WA	Mark Gosvener	1(888) 883-9879	mark@esgroupplc.com
Snohomish County PUD	Everett	WA	Allison Grinczel	(425) 783-8275	AAGrinczel@snopud.com
Sumas, City of	Sumas	WA	Rod Fadden	(360) 988-5711	rfadden@cityofsumas.com
Tacoma Public Utilities	Tacoma	WA	Roger Peery	(253) 502-8138	rpeery@ci.tacoma.wa.us
Vera Water & Power	Spokane Valley	WA	Paul Rich	1(888) 883-9879	paul@esgroupplc.com

WASHINGTON LIGHTING SPECIALIST:

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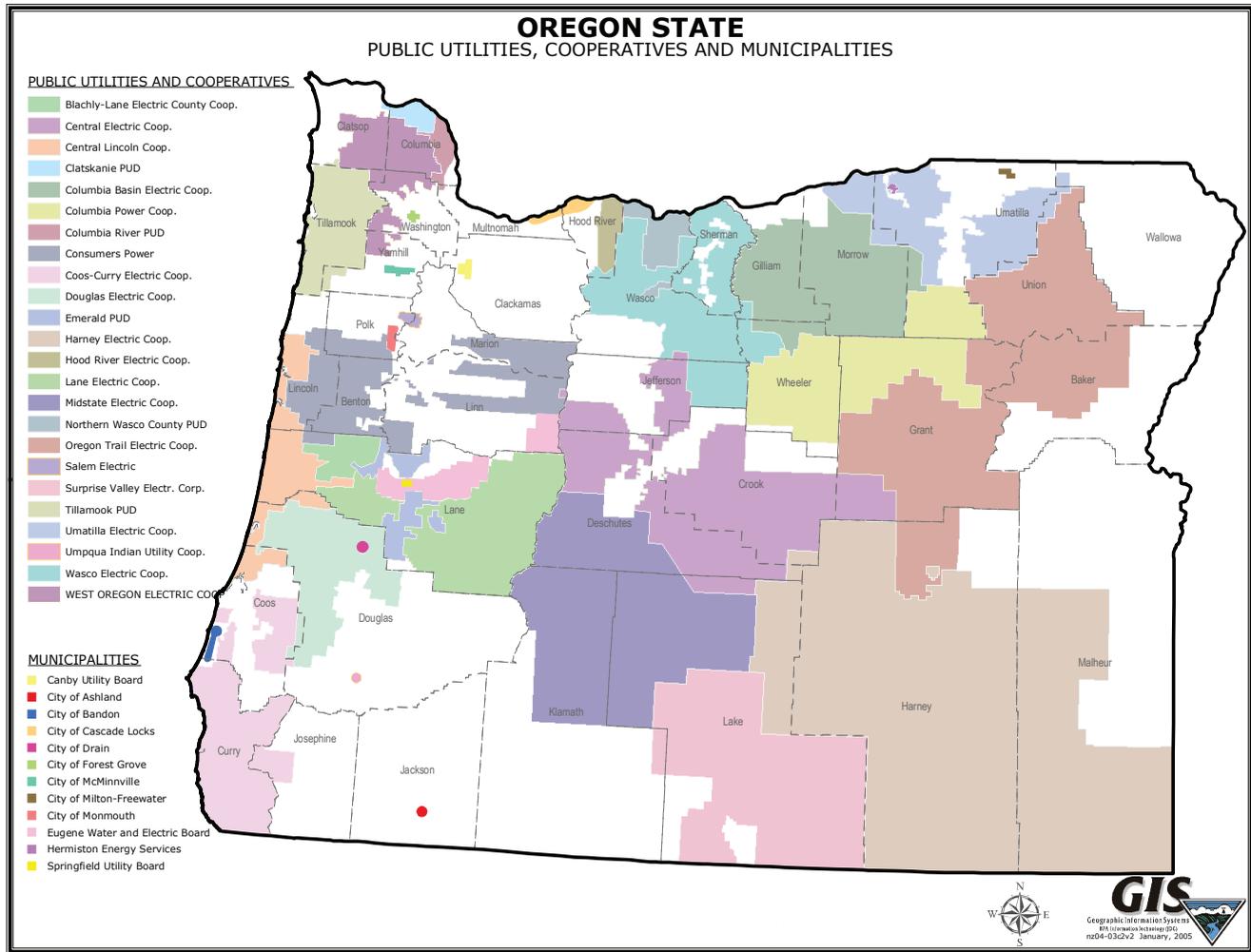
OREGON

UTILITY NAME	CITY	ST	REP	PHONE	EMAIL
Ashland, City of	Ashland	OR	Larry Giardina	(541) 552-2065	giardin@ashland.or.us
Bandon, City of	Bandon	OR	Paul Rich	1(888) 883-9879	paul@esgroupllc.com
Canby Utility Board	Canby	OR	Mark Gosvener	1(888) 883-9879	mark@esgroupllc.com
Cascade Locks, City of	Cascade Locks	OR	Mark Gosvener	1(888) 883-9879	mark@esgroupllc.com
Central Electric Cooperative	Redmond	OR	Vern Rice	(541) 312-7775	vrice@cec.coop
Central Lincoln People's					
Utility District	Newport	OR	Paul Rich	(888) 883-9879	paul@esgroupllc.com
Clatskanie People's Utility District	Clatskanie	OR	Brian Fawcett	(503) 308-4575	brian@clatskaniepud.com
Clearwater Power Co.	Lewiston	ID	Greg Hansen	(208) 743-1501	ghansen@clearwaterpower.com
Columbia Power Coop Association	Monument	OR	Patti Engle	(541) 934-2311	patti.engle@centurytel.net
Columbia River PUD	St. Helens	OR	Cathy Cartmill	(503) 366-3262	ccartmill@crpud.org
			Tim Lammers	(503) 397-8155	tlammers@crpud.org
Consumers Power Inc.	Philomath	OR	Thomas Elzinga	(541) 929-8532	thomase@cpi.coop
Coos-Curry Electric Coop, Inc.	Brookings	OR	Duffell Gray	(541) 332-8182	dgray@cooscurryelectric.com
Douglas Electric Cooperative	Roseburg	OR	Todd Munsey	(541) 673-6616	tmunsey@douglaselectric.com
Emerald People's Utility District	Eugene	OR	Rob Currier	(541) 744-7402	rob@epud.org
Energy Trust of Oregon	Portland	OR	Lisa Hull	(503) 559-7379	lisa.hull@evergreen-efficiency.com
Eugene Water & Electric Board	Eugene	OR	Joe Vaccher	(541) 685-7370	joe.vaccher@eweb.org
Forest Grove Light & Power	Forest Grove	OR	Michael Stoltz	(503) 992-3296	mstoltz@forestgrove-or.gov
Hermiston Energy Services	Hermiston	OR	Kathy Moore	(541) 564-4357	kathy.moore@umatillaelectric.com
Hood River Electric Co-op	Hood River	OR	Chuck Wiesman	(541) 354-1233	chuckw@hrec.coop
Idaho Power (Oregon)	Boise	ID	Shelley Martin	(208) 388-5872	smartin@idahopower.com
Lane Electric Cooperative	Eugene	OR	John Murray	(541) 484-1151	john.murray@laneelectric.com
McMinnville Water & Light	McMinnville	OR	Matt Deppe	(503) 435-3114	mgd@mc-power.com
Midstate Electric Cooperative	LaPine	OR	John Thomas	(541) 536-2126	jthomas@midstateelectric.coop
Milton-Freewater, City of	Milton-Freewater	OR	Pat Didion	(541) 938-8237	pat.didion@milton-freewater-or.gov
Monmouth Power & Light	Monmouth	OR	Paul Rich	1(888) 883-9879	paul@esgroupllc.com
Northern Wasco County PUD	The Dalles	OR	Steve Holmes	(541) 298-3311	steveh@nwasco.com
Oregon Trail Electric					
Consumers Cooperative	Baker City	OR	Sandra Ghormley	(541) 523-3616	sghormley@otecc.com
Pacific Power	Portland	OR	Lisa Hull	(503) 559-7379	lisa.hull@evergreen-efficiency.com
Portland General Electric	Portland	OR	Lisa Hull	(503) 559-7379	lisa.hull@evergreen-efficiency.com
Salem Electric	Salem	OR	Jeff Lewis	(503) 362-3601	lewis@salemelectric.com
Springfield Utility Board	Springfield	OR	David Harris	(541) 744-3775	davidh@subutil.com
			Jack Foster	(541) 744-3765	jackf@subutil.com
			Keith Lockhart	(541) 744-3776	keithl@subutil.com
Tillamook People's Utility District	Tillamook	OR	Dave Wimpy	(503) 842-2535	davew@tpud.org
Umatilla Electric Cooperative	Hermiston	OR	Kathy Moore	(541) 564-4357	kathy.moore@umatillaelectric.com

Wasco Electric Cooperative	The Dalles	OR	Traci Brock	(541) 296-5051	tracib@wascoelectric.com
West Oregon Electric Cooperative	Vernonia	OR	Mark Gosvener	(888) 883-9879	mark@esgroupllc.com

OREGON LIGHTING SPECIALIST:

Mike Hughes <i>Southern and Central Oregon</i>	Nick Jones <i>Eastern Oregon</i>	Micah Rose <i>Portland Metro</i>
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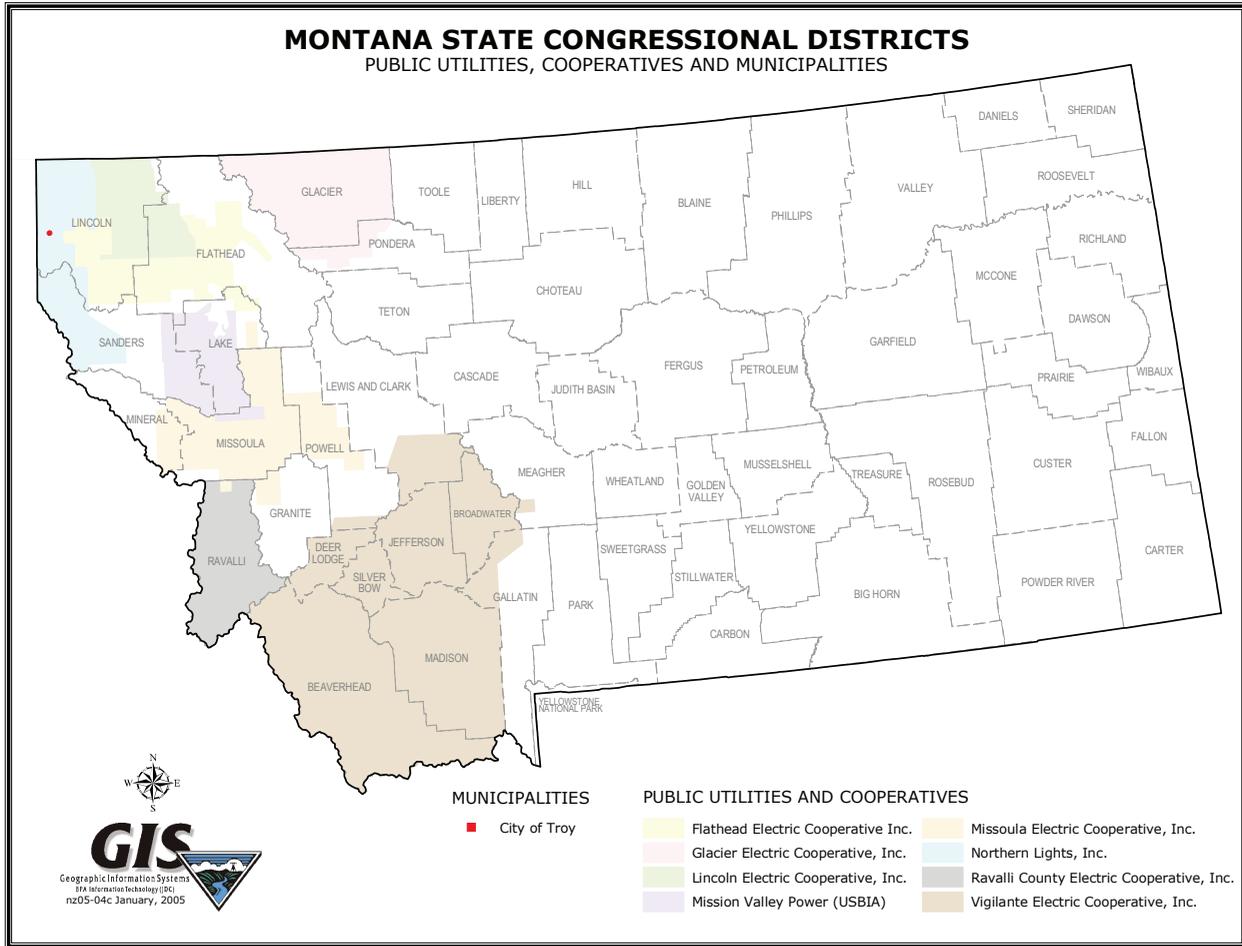


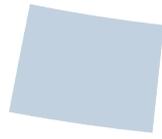
MONTANA

UTILITY NAME	CITY	ST	REP	PHONE	EMAIL
Flathead Electric	Kalispell	MT	Mike Stahlberg	(406) 751-1876	m.stahlberg@flathead.coop
Glacier Electric Coop., Inc.	Cut Bank	MT	Virginia Harman	(406) 873-5566	VirginiaH@GlacierElectric.com
Lincoln Electric Cooperative, Inc	Eureka	MT	Brent Holder	(406) 882-3307	brentholder@lincolnelectric.coop
Mission Valley Power	Pablo	MT	Lyle Neiss	(406) 883-7910	neiss@missionvalleypower.org
Missoula Electric Cooperative	Missoula	MT	Dan Rogers	(406) 541-6333	danr@meccoop.com
Northern Lights, Inc.	Sagle	ID	Elissa Glassman	(208) 263-5141	elissa@norlight.org
Northwestern Energy	Butte	MT	Mike Horner	(800) 823-5995	Mike.Horner@dnvgl.com
Ravalli County Electric Co-op	Corvallis	MT	Jim Maunder	(406) 961-3001	jmaunder@ravallielectric.com
Troy, City of	Troy	MT	Clint Taylor	(406) 295-4540	citytroy@troymt.net
Vigilante Electric Cooperative	Dillon	MT	Rod Siring	(406) 683-2327	contact@vec.coop

MONTANA LIGHTING SPECIALIST:

John Wilmoth
Western Montana





WYOMING

UTILITY NAME	CITY	ST	REP	PHONE	EMAIL
Lower Valley Energy	Jackson	WY	Wid Ritchie	(307) 885-6122	writchie@lvenergy.com

WYOMING LIGHTING SPECIALIST:

Dan Kuhl
Wyoming



NEVADA

UTILITY NAME	CITY	ST	REP	PHONE	EMAIL
Wells Rural Electric Co.	Wells	NV	Paul Rich	(888) 883-9879	paul@esgroupllc.com

NEVADA LIGHTING SPECIALIST:

Dan Kuhl
Nevada

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Northwest Trade Ally Network
Commercial & Industrial Lighting

888-205-5756 OR EMAIL INFO@NORTHWEST-LIGHTING.ORG

REGIONAL ENERGY EFFICIENCY ORGANIZATIONS

For the last 30 years, the Northwest has been a leader in treating energy efficiency and conservation as a power resource. The Northwest Power Act of 1980 called on the Northwest to give energy conservation top priority in meeting its power needs. The region quickly learned that a megawatt saved is the equivalent of a megawatt produced. Market transformation to energy efficiency and “purchasing” energy efficiency through incentives (known as resource acquisition) is less expensive than creating new power plants or purchasing electricity on the open market.

As of 2009, energy efficiency accounted for only one percent of all electricity production in the United States. But in the Northwest, it accounted for 12 percent, thanks to collaboration among a number of entities.

Key players in this collaboration include the following organizations:

BONNEVILLE POWER ADMINISTRATION



BONNEVILLE POWER ADMINISTRATION (BPA)

BPA is a federal nonprofit agency based in the Pacific Northwest. Although part of the U.S. Department of Energy, it is self-funding and covers its costs by selling its products and services. BPA markets wholesale electrical power from 31 federal hydro projects in the Columbia River Basin, one nonfederal nuclear plant and several other small nonfederal power plants. About one-third of the electric power used in the Northwest comes from BPA.

BPA also operates and maintains about three-fourths of the high-voltage transmission in its service territory, which includes Idaho, Oregon, Washington, western Montana and small parts of eastern Montana, California, Nevada, Utah and Wyoming.

As part of its shared commitment to meeting the region’s power needs, BPA promotes energy efficiency, renewable resources and new technologies. They guide the delivery of energy efficiency opportunities and programs and provide tools, technical support and financial resources to their utility customers.

bpa.gov



Northwest Power and Conservation Council

NORTHWEST POWER AND CONSERVATION COUNCIL

The Council was created by the Northwest Power Act of 1980 to develop and maintain a regional power plan and a fish and wildlife program to balance the Northwest’s environmental and energy needs. The Council’s three tasks are:

1. Develop a 20-year electric power plan to provide adequate and reliable energy at the lowest economic and environmental cost to the Northwest.
2. Develop a program to protect and rebuild fish and wildlife populations affected by hydropower development in the Columbia River Basin.
3. Educate and involve the public in the Council’s decision-making processes.

The Council sets the regional energy efficiency target through power plans. The Sixth Power Plan set public power's share of the regional target at 504 aMw for 2010-2014.

nwcouncil.org



REGIONAL TECHNICAL FORUM (RTF)

Formed by the Northwest Power and Conservation Council in 1999, the RTF selects, develops and maintains methods for estimating savings, costs and lifetimes from the delivery of energy efficiency measures.

A volunteer organization comprised of 20-30 voting members and 60+ corresponding members, the RTF helps review the technical elements of energy efficiency in the Council's power plan, including analysis of the region's progress toward its energy-efficiency goals.

rtf.nwcouncil.org



NORTHWEST ENERGY EFFICIENCY ALLIANCE (NEEA)

NEEA is a nonprofit organization working to increase energy efficiency to meet our future energy needs. NEEA is supported by, and works in collaboration with, BPA, Energy Trust of Oregon, and more than 130 Northwest public and investor-owned utilities on behalf of more than 12 million energy consumers to accelerate the innovation and adoption of energy-efficient products, services and practices.

NEEA leverages the region's market power within the commercial, industrial and residential sectors to remove barriers to adoption of energy-efficiency measures, aggregate and synthesize knowledge, convene and collaborate with the region and provide an independent perspective.

Between 2010-2014, NEEA and the region are striving to achieve 200 aMw of total regional savings as part of the organization's five-year business plan, which will be achieved primarily through long-term market-transformation strategies.

neea.org



Northwest Trade Ally Network
Commercial & Industrial Lighting

NORTHWEST TRADE ALLY NETWORK (NWTAN)

NWTAN supports both trade allies and utilities with valuable resources and information relevant to commercial and industrial lighting opportunities across the Northwest. Through networking opportunities, access to expert lighting specialists, free hands-on workshops and more, trade allies gain an increased understanding of utility incentives, lighting calculator tools, sales techniques, best practices and emerging lighting technologies. By enrolling, trade allies are able to deliver better service and energy savings to their customers, which yields more projects and business expansion.

NWTAN also helps utilities connect their customers with key players in the lighting industry including electrical contractors, distributors, manufacturer reps and designers in order to make cost-effective, energy-efficient lighting choices. NWTAN expands utility capacity to serve its business customers, promote more lighting projects and meet energy efficiency targets and goals in the areas of retrofit and new construction lighting.

nwlightingnetwork.com

NORTHWEST LIGHTING NETWORK

NORTHWEST LIGHTING NETWORK (NWLN)

Developed in partnership with regional utilities and their trade ally networks, the NWLN provides online resources and information to trade allies and utilities to make energy efficient lighting more accessible throughout the region. The robust network website is a one-stop resource for lighting trade allies to keep up to date on workshop and training opportunities, acquire information on relevant trends and technologies, access tools and resources for planning lighting projects, and find contact information for utilities and lighting specialists throughout the region.

nwlightingnetwork.com



LIGHTING DESIGN LAB

The Lighting Design Lab focuses on commercial and industrial lighting and provides education and consultations to over 900 people each year. As an interactive facility that is funded by major Northwest electric utilities and conservation partners, the Lab's services are free or supplemented so it is accessible to all businesses seeking guidance. Their goal is energy efficiency transformation. The Lab also maintains the LED Qualified Products List, which is a resource for regional utilities and trade allies in planning lighting efficiency projects.

The Lab is supported by a core team of Partners in Conservation at Seattle City Light, Northwest Energy Efficiency Alliance, Puget Sound Energy, Bonneville Power Administration, Snohomish PUD, Tacoma Power, Idaho Power, Energy Trust of Oregon, BC Hydro, Washington State University—Extension Energy Program and South Seattle Community College.

lightingdesignlab.com

ANNUAL LIGHTING SURVEY OF NORTHWEST ELECTRICAL DISTRIBUTORS 2013



COMPOSITION OF PARTICIPANTS »

# of Survey Participants	12 electrical distributors provided complete lighting sales data for 2010 to 2012 and completed a 60-90 minute interview (7 others completed only ¹ the interview).
States Represented in Participants' Sales Data	Idaho, Montana, Oregon, and Washington
Total reported ² lamps sold into the region in 2012	4,870,717

REPORT HIGHLIGHTS »

- » T8 lamps continue to dominate the linear fluorescent market while T12 shipments fell 40% from 2010 to 2012.
- » 28W and 25W lamps represented 18% of total 4ft T8 shipments in 2012.
- » 4ft lamps outsold 8ft lamps 33:1 in 2012.
- » Quartz probe start metal halide lamps continue to be the most popular HID lamp type sold by distributors, representing 44% of HID lamp sales.
- » LEDs accounted for about 4% of total linear fluorescent, HID and solid state lighting sales (by units) in 2012. Participants estimated that LED sales in 2013 would increase by 60%.

SURVEY OVERVIEW »

This report represents the results of the first annual BPA and NEEA Northwest Electrical Distributor Lighting Survey. On behalf of NEEA and BPA, Navigant, the survey administrator, interviewed 19 electrical distributors and collected linear fluorescent, high intensity discharge (HID), and LED unit sales data from 12 of the 19 distributors.

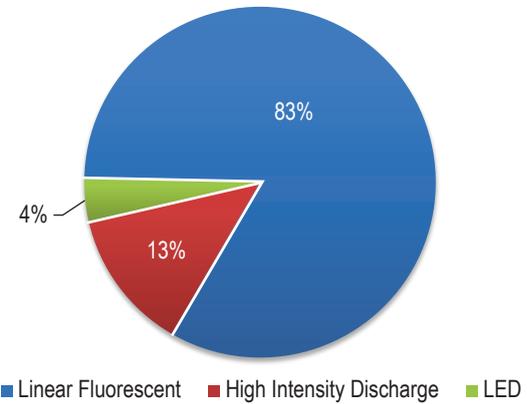
In general, the data quantity and quality of the survey responses was very good. Participants included distributors large and small, as well as rural and urban. Navigant estimates that the shipment data provided by distributors represented about 40% to 50% of the total Northwest non-residential lighting market, depending on the technology.³ The survey focused on the sale of linear fluorescent, HID, and LED lamps, and those submarkets are the focus of the report. While the survey did request sales data for incandescent and compact fluorescent lamps as well, only a few participants submitted data, which Navigant cannot be confident is representative of the total regional non-residential lighting market. Therefore, compact fluorescent and incandescent

technologies—both of which distributors qualitatively described as declining categories—have been excluded from the results reported herein.

SURVEY RESULTS »

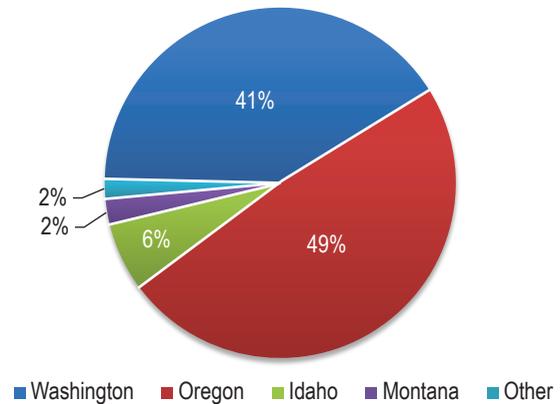
From a unit perspective, 2012 shipments were dominated by linear fluorescent lamps, representing 83% of distributor reported sales, followed by HID lamps at 13%. The remaining lighting units comprised LED lamps and fixtures, which represented 4% of sales in 2012. In terms of wattage sold: linear fluorescent, HID, and LED represented 77%, 21%, and 2%, respectively.⁴

2012 Reported Shipments by Technology



Nearly half of all reported units were sold to Oregon, while 41% went to its northern neighbor in Washington. About 6% of lamp units flow to Idaho, 2% to Montana, and 2% to other states.

2012 Lamp Shipments by Region



¹ Only those distributors who submitted sales data will have access to this report and the upstream lighting program sponsored by BPA and NEEA.

² Throughout the document "reported" values represent actual sales data from distributors that have not been scaled and adjusted for sales from non-responders and other channels. A separate BPA project report will provide those figures.

³ Total non-residential lighting shipments in the Northwest were calculated by scaling national sales data estimates to the northwest region based on commercial floorspace.

⁴ The percentage breakdown of shipments does not include compact fluorescent or incandescent lamp sales.



Linear Fluorescent Lamps and Ballasts »

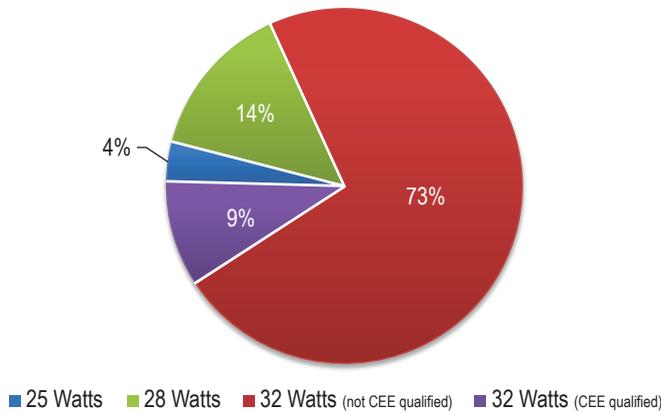
This subsection of the report details the survey findings for linear fluorescent lamps and ballasts. In 2012, distributors reported approximately 4.1 million linear fluorescent lamps sold to the Northwest. Four-foot T8s continue to gobble up the market share of T12s and 8-foot lamps at a rapid pace. T5 lamps have also experienced steady growth. Of reported shipments about 55% were 4ft T8 800 Series lamps and 23% were the less efficient 4ft T8 700 Series. The remaining 22% of sales were comprised of T5, 4ft T12, 8ft T12, and 8ft T8.

A common retrofit option for T12 lamps of all lengths, the 4ft 32W T8 lamp, has captured an increasing share of linear fluorescent sales in recent years and represented 82% of 4ft lamps in 2012. In the 4ft category, 800 Series

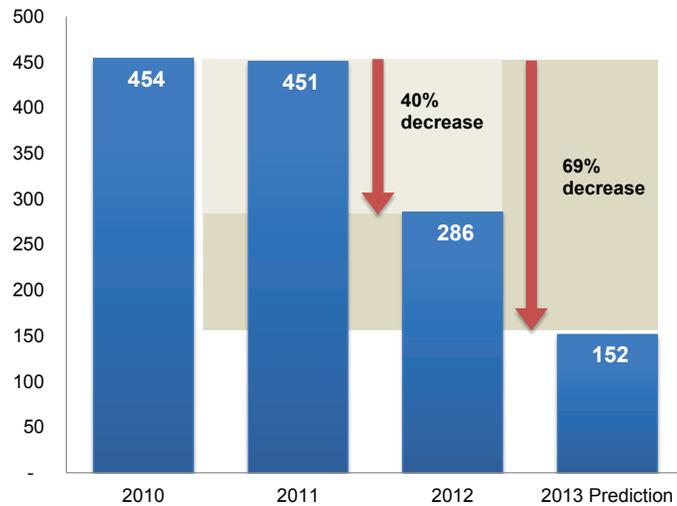
lamps, most commonly offered at 25W, 28W, and 32W, have also become more prevalent since 2010. While all reduced wattage lamps are 800 series, a surprising 64% of the 32W category were 800 series lamps.

Several other trends in the linear fluorescent lamp market were captured by the survey results. To be expected, shipments of T12 lamps have rapidly declined, falling approximately 40% since 2010. Additionally, sales of 8ft linear fluorescent lamps (T12 and T8) decreased by 23% from 2010 to 2012. This trend is likely due to the increasing use of 4ft T5 and T8 lamps for commercial and industrial applications as well as the relative difficulty in handling and maintaining the longer 8ft lamps.

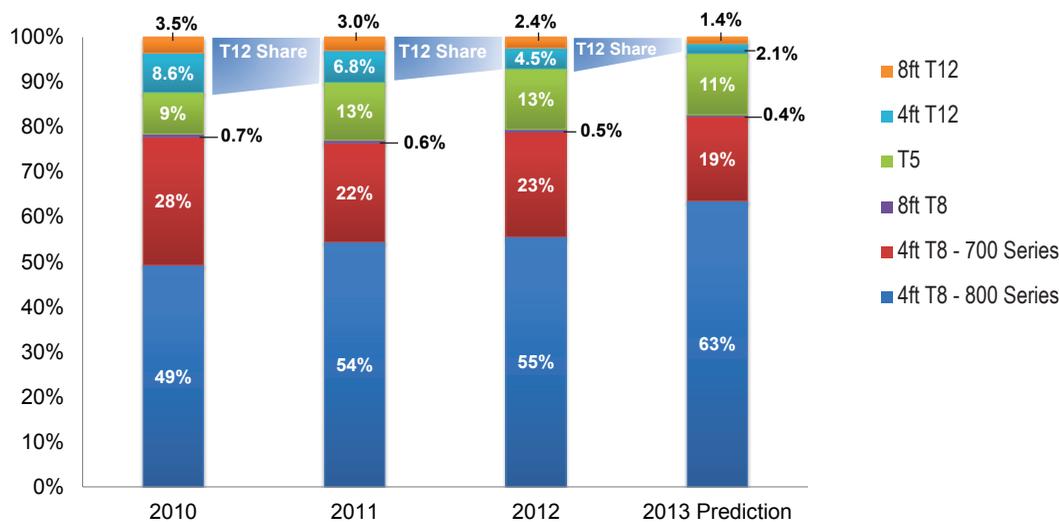
2012 4ft T8 Lamp Shipments by Wattage



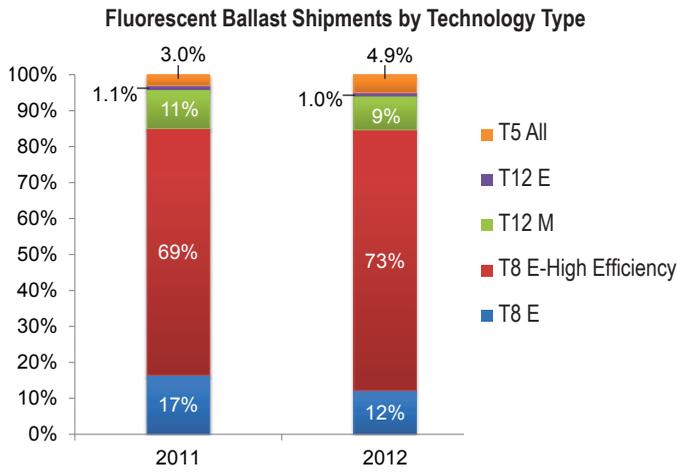
Reported T12 Lamp Shipments (Thousands)



LFL Shipments by Type

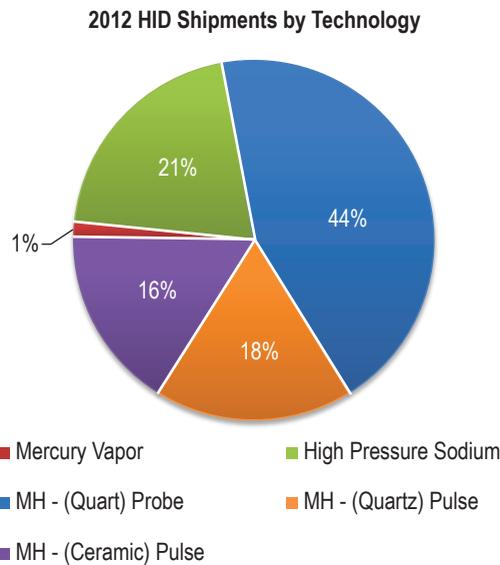


In terms of ballast sales, T8 ballasts outsell T12 units 8:1. The remaining T12 ballast sales mostly serve the 8ft replacement/maintenance market, particularly in high output applications, including sign ballasts. T5 ballasts have slowly grown in the market as T5 fixtures remain a popular HID retrofit option, particularly in industrial applications.



High Intensity Discharge Lamps »

The 2013 annual lighting survey also requested shipments of HID lamps, including high pressure sodium (HPS), metal halide (quartz probe start, quartz pulse start, and ceramic pulse start), and mercury vapor. Distributors reported more than 600,000 unit sales to the region. Of these, metal halide lamps represent the growing majority.



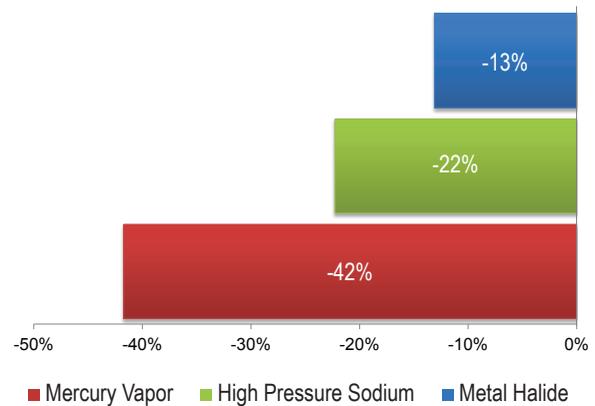
⁵ Other LED product types include: Wall packs, high/low bay fixtures, troffers, linear fluorescent lamp replacements, roadway fixtures, bollard lighting, track fixtures, and outdoor area lighting.

Since 2010, the market share of metal halide shipments has increased from 69% to 78% in 2012, while HPS have declined—presumably moving to metal halide and LED alternatives. In 2010, HPS lamps comprised 30% of all HID sales but only 21% by 2012.

In general, ceramic metal halide sales have gained share in the lower wattage categories (<150W), while probe start and pulse start dominate the higher wattage categories. At very high wattages, 1000W or greater, sales are almost exclusively probe start lamps. Only a few thousand mercury vapor lamps are now sold as the federal ban on mercury vapor ballasts, effective in 2009, appears to have largely had its intended effect.

Interestingly, distributors predict that all HID lamp sales will decrease in 2013. With mercury vapor predicted to decrease by 42% from 2012, HPS by 22%, and metal halide by 13%.

2013 Distributor Predicted Change in HID Shipments By Type



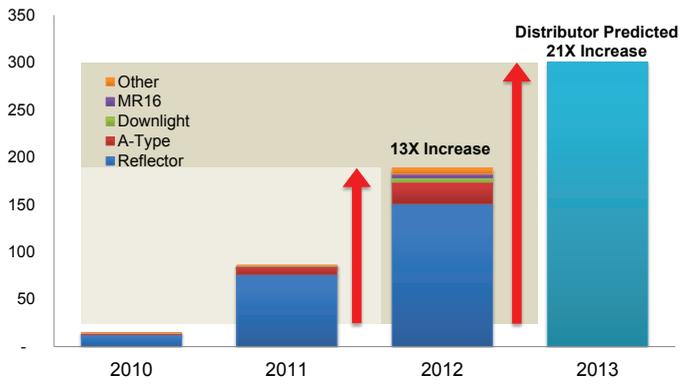
Light-Emitting Diode Lamps »

As is the dominate trend throughout the nation, LEDs are unsurprisingly the fastest growing lighting technology in the Northwest. According to the survey results, 2012 distributor LED lighting sales totaled about 188,500 units, or 4% of all non-residential reported lamp sales in the Northwest. This total represents a thirteen-fold increase from 2010 to 2012 and survey participants expect shipments to increase further in 2013, to more than 300,000 units.

In 2012, the vast majority of reported LED shipments were reflector and A-type lamps. Combined, these two product types represented 92% of all 2012 LED reported shipments. The remaining 8% includes LED downlight fixtures, MR16 lamps, as well as several other product types.⁵ We note, however, that only a few distributors reported sales of lamps in the other categories; it is unclear whether that is because they did not sell any lamps in those categories or because they chose not to submit data.



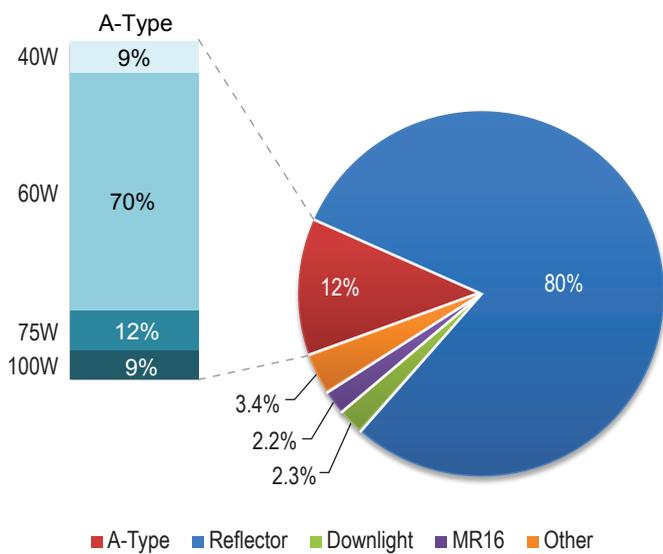
Reported Total LED Shipments 2010-2013 (Thousands)



Reflector lamps currently represent 80% of all non-residential LED lighting sales in the Northwest and largely include sales of PAR38, PAR30, PAR20, and R30/BR30 replacement lamps. The survey also indicated that LED reflector lamps are poised for tremendous growth. On average, distributors predicted that LED reflector lamp sales would grow by nearly 50% in 2013.

Sales of LED A-type lamps have increased rapidly between 2010 and 2012. In 2010, the data show that these products represented just 5% of the total LED lighting market – but that increased to 12% by 2012. By far the most common LED A-type lamp sold in 2012 was the 60W-equivalent, which composed 70% of all LED A-type lamp sales, followed by the 75W-equivalent at 12%, and the 40W and 100W equivalents, each at 9%.

2012 LED Shipments by Product Type



The survey also asked participants to indicate the “top” brands being stocked for LED lamp and fixture products. The results indicate that among Northwest distributors TCP is the most commonly stocked brand⁶ for LED lamps followed by Osram Sylvania and Philips. Meanwhile, RAB Lighting is the most popular brand stocked for LED fixtures followed by Lithonia Lighting and Cooper Lighting.

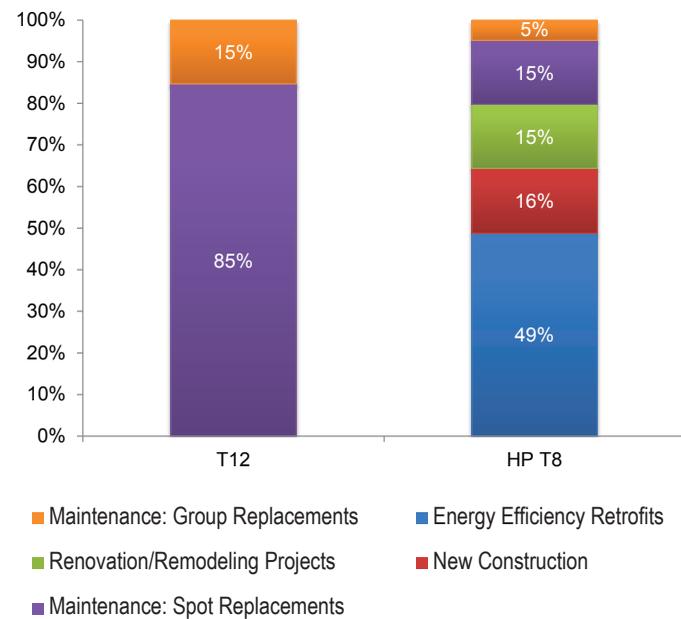
Top LED Brands Sold by Distributors



Incentives and Consumer Trends »

In addition to collecting lighting sales data, the survey asked Northwest distributors to comment on consumer purchasing trends and the use of utility incentives. As seen below, distributors estimate that 100% of T12 lamps are sold for maintenance. Comparatively, sales of high performance T8 lamps are perceived to be mostly for energy efficiency retrofits representing 49% sale events, while only 20% are maintenance related. The remaining 31% percent of T8 purchases is divided between new construction and renovation projects.

Lamp Sales by “Purchase Event”

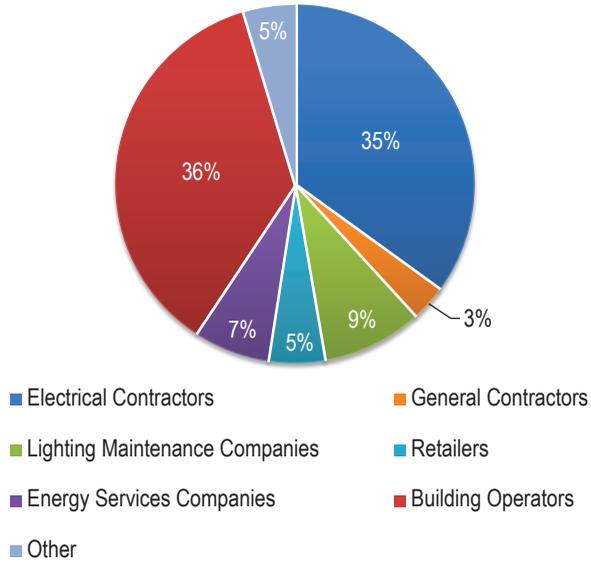


⁶ Order is based on distributor references of brands stocked, and does not necessarily reflect the order of sales volume.



The survey also invited distributors to comment on the shares of all lamps sold to different customer types or “market actors.” The results indicate that the majority are sold to either building operators (about 36%) or electrical contractors (about 35%). The remaining 29% of lamps are sold to lighting maintenance companies, energy service companies, retailers, general contractors, and others.

Lamps Sold to Each “Market Actor”



CONTACTS »

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 jawilson@bpa.gov
www.bpa.gov





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Northwest Trade Ally Network

Commercial & Industrial Lighting

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