



# TRADE ALLY NETWORK<sup>NW</sup>

Building Success Together

## 2023 FIELD GUIDE



*BPA energy-efficiency incentives and requirements listed within are effective October 1, 2021, through September 30, 2023. Incentives may vary between utilities, and additional terms and conditions may apply. Contact the local serving utility or local Trade Ally Network NW field specialist to confirm incentives and requirements. See pages 96-106 for local utility and field specialist contact information.*



As we move into 2023, it finally feels like we might have left the **Pandemic** behind us. But now, we have new concerns ahead of us: **Recession? Supply Chain Pressures? Increased Costs? Not Enough Time? Staffing Shortages?** The challenges are different, but many of us have crossed these intersections in the past.

Trade Ally Network is here to help you navigate these “mean streets” with our full suite of free services: **Technical Support, Product Recommendations, Business Development Strategies, Utility Connections, Training, and Incentive Program Guidance.** Our team is so excited to be able to meet in-person again (as well as over the phone and via Zoom)!

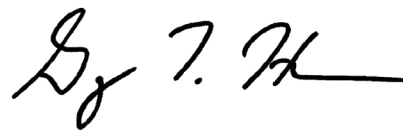
Our 2023 Field Guide is your in-the-field, in-the-truck, and at-the-desk roadmap. Need incentive information? It’s in there. Want to check a recommended lighting level? Yep, we’ve got that too. Plus, you’ll find technology information, links to our online – and in-person – training, case studies, sales tips, business development ideas and contact information for both our field team and local utility representatives.

Saving energy remains a good business decision regardless of what challenges the economy throws at us. By working together, we can power past these potential roadblocks and enable our communities to continue to invest in making the Northwest region stronger, and more energy efficient.

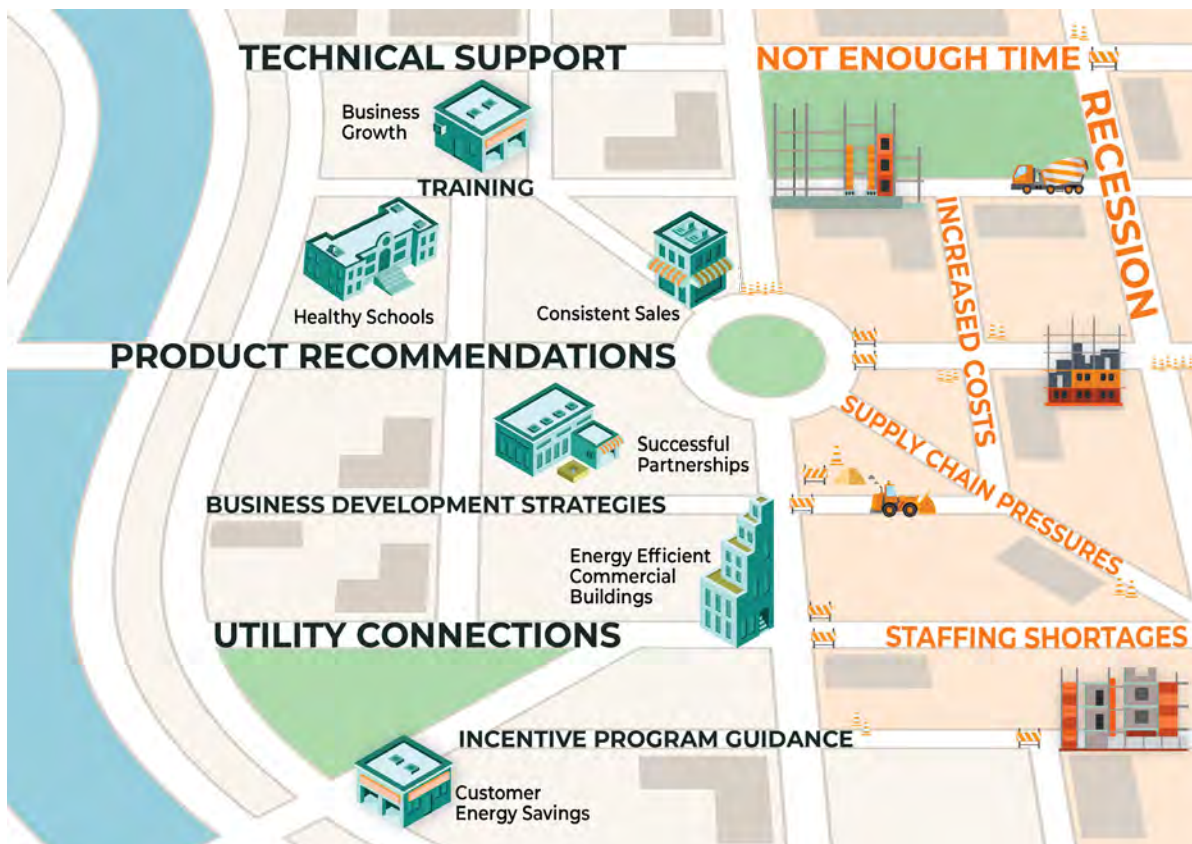
Regards,



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## Join the Network. It's good for business.



As a commercial lighting or HVAC contractor, you have the expertise to improve energy efficiency for your customers, saving them energy and money. Trade Ally Network NW supports your business with services and training to help you make new connections with customers and seal the deal on more projects. Membership is loaded with benefits at no cost to you. Sign up today and join us in Building Success Together.

### **GOOD FOR YOUR BUSINESS**

- Free workshops and 24/7 online education
- Technical support, calculation tools, product information, and best practices
- Access to utility contacts and program incentives
- Increase revenue through more projects

### **GOOD FOR YOUR CUSTOMERS**

- Improve comfort of the work environment
- Latest energy-efficient technologies to reduce operating costs
- Utility incentives to reduce project costs and improve payback

**Join Trade Ally Network NW today. Call us at 1-888-205-5756 or complete an application form at <https://www.tradeallynetworknw.com>**





## What Lighting Trade Allies Need to Know About HVAC



While the design and installation of HVAC systems requires specialized skills, lighting contractors can help customers identify potential HVAC improvement opportunities. One of the ways lighting contractors can offer value is to learn to identify electric resistance heat upgrade opportunities.

Electric resistance heaters are widely found in commercial buildings throughout the Northwest. Convenient and low-maintenance, they're also one of the leading energy-wasting ways to heat a building.

During colder months, building owners will run heating systems most of the time. Electric resistance heaters are effective at raising cold winter temperatures up to comfortable levels for building occupants. But, along with round-the-clock heating comes bigger utility bills for the building owner.

Your customers can reduce heating costs by up to 70% when they take advantage of utility incentives to replace their existing system with a heat pump.

Clues that suggest the building uses electric resistance heating:

1

**Customers complain about high heating costs.** If their electric bills increase dramatically during the winter, ask questions about what type of spikes they see and when.

2

**Building occupants complain about a burning smell from the heating system.** Ask your customer if this is common when the system is first activated for the season.

3

**Customers ask for help in identifying HVAC issues.** If you're already doing a virtual or on-site lighting audit, check the space for heating system clues.

- Look for electric heat in the form of baseboard heating, unit heaters in the wall, and in forced-air furnaces or rooftop units.
- Look for a gas line as part of a furnace or rooftop unit. If there is no gas line and the unit is not brand new, then it is likely electric resistance heat.
- Look at the equipment nameplate. Electric resistance heating capacity will typically be listed in kW while natural gas or heat pumps will be given in BTUs/h. You can also look up the equipment model number, typically located on the equipment exterior.

By learning to recognize electric resistance heat in a commercial building, you can help your customer improve building comfort and save on heating costs. You'll also deliver high value as a resource by identifying energy-efficiency solutions and connecting customers with an HVAC contractor who can help them explore upgrade opportunities.



## What HVAC Trade Allies Need to Know About Lighting



**A**lthough proper lighting design requires experience and knowledge, HVAC contractors are well-equipped to make a first-level assessment of existing light fixtures in a space. By asking additional questions that focus on potential lighting issues, HVAC contractors can play an important role in identifying and improving lighting system performance.

LED lighting retrofits improve a building owner’s bottom line through energy savings. When the system includes wireless control options, it also improves occupant comfort, satisfaction and productivity. Incentives help reduce installation costs.

Ask your customer these questions to determine if their lighting system is a candidate for an upgrade.

LED upgrades can be a solution for any of these opportunities. LED lighting is proven and available, so any facility not using it now is a candidate for upgrade and incentives. Here are two key concepts for HVAC trade allies to cover:

<b>How old is your current system?</b>	<b>What source technology is in use?</b>	<b>Are there specialty lighting upgrade opportunities?</b>	
Increased maintenance?	Incandescent?	Exit signs?	
Complaints from tenants?	CFL?	Sign lighting?	
High number of outages?	T12 fluorescent?	Flagpole lights?	
Chipped or rusted housings?	HID?	Casework or art lighting?	
Yellowed lenses?	T8 or T5 fluorescent?	Facade floodlights?	
Light flicker, hum or strobing?			





# Network Resources for HVAC and Lighting

- 1 Help customers understand that by replacing outdated incandescent, compact fluorescent, linear T8 and T12, and HID lamps with LED technology, property owners can realize significant energy savings of up to 60-80%.
- 2 Explain that adding lighting controls can deliver even bigger savings. Utility program incentives can help offset the initial cost of LED luminaires that use networked or luminaire level lighting controls (LLLC).

These combined digital lighting systems deliver more energy savings than the luminaire alone and create a better-quality interior environment. Plus, they offer a list of non-energy benefits, including diagnostics, easy maintenance and occupant well-being.

If you see potential for a lighting upgrade, refer your customer to an electrical contractor who can investigate opportunities for a highly efficient, controllable and long-lasting lighting system.

Learn more about basic and advanced lighting controls at:

<https://www.tradealynetworknw.com/industries/lighting/>

Additional training information on controls is available from the Lighting Controls Association:

<https://lightingcontrolsassociation.org/>





## 5 Sales Skills for 2023

Trade Ally Network NW sales strategist Dan Kuhl recommends five ways to prepare your sales strategy for the year ahead:



### 1. Stay current on incentives.

**Do you know what incentives are offered by your local utility?** Utility programs are updated on an ongoing basis, so it's critical to stay current on the latest offerings. Look for program offerings with higher incentives and talk about them with customers. For example, incentives for networked lighting controls (NLC) can significantly offset the cost of utilizing them. Why not share this with customers? LEDs by nature are made to control, so don't propose or install them without controls. It's a missed opportunity if you don't talk with your customers about how much energy this can save.



### 2. Integration is here.

Consider how today's lighting controls interact with other building systems. For example, lighting controls, or smart sensors, that are integrated into each light fixture are fast becoming the eyes and ears of the building management system (BMS). Located approximately every 100 square feet they are in a prime location to monitor and deliver key information to the BMS, which in turn communicates to the other building systems. This is the wave of the future and customers not only need this but want it.

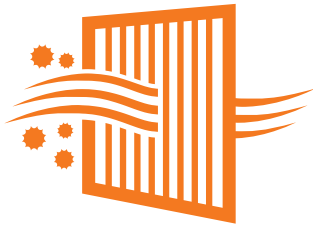
**Is your team up to speed on these systems?**



### 3. Sell Value, Communicate Benefits

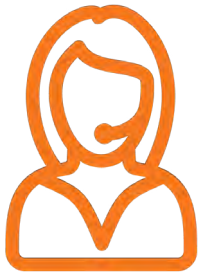
Inflation is showing up everywhere, from basic everyday items all the way to specialty equipment. Higher product and labor costs can make it challenging to convince customers to move forward with energy-efficient upgrades. Many projects can no longer be sold based only on energy savings or payback. Instead, consider having your teams focus on communicating the overall value of your proposal. This should include calculated savings like reduced energy and operational costs, utility incentives, and return on investment, plus important benefits such as enhanced building value, occupant safety and comfort. By identifying the unique non-energy benefits specific to each customer's project, you can promote those to compensate for higher overall project costs and market uncertainty. Are you utilizing the [sales and technical training resources](#) available through Trade Ally Network NW?





## 4. Preparation is key.

**Are you prepared to clean the air in your customer's buildings?** This has become one of the most requested topics from building owners and facility managers, who want to know how they can provide better indoor air quality (IAQ) to employees and tenants. Learn more about IAQ by heading to the Trade Ally Network NW training resource page to view our free, two-part webinar series. These trainings address air quality questions and review how to help your customer navigate this much-needed building upgrade. Being a resource for your customer can provide you with the opportunity to solve their needs first before they contact your competitors.



## 5. Clear Communication and Additional Opportunity

Supply chain issues and their severe impact on our industry are no secret. It's difficult to convince customers to get excited and sign on for projects, only to then inform them that there are delays of several months before equipment is available. It's important to manage customer expectations by communicating openly and defining realistic timelines up front. Take additional steps to help mitigate supply chain issues, such as increasing product options and availability by diversifying your network of suppliers. Also, consider identifying any consistent gaps you have in material and research options to avoid delays, such as adding to what you stock or locating alternative suppliers with inventory. If a customer's project is held up by supply chain issues, consider offering an intermediate service, like a building systems evaluation and tune-up. Adjusting heating and cooling set points, tuning HVAC systems, evaluating occupancy and control settings, or doing a scoping walkthrough to identify low-cost items such as vampire plug loads are all ways you can provide immediate energy and cost savings to customers while they wait for equipment deliveries.

**Strong business opportunities are out there. Use supply chain uncertainty as a time to creatively build your sales and project pipelines.**

As always, when we focus on what our customers need, sales will follow. Need help? Contact your regional field specialist to apply these reminders to your business.





## Setting Lighting Controls for Maximum Comfort & Deeper Savings

Properly setting lighting controls for your customers can have a major impact on your project by reducing operational costs, increasing utility incentives, producing a greater return on investment, and ensuring occupant safety and comfort.

While lighting controls are required by code in most commercial spaces, they need to be commissioned properly for customers to fully experience their benefits. When set up correctly, controls can achieve 47% energy savings over facilities without controls, plus they offer non-energy benefits like occupancy sensing, space utilization and energy management. When commissioning advanced controls, make sure that each luminaire and control device is connected and that at least two of the following control strategies are employed: occupancy sensing, daylight harvesting or photocell control with continuous dimming, and high-end trimming or personal tuning.

If you are deciding between zone-based or luminaire level lighting controls (LLLC), it's important to think about the space in which the controls will be installed. LLLC allows for greater coverage of smaller zones, whereas zone-based daylighting utilizes photosensors on the ceiling and controls wires to dim each luminaire. As a result, sensor placement requires more review, coordination, and commissioning. Zone-based control is most common for top-lighting applications.

Setting up lighting controls correctly can yield increased energy savings in many situations, including a range of climates and outside lighting conditions. Additionally, many utilities offer incentives for control installation. Contact your local field specialist today to make sure that you're taking advantage of available lighting controls incentives in your area.

**“ WHEN SET UP  
CORRECTLY, CONTROLS  
CAN ACHIEVE 47%  
ENERGY SAVINGS OVER  
FACILITIES WITHOUT  
CONTROLS... ”**







## HSPF Changes on the Horizon for Air-Source Heat Pumps

For more than a decade the HVAC industry has relied on the terms Seasonal Energy Efficiency Ratio (SEER) and Heating Season Performance Factor (HSPF) to give trade allies and their customers an apples-to-apples comparison of yearly energy consumption in a range of heat pumps.

Equipment and technology have significantly changed in the past several years, and the Department of Energy (DOE) recently updated test procedures for single-phase heat pumps to more accurately account for installation conditions. With this updated testing procedure comes a new efficiency designation: SEER2 and HSPF2. These designations are meant to distinguish units that are tested to the new federal standard from those tested to the old standard. This change intends to better reflect real-world performance by decreasing measured unit performance ratings compared to current levels for identical equipment. As an example, a 15 SEER unit tested under the new procedure may report a 14.3 SEER2 even though the unit characteristics have not changed.

Under these new rules, starting January 1, 2023 all heat pump products manufactured or imported to the U.S. will need to be tested using the revised test procedure, receive a new AHRI rating of performance, and comply with the updated standard efficiency levels. The map on the next page shows the minimum federal efficiency levels for heat pumps (including ductless heat pumps) and A/C units beginning January 1, 2023.

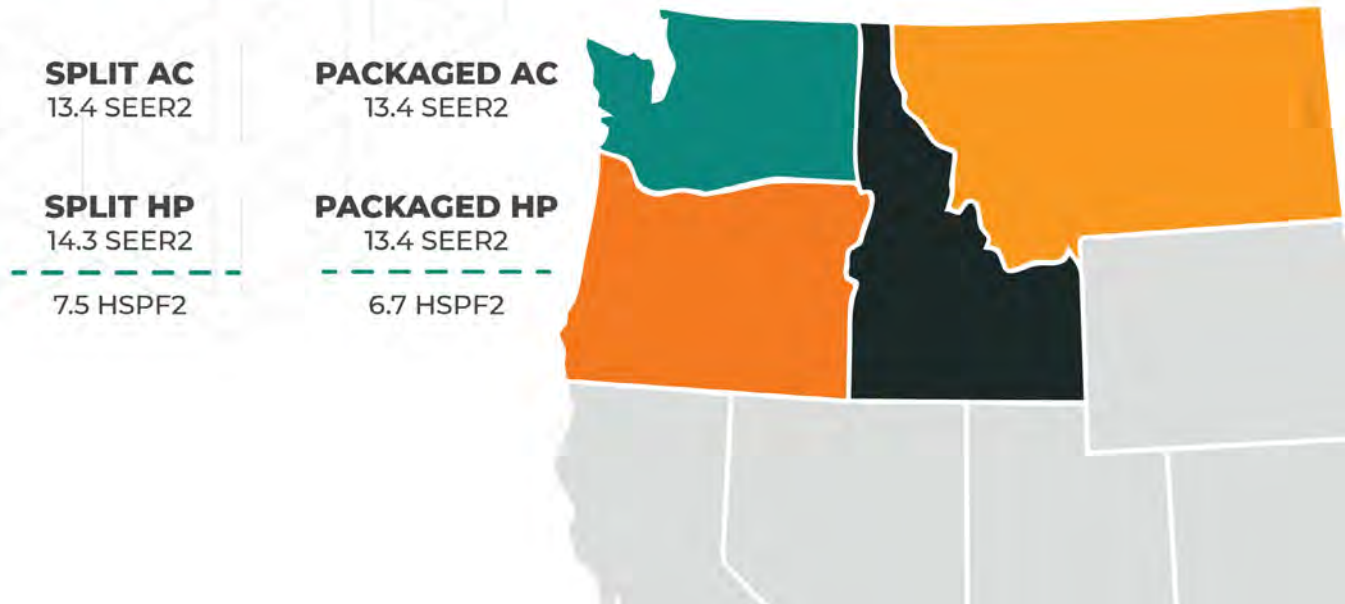
Because the new test procedure will do away with SEER and HSPF ratings in favor of SEER2 and HSPF2 ratings on labels, the market will not see units rated to two different test procedures. Units will maintain SEER and HSPF ratings until they are re-tested under the new test procedure at which point they will be marked with SEER2 and HSPF 2 ratings only. The goal is to avoid confusion about which test procedure is referenced.

However, trade allies and their customers may face some confusion if they come across equipment manufactured before January 1, 2023 that is still available for purchase. This legacy equipment, rated only to the older performance standards, can be sold until the stock is depleted. Just be aware that regional distributors will likely have stock for awhile with either of the two efficiency ratings.



## HSPF Changes on the Horizon for Air-Source Heat Pumps

### 2023 REGIONAL EFFICIENCIES FOR SPLIT AC, SPLIT HP AND PACKAGED UNITS: NORTH



The Network is here to help you and your customers navigate the changes in the coming year. The Bonneville Power Administration (BPA) has modified their residential and commercial heat pump specifications to include both the old ratings as well as equivalent SEER2 and HSPF2 values for all affected equipment. Still want more info? Contact your local field specialist if you have any questions.



**The fastest route to energy efficiency answers.**

## Your Journey Starts in The Online Learning Center

As a trade ally, you may have questions about the latest energy-efficient technologies and utility incentives programs. Fortunately, you have convenient access to answers through the Network’s Online Learning Center. Courses are free, available 24/7, and cover topics that can help you help your customers know about new ways to save energy and lower costs. You can finish most courses in 15 minutes and earn continuing education credits. Turn your questions into business opportunities. Take a course today!

*“I have a customer asking about ARC. Are there incentives and installation tips?”*

**Yes! Incentive Program: Advanced Rooftop Unit Controls.** Course time: 45 minutes.

*“What’s the right heat pump for my customers in a colder mountain climate?”*

**Take our Cold Climate Heat Pump course.** Course time: 15 minutes.

*“I think LLLC could be a great option for several customers. How do I recommend the best product for their project?”*

**Check out Finding Luminaire Level Light Control Solutions for Lighting Projects or Selling Luminaire Level Lighting Controls for Retrofits.** Course time: 15 minutes.

*“We’re so busy we hired new people, and now we need help training them. What are the best introductory courses?”*

**To start, try our Intro to the Commercial HVAC Program or Intro to the Commercial Lighting Program.** Course time: 45 minutes.

*“Our staff is slammed. Are there any courses to take during the lunch hour?”*

**You can finish most of our courses in 15 minutes or less!**

*“I have a new business opportunity. Do you have any winning proposal tips?”*

**Try Building a Winning Proposal.** Course time: 15 minutes.

*“What courses have ideas to help me with meeting my quarterly sales goals?”*

**Enjoy The Forgotten Stakeholder, Meeting Customer Needs and Building Trust.** Course time: 15 minutes.



All Network trade allies are registered for the Online Learning Center. Log in to start learning or sign up.

### ONLINE LEARNING CENTER

**It’s easy:** Log in anywhere from any device

**It’s convenient:** Free HVAC and lighting courses available 24/7









**HVAC**





## STEP 1 - IDENTIFY PROJECT

Customer contacts local utility, trade ally or the Network.

Utility/trade ally/Network identifies potential project with customer.

Network discusses utility program offerings with customer; may recommend local trade allies (subject to utility approval).



## STEP 2 - ESTIMATE AND APPROVE PROJECT

Customer reviews trade ally proposals; participates in project scoping activities; confirms proper paperwork.

Network ensures customer and trade ally understand project qualifications and ensures incentive availability.

Trade ally reviews utility program with customer; contacts utility for project eligibility; provides project cost estimate.



## STEP 3 - IMPLEMENT PROJECT

Utility issues agreement to business and/or trade ally and gets required signatures.

Customer signs agreement with trade ally (and sometimes utility) to complete work.

Trade ally completes proposed scope of work.



## STEP 4 - INSPECT PROJECT

Customer signs off on completed project.

Network updates documentation and submits to utility for BPA reporting/invoicing.

Utility or Network completes post-installation inspection.

Trade ally verifies completed project met program requirements.



## STEP 5 - PROCESS INCENTIVE

Trade ally provides Network and utility with final documentation.

Network ensures complete paperwork for incentive processing.

Utility processes incentive payment (est. 6-8 weeks).

Customer receives incentive payment (est. 6-8 weeks).





REDUCE ENERGY COSTS

INCREASE COMFORT

ZONE CONTROL



## DITCH THE DUCT

Upgrading your existing heating system to a ductless heat pump (DHP) can help increase occupant comfort and the value of your commercial space.

Your **local electric utility** may offer up to \$1,000 per ton\* for qualifying energy-efficient DHPs in commercial buildings or \$300 per ton for a DHP upgrade.

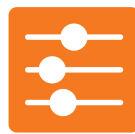
### BEST PRACTICE TIP:

There are a wide range of Heating Seasonal Performance Factors (HSPF) for qualifying units. Some extremely efficient units are rated with HSPFs up to 15. To maximize energy savings, consider units with higher HSPF ratings that are able to maintain their heating capacity down to extremely low temperatures. in cold climates.

### BENEFITS MAY INCLUDE



Typically more efficient than central air systems



Improved indoor air quality



Quiet operation



Easy, low-cost installation





# Ductless Heat Pumps

## How Does It Save Energy?

Ductless heat pumps (DHPs) allow the user to control each heating/cooling zone independently, eliminating the costly over-heating and cooling common to central air systems.

Ductless heat pumps use variable speed compressors to continuously match the heating and cooling load, and avoid the on/off cycling of conventional heating systems that are often associated with uncomfortable temperature variations and high energy consumption.

Heat pumps are also 70% more efficient than electric resistance heaters since moving heat is less energy intensive than creating heat.



## Incentive Requirements\*\*

### PRE-INSTALLATION CONDITIONS

- Retrofit:**
- Conditioned area is heated by zonal or forced air electric resistance heat as the primary heating source.
  - No other heating sources are eligible.
- Upgrade:**
- Space is conditioned by an operational or failed DHP; or
  - Space is part of a building addition, new construction, or major renovation project.

### POST-INSTALLATION CONDITIONS

The installed DHP must have the following features:

- Must be rated with a minimum of 11.0 HSPF for non-ducted indoor units and 10.0 HSPF for ducted or mixed indoor units.
- Efficiency requirements apply to single and multi-head systems.
- Have an AHRI certificate of product rating.

*\*Ask your field specialist about promotional incentives offered.*

*\*\*These measures cannot be used to retrofit packaged terminal air conditioning (PTAC) units.*

Visit <https://www.tradeallynetworknw.com> to view a Qualified Products List

## Estimated Incentives



Your local utility may offer **up to \$1,000 per ton** for qualifying ductless heat pump retrofit installations, or \$300 per ton for upgrades.



A typical project payback, including incentives, is **about 3-5 years for a 3-ton unit.**



If your project meets the above requirements and the equipment is on the Qualified Products List, **call your local utility or Trade Ally Network NW** today to confirm eligibility and incentives.



# Understanding Cold Climate Ductless Heat Pumps



Utility territories served by BPA that are east of the Cascade Mountains are generally considered “cold climates” and require equipment designed for harsher conditions. Many modern ductless heat pumps (DHP) can heat a space effectively, maintaining around 70% capacity even below 5°F without reverting to backup resistance heat. However, when installing DHPs where the temperature remains below freezing for much of the year, extra care must be taken to choose the right equipment and to install it thoughtfully.

The performance and efficiency of the system can be severely degraded by improper selection or installation. The following offers tips for finding the right product and best practices for design and installation considerations. (Note: these are considerations only, not requirements. Trade Ally Network NW and BPA do not currently have a cold climate heat pump specification.)

## Finding the right product

- The DHP should maintain at least 70% of its rated capacity and a co-efficient of performance (COP) of 1.75 or better at 5°F without backup heat.
- Be wary of equipment that does not have performance data for outside air temperatures of 5°F or below.
- Northeast Energy Efficiency Partnerships (NEEP) maintains a list of cold climate air source heat pumps that includes low temperature performance data that is not covered in AHRI testing. This information is invaluable for sizing and selecting ductless heat pumps for cold climates. View the cold climate air source heat pump list here: [ashp.neep.org/#1/](http://ashp.neep.org/#1/).
- Important: Any selection from NEEP’s list must be cross-referenced with the BPA qualified products list for DHPs to verify incentive qualification.

## Design considerations

- Make accurate load calculations accounting for the building envelope, air leakage, solar gains, and internal gains. Commercial load calculation procedures can be found in the Air Conditioning Contractors of America (ACCA) Manual N.
- Do not use the nominal rated capacity of the DHP. These numbers will not be accurate for your specific climate. Look for capacity ratings that align with your climate.
- Look for units with a high maximum capacity and low minimum capacity to ensure a wide range of steady operation that avoids cycling.



# Ductless Heat Pumps

## Installation considerations

- Size to meet both the estimated heating and cooling loads. Match system capacity at the design temperature with 115-125% of the estimated heating load, without the use of auxiliary electric resistance heat.
- Insulate the entire line set length to avoid condensation and energy loss.
- Avoid the use of condensate pumps whenever possible.
- Mount outdoor units above anticipated historical average maximum snowfall depth on the leeward side of the building to avoid snow drift buildup. Wall mount is best.
- Avoid installing outdoor units under any drip line where snowmelt or extreme rain runoff may occur.
- In January 2023 the U.S. Department of Energy changed minimum efficiency requirements for single-phase central air conditioners and heat pumps under 65,000 btu/h. These updated performance ratings are referred to as SEER2 and HSPF2 and will begin replacing the older metrics for equipment manufactured after January 1, 2023. For more information, please visit [page X](#)

*Accurate load calculation and right sizing is key to efficient operation. Avoid oversizing as that will lead to excessive cycling and poor performance.*



## Good Applications for Ductless Heat Pumps

- Offices, restaurants, retail stores, banks or spaces that may be isolated from the main HVAC system and experience unwanted temperature swings.
- Spaces with consistent year-round cooling loads such as server rooms and A/V rooms.
- Spaces or zones served by systems under five tons.
- Buildings or spaces that have low ceiling heights, making installing conventional ducted systems problematic.
- Rooms or spaces that need air conditioning.
- Buildings with operable windows serving as required ventilation.

# TOP 10

## Reasons to Install Ductless Heat Pumps Now

- 1 More closely match a building's heating and cooling loads year-round.
- 2 Reduce costly on/off cycling, prolonging the life of equipment while avoiding uncomfortable temperature swings in the space.
- 3 Quieter operation compared to ducted systems.
- 4 Significant energy savings; up to 25% more efficient than conventional central air systems.
- 5 Fast and simple installation, often able to be done in less than a day.
- 6 No need for costly (and often leaky) ductwork in the space or above the ceiling.
- 7 Numerous models and styles are available that meet the specification and fit the needs of the space.
- 8 Minimal annual maintenance is required.
- 9 Incentives may be available from your local utility.
- 10 Realizes a quick payback on the investment, typically three to five years.









INCREASE FUNCTIONALITY

MAXIMIZE COMFORT

OPTIMIZE ENERGY USAGE

## TAKE CONTROL OF COMFORT



Making the switch to a connected thermostat gives you more control over your building's HVAC system and can help you manage and reduce your energy consumption and costs.

Your **local electric utility** may offer up to \$150\* for qualifying connected thermostat installations, and up to \$50 per programming verification. The thermostat is eligible for up to four verification payments within two years of the initial install.

### BEST PRACTICE TIPS:

- 1 Make sure key site personnel are properly trained on how to use the connected thermostat. They should be able to:
  - Log in to the web-based platform
  - Check set points, schedules, and equipment status
  - Modify set points and schedules
- 2 Schedule the fan to "auto" mode during unoccupied hours for the best energy savings. Verifying that this setting is properly configured during the initial install and subsequent verifications will help achieve desired energy savings.
- 3 Discuss the auxiliary resistance heat lock-out set point on heat pump units with site personnel to confirm it is appropriate. Lower set points enable higher energy savings but could lead to occupant discomfort, especially if the controlled unit is undersized.
- 4 Ensure original connected thermostat settings are maintained via verification. If changes have been made, discuss them with the building owner.

### BENEFITS MAY INCLUDE



Simple programming



Remote access via smart devices



Automatic updates



Web-based monitoring and alerts



Reduced energy costs



# Connected Thermostats

## How Does It Save Energy?

Connected thermostats control the HVAC system in order to maintain zone temperatures via the internet. Connected thermostats provide remote access to alerts and monitoring, scheduling, and control.



Programming capabilities allow you to more accurately match HVAC operation with actual occupancy (for example, scheduling setback temperatures during evenings, holidays and breaks), while ensuring desired temperatures are maintained during occupied hours, thus minimizing energy usage.

## Incentive Requirements

### PRE-INSTALLATION CONDITIONS\*

- Thermostat must replace an existing thermostat that is not web enabled.
- Heating can be electric or gas.
- Lodging, 24/7 occupancy, or semi-conditioned spaces are not eligible.

*\*Available for retrofits only. Not eligible for an ARC payment.*

### POST-INSTALLATION CONDITIONS

#### The installed thermostat:

- Controls an existing HVAC supply fan and serves a single zone.
- Must be listed on the Qualified Products List.

#### The installed thermostat must be programmed as follows:

- Must be connected to the internet.
- Temperature setback is used for unoccupied hours (heating and/or cooling, as applicable).
- Fan schedule uses auto mode for unoccupied hours (e.g., during unoccupied hours or holidays, the fan will only run when there is a demand for heating or cooling).
- Override duration set to three hours or less.
- For heat pumps, aux resistance heat lockout is enabled with appropriate set points.
- Simultaneous heating and cooling are eliminated in cases where two or more systems serve spaces not separated by physical barriers.

*\*Ask your field specialist about promotional incentives offered.*

Visit <https://www.tradeallynetworknw.com> to view a Qualified Products List

## Estimated Incentives



Your **local electric utility** may offer up to **\$150 for qualifying connected thermostat installations**, and **up to \$50 per programming verification**. The thermostat is eligible for up to four verification payments within two years of the initial install.



A typical project payback, including incentives, **is about 2-3 years.**



If your project meets the above requirements and the equipment is on the Qualified Products List, **call your local utility or Trade Ally Network NW** today to confirm eligibility and incentives.





# TOP 10

## Reasons to Install a Connected Thermostat

- 1 More control to better match desired temperatures with occupancy patterns.
- 2 Provides a clear picture of what's happening with the HVAC system.
- 3 Simple to set up and retains settings so there's no need to re-program even if power is lost.
- 4 Easily controllable from smart phone, tablet or laptop.
- 5 Automatically updated and sends alerts if faults are detected.
- 6 Reduced operating and maintenance costs.
- 7 Increased energy savings.
- 8 More comfortable for building occupants.
- 9 Incentives may be available from your local utility.
- 10 Realizes a quick payback on the investment, typically under two years.



## Watch our video

<https://www.tradeallnetworknw.com/resources/video-take-control-of-comfort-connected-thermostats/>





## Full and Lite Retrofits

OPTIMIZE PERFORMANCE

REDUCE MAINTENANCE

SAVE MONEY

## SAVINGS THROUGH THE ROOF



Older inefficient rooftop units can waste thousands of dollars annually.

By retrofitting those rooftop units with advanced rooftop unit controls (ARC), building owners and operators can save money and make their building more comfortable.

Your **local electric utility** may offer incentives up to \$100-200 per ton\* of cooling capacity for qualifying retrofits.

### BEST PRACTICE TIPS:

- 1 Check that the existing supply fan motor is inverter-duty rated. Inverter-duty rated motors have longer life expectancies than non-inverter-duty rated motors because they can better withstand the elevated voltage spikes and increased internal temperatures associated with variable frequency drive (VFD) control.
- 2 The building's owner or manager should understand that ARC implementation will cause a significant increase in energy consumption if the controlled RTU is now being used to continuously ventilate the building when it wasn't before.
- 3 A CO<sub>2</sub>-based demand control ventilation (DCV) system uses a CO<sub>2</sub> sensor in the conditioned space to control the outside and return air dampers to open and close proportionally to the measured CO<sub>2</sub> level. It is recommended that installers reference ASHRAE Standard 62.1 to establish appropriate minimum and maximum set points for the DCV algorithm.
- 4 Web-enabled controls add non-energy benefits for the end-user to allow for enhanced programming, fault detection, and alerts. Check that the user has set up these features and knows how to use them to maximize the benefit of ARC.
- 5 Installers should establish economizer control consistent with ASHRAE Standard 90.1, with a focus on sensor calibration, plus choose an appropriate control type and high-limit shutoff set point.





# Advanced Rooftop Unit Controls

## BENEFITS MAY INCLUDE



Improved comfort



Improved indoor air quality



Reduced fan usage



Remote energy monitoring and control

## How Does It Save Energy?

ARC retrofits can reduce fan speeds up to 40% during the first stage of heating and cooling and 60% in ventilation mode when no heating or cooling is needed.

Energy savings generally increase with higher hours of occupancy.

## Incentive Requirements\*\*

### PRE-INSTALLATION CONDITIONS

The existing RTU must have the following characteristics:

- Heating fuel type may be electricity or gas.
- Have five tons of cooling capacity or more.
- Is a packaged unitary system (split systems are not eligible); and
- Constant speed supply fan (RTUs with variable speed fans are not eligible).

### POST-INSTALLATION CONDITIONS

- Installed on an existing rooftop unit.
- Listed on the ARC Qualified Products List.

*\*Ask your field specialist about promotional incentives offered.*

*\*\*Available for retrofits only. Not eligible for a connected thermostat payment.*



Image courtesy of Pelican Wireless

## Visit <https://www.tradeallynetworknw.com> to view a Qualified Products List

## Estimated Incentives



Your local utility may offer up to **\$100-\$200 per ton** for qualifying retrofits.



A typical project payback, including incentives, is about **4-10 years**.



If your project meets the above requirements, **call your local utility or Trade Ally Network NW** today to confirm eligibility and incentives.



# TOP 10

## Reasons to Install ARC Now

### ARC Lite and ARC Full Benefits

- 1 Improved equipment life through motor soft-start and decreased wear and tear on the fan, motor, bearings, belts, and filters.
- 2 Quieter operation.
- 3 Improved energy savings.
- 4 Incentives may be available from your local utility.
- 5 Realizes a quick payback on the investment, typically under three years.

### ARC Full Additional Benefits

- 6 Improved indoor air quality.
- 7 Reduced temperature swings from set point overshoot.
- 8 Typically has ability for remote access and control.
- 9 Fault detection and alarming which limits unnecessary service calls.
- 10 More closely match ventilation rates with building occupancy through demand control ventilation.



## Watch our video

<https://www.tradeallnetworknw.com/resources/how-to-sell-advanced-rooftop-unit-controls/>



# Advanced Rooftop Unit Controls

## ARC Savings Tool

Is ARC a good fit for your customer? Get a savings estimate in five minutes with our ARC Savings Tool.

This tool helps field specialists and trade allies estimate potential energy savings and calculate a simple payback for ARC installations. Results calculated by this tool should be considered estimates only and are not guaranteed to reflect the true operating conditions of a site.



Download the tool here: <https://www.tradeallynetworknw.com/resources/advanced-rooftop-control-savings-tool/>







## How to Scope ARC Opportunities

### STEP 1 Ask questions

When was the RTU installed?  
What is the unit's service history?  
Has the unit experienced maintenance issues?

### STEP 2 Examine the RTU

Consider the following:

- Space type
- Occupancy schedule
- Thermostat set points
- RTU make and model
- Age
- Equipment tonnage (BTU/hr ÷ 12,000)
- General condition
- Maintenance history
- Single speed, single zone

### STEP 3 Check with the local utility for incentives

### STEP 4 Determine if ARC should be installed

<b>General Condition</b> =	Good or better	Good or fair	Poor
<b>Remaining Life</b> =	Over 5 years	Under 5 years	Under 5 years
<b>Equipment Tons</b> =	Over 5 tons	Over 5 tons	Under 5 tons
	<b>Great opportunity</b>	<b>Proceed with caution</b>	<b>Not a good candidate</b>



### STEP 5 Set the customer up for success

- Contact your local utility and field specialist for assistance
- Complete the ARC Savings Tool: <https://www.tradeallnetworknw.com/resources/advanced-rooftop-control-savings-tool/>
- Check the qualified products list and connect with vendors to find the right ARC product.





**INCREASE COMFORT**  
**REDUCE ENERGY COSTS**

## MAXIMUM COMFORT MINIMUM COST

Your **local electric utility** may offer up to \$1,000 per ton\* for a heat pump retrofit or \$150 per ton for a heat pump upgrade.

Upgrading your existing heat pump or installing a heat pump as part of a new construction project will help increase comfort for occupants and increase the value of your commercial space.

### BEST PRACTICE TIP:

Confirm that the unit's backup heat lockout is utilized and configured per manufacturer recommendations. Properly locking out backup heat is one of the most critical aspects of heat pump installations to maximize energy performance.

### BENEFITS MAY INCLUDE



Increased value  
of commercial space



Less maintenance than  
traditional heating systems



Long life span





# Air-Source Heat Pumps

## How Does It Save Energy?

Heat pumps don't heat like an electric baseboard heater, instead they extract heat from outside, which requires less energy.

During the summer, heat pumps extract heat from inside and move it outside, providing cooling in the process.

Also, some heat pumps are more efficient than others; the higher the COP and EER ratings, the less energy is used to heat and cool the building.



## Incentive requirements

### PRE-INSTALLATION CONDITIONS

#### Upgrade projects meet the following conditions:

- Space is conditioned by an operational or failed air source heat pump; or
- Space is part of a building addition, new construction, or a major renovation project.

#### Retrofit:

- Space is conditioned by zonal or forced-air, electric-resistance heat as the primary heating source. No other heating sources are eligible.

### POST-INSTALLATION CONDITIONS

#### The installed heat pump must meet the following requirements:

- Be an air-to-air heat pump system.
- Have an AHRI certificate of product rating; and
- Meet BPA's efficiency specifications for both heating and cooling.

*\*Ask your field specialist about promotional incentives offered.*

Visit <https://www.tradeallynetworknw.com> to view a Qualified Products List

## Estimated Incentives



Your local electric utility may offer **up to \$1,000 per ton for a heat pump retrofit or up to \$150 per ton for a heat pump upgrade.**



If your project meets the above requirements, **call your local utility or Trade Ally Network NW** today to confirm eligibility and incentives.



## COMMERCIAL HEAT PUMP PERFORMANCE RATING CHANGES

In **January 2023**, the U.S. Department of Energy is changing their minimum efficiency requirements for single-phase central air conditioners and heat pumps under 65,000 btu/h. These updated performance ratings are referred to as **SEER2** and **HSPF2** and will begin replacing the older SEER and HSPF rating metrics for equipment **manufactured after January 1, 2023**.

Under the new specifications, ratings will vary between split and packaged systems as well

as ducted and ductless systems. The tables below highlight the equivalent requirements between the current and new ratings for commercial equipment affected by this change.<sup>1</sup>

**During this transition, Trade Allies may find qualified products labeled with either rating. Equipment that meets either the current or new equivalent requirements listed below can qualify for utility incentives.**

### AIR-SOURCE HEAT PUMPS (CONVERSIONS AND UPGRADES)

EQUIPMENT SIZE (COOLING CAPACITY; BTU/H)	MODE	SUB-CATEGORY OR RATING CONDITION	CURRENT EFFICIENCY REQUIREMENT	NEW EQUIVALENT EFFICIENCY REQUIREMENT
< 65,000	COOLING	SPLIT SYSTEM & SINGLE PACKAGE	15.0 SEER	14.3 SEER2
	HEATING	SPLIT SYSTEM & SINGLE PACKAGE	8.5 HSPF	7.2 HSPF2

### DUCTLESS HEAT PUMPS (CONVERSIONS AND UPGRADES)

INDOOR UNIT TYPE	CURRENT EFFICIENCY REQUIREMENT	NEW EQUIVALENT EFFICIENCY REQUIREMENT
NON-DUCTED	11.0 HSPF	10.4 HSPF2
DUCTED OR MIXED	10.0 HSPF	9.4 HSPF2

*Note: These changes do not affect PTHPs or VRFs. Those values will remain the same in the Implementation Manual.*

This notice is to ensure Trade Ally Network NW trade allies understand the upcoming HSPF and SEER rating changes.

As more units are rated under these new test standards, public utilities supported by Trade Ally Network NW will compare results against existing program thresholds to determine potential heat pump specification changes for the **October 2023** Implementation Manual. For questions about these changes, contact your local field specialist or [tradeallynetworknw@evergreen-efficiency.com](mailto:tradeallynetworknw@evergreen-efficiency.com).

<sup>1</sup>For air-source heat pumps, the SEER2 rating is expected to be 4-5% lower than its SEER rating and the HSPF2 rating is expected to be 15-16% lower than its HSPF rating. For ductless heat pumps, the HSPF2 rating is expected to be 4-5% lower than its HSPF rating with no change to the SEER rating.

ZONE CONTROL

OCCUPANT COMFORT

## COMFORT AND CONTROL ANYWHERE YOU WANT IT

Your local utility may offer up to \$1,000 per ton\* for qualifying energy-efficient variable refrigerant flow (VRF) systems in commercial buildings.

Utilizing VRF technology allows for better zone control, an increase in occupant comfort, and increased efficiency of heating and cooling in a building.



### BEST PRACTICE TIP:

Heat recovery VRF systems are capable of moving heat between zones. It is beneficial for VRF system designs for buildings with significant load diversity to enable VRF's heat recovery method. This method of HVAC design is counterintuitive for many design professionals who are familiar with VAV systems because VAV systems are most efficient when they serve zones with similar heating/cooling needs.

### BENEFITS MAY INCLUDE



Quiet operation



Increased value of commercial space



Precise temperature control





## How Does It Save Energy?

A VRF system cools or heats a space more efficiently than standard systems by moving variable amounts of refrigerant through a piping system to each space independently in order to cool or heat it. The system swiftly adapts to changing loads and can be designed for the exact needs of a space resulting in greater control of the building’s interior temperature.

Compared with other heat pump systems, VRF saves energy with better part-load performance, zone control, and heat recovery options. By reducing the amount of ductwork, or eliminating ductwork completely in some cases, fan energy use is reduced by 10-20%.



## Incentive Requirements

### PRE-INSTALLATION CONDITIONS

- The space is conditioned by zonal or forced-air, electric-resistance heat as the primary heating source. No other heating sources are eligible.
- This measure applies to retrofits only.

### POST-INSTALLATION CONDITIONS

The installed VRF system must meet the following requirements:

- Have an AHRI certificate of product rating.
- Meet BPA’s efficiency requirements for heating and cooling.

*\*Ask your field specialist about promotional incentives offered.*

**Your local utility likely requires pre-approval for any VRF project. Contact Trade Ally Network NW or your utility once you start planning your project.**

## Estimated Incentives



Your local electric utility may offer **up to \$1,000 per ton** for qualifying variable refrigerant flow installations.



If your project meets the above requirements, **call your local utility or Trade Ally Network NW** today to confirm eligibility and incentives.



# Packaged Terminal Heat Pumps



Courtesy of LG

- MAXIMIZE COMFORT
- REDUCE ENERGY USE
- IMPROVE CONTROL

## A Package for All Seasons

Packaged terminal heat pumps (PTHPs) are an efficient replacement for packaged terminal air conditioners (PTACs), often found in commercial buildings with small living spaces. Both offer similar air-cooling performance; however, instead of electric resistance heating elements, PTHPs use energy-saving heat pump technology for consistent, even warmth inside when the weather cools. Compact and easy to install, these units are ideal for senior living facilities and commercial lodging establishments.

**Your local utility** may offer up to \$600 per unit for qualifying retrofits and \$100 per unit for new construction.

### BENEFITS MAY INCLUDE



Improved energy efficiency



Easy installation



Better heating control



Improved comfort



## How Does It Save Energy?

While PTHPs and PTACs offer similar cooling performance, their heating methods are very different. Instead of an electric resistance heating element delivering forced air heat, the PTHP functions like a traditional heat pump, drawing warmth from the outside air, even in cooler temperatures. This method can be up to four times more energy efficient than electric resistance heating while producing an even, comfortable heat.

## Incentive Requirements

### ELIGIBLE BUILDING TYPES FOR THIS MEASURE

- A lodging building type, such as hotel, motel, bed and breakfast, boarding/rooming house, apartment hotel, dormitory, and shelter.
- A residential care building type, such as nursing home, retirement home, and assisted living.

### PRE-INSTALLATION CONDITIONS\*

- The space is conditioned by a PTAC or zonal electric resistance heat as the primary heating source.
- No other heating sources are eligible.

### POST-INSTALLATION CONDITIONS

- The installed PTHP must have an AHRI certificate of product rating.

Visit <https://www.tradeallynetworknw.com> for more information.

## Estimated Incentives



Your utility may offer up to **\$600 per unit for qualifying retrofits**, and **\$100 for new construction**.



A typical project payback, including incentives, is about **1-3 years**.



If your project meets the above requirements, call your **local utility** or **Trade Ally Network NW** today to confirm eligibility and incentives.





## ON AIR HANDLING UNIT FANS

INCREASE ENERGY SAVINGS

REDUCE MAINTENANCE

LOWER OPERATING COSTS

### DRIVING DOWN CONSUMPTION

Your **local utility** may offer up to \$300 per horsepower\* for qualifying variable frequency drives (VFD) on air handling unit (AHU) fan installations.

Adding a VFD on a constant speed AHU fan allows the drive to match the amount of energy the motor needs for the amount of work that is being done. This allows for greater energy savings and an extended life of the motor.



### BEST PRACTICE TIPS:

**1** Check that the existing supply fan motor is inverter-duty rated. Inverter-duty rated motors have longer life expectancies than non-inverter-duty rated motors because they can better withstand the elevated voltage spikes and increased internal temperatures associated with VFD control.

**2** Ensure that duct static pressure resets are properly functioning. Artificially high duct static pressure set points can limit fan energy savings when adding a VFD to the supply fan. If a supply air temperature reset strategy is present, ensure static pressure reset strategies do not conflict with them as that can degrade overall savings significantly.

### BENEFITS MAY INCLUDE



Reduced energy costs



Reduced fan usage



Long life span



Precise temperature control



## How Does It Save Energy?

A VFD is a device that matches the energy the motor needs with the work that is being done. Installing a VFD on an AHU fan allows the VFD to vary the speed of the fan. As the fan slows down, it draws less power than at constant speed, resulting in energy savings.

Many AHU systems are engineered for 100% design flow, but many could operate with less flow. For example, fans that are turned down just 10% can save up to 25% in energy costs. In most systems, reducing the speed by 50% can cause a 75% drop in energy consumption.



## Incentive Requirements

### PRE-INSTALLATION CONDITIONS

- Building heating fuel type may be either electric or gas.
- VFD must be installed on existing AHU single-speed fan.
- This measure applies to retrofits only.

### POST-INSTALLATION CONDITIONS

- The retrofit adds a VFD to control the fan with variable-speed fan operation.
- Any existing AHU throttling or bypass devices are removed or permanently disabled.

*\*Ask your field specialist about promotional incentives offered.*

**Need help planning your project or want to learn more about VFD requirements?  
Visit <https://www.tradeallynetworknw.com>.**

## Estimated Incentives



Your local utility may offer **up to \$300 per horsepower**.



A typical payback, including incentives, is about **2 years**.



If your project meets the above requirements, **call your local utility or Trade Ally Network NW** today to confirm eligibility and incentives.



## Two Systems are Sometimes Better than One

**T**raditional packaged commercial heating and cooling systems must contend with ventilation air year-round. While the Northwest enjoys mild spring and fall temperatures that can take advantage of free-cooling (i.e. using outdoor air that is close to the room setpoint temperature), ventilation air can still induce a large load on the HVAC system during the remainder of the year.

One energy-saving solution is a Dedicated Outdoor Air System (DOAS), which decouples the ventilation load from the heating and cooling load. By handling the ventilation load throughout the seasons, the DOAS enables the heating and cooling system to focus its response more efficiently to changes in space temperatures. Additionally, many DOAS units employ energy or heat recovery ventilators (ERVs/HRVs) which can utilize conditioned building air to preheat or cool the incoming ventilation air, further reducing the energy use. DOAS has produced significant energy savings in certain building types, especially where occupancy fluctuates during the day and where ventilation rates are high. As such, many regional codes mandate that certain building types incorporate DOAS in addition to heat recovery into their design.

To maximize DOAS performance, select a high-efficiency electric heat pump system that is correctly sized for the building's heating and cooling load. There are several types of systems particularly suited to this approach, including variable-refrigerant flow (VRF) and hydronic systems served by high-efficiency air-to-water heat pump central plants. These systems work well in both new construction and retrofits because they do not rely solely on having large ductwork in place. In fact, many retrofit applications can reuse existing ductwork to deliver ventilation air while

reaping the benefits of a ductless solution for heating and cooling.

While there are many ways to utilize a DOAS in commercial buildings, a new approach gaining traction in the Northwest is the very-high-efficiency DOAS. In this system configuration, the HRV/ERV provides ventilation air to occupied spaces independently from the primary heating/cooling system. A high-efficiency heat exchanger core (or enthalpy wheel) within the HRV/ERV passively pre-conditions incoming outside air by transferring heat to or from the outgoing airstream without mechanical heating or cooling coils.

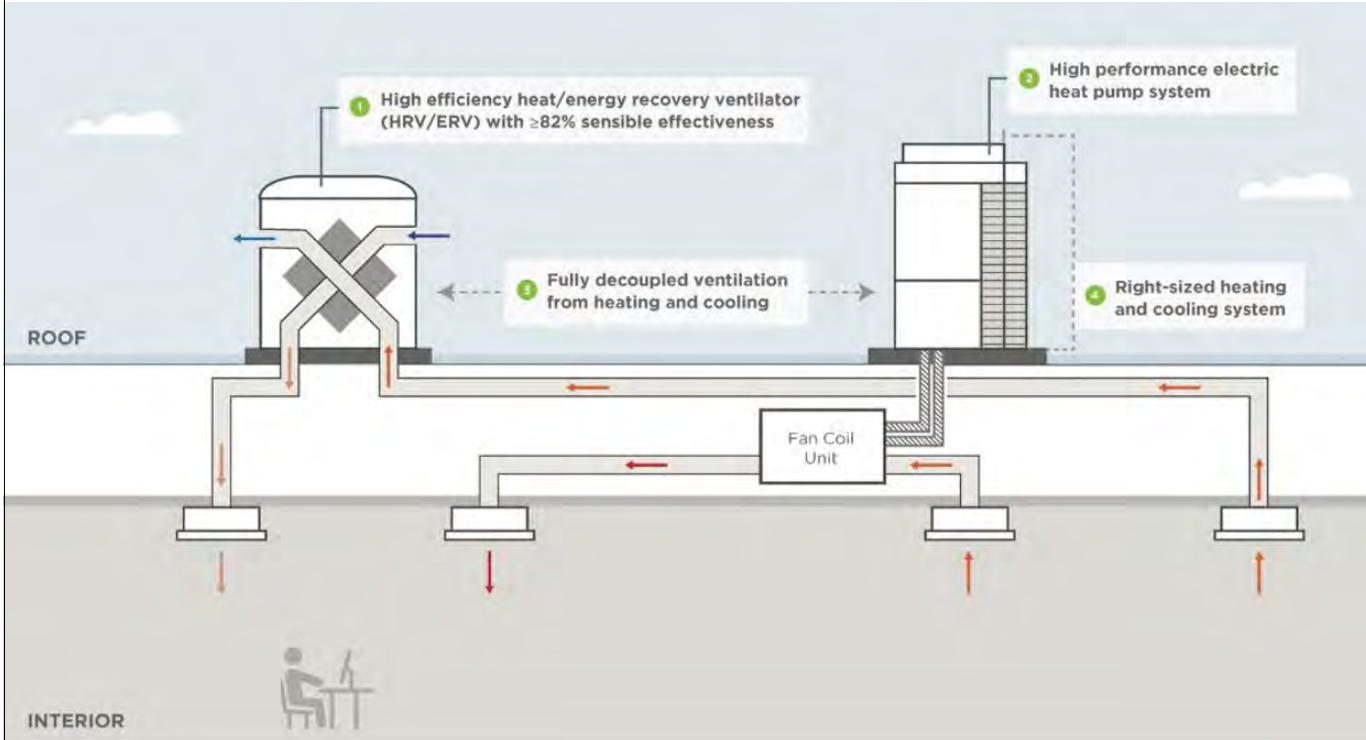
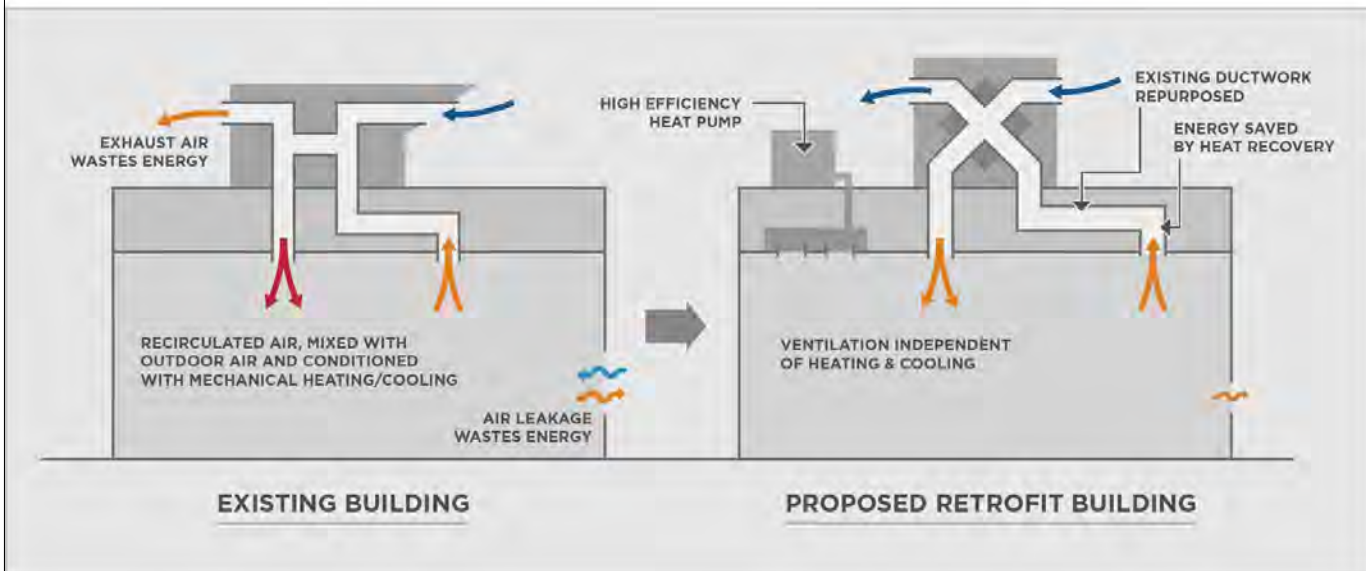
In many Northwest climates, high-efficiency heat recovery means that ventilation air can often be delivered directly to indoor spaces without supplemental heating or cooling, which further increases energy savings. Check out case studies using this approach and in-depth material on [very-high-efficiency DOAS at Betterbricks.](#)

Many regional utility programs are offering incentives to switch to DOAS from traditional building designs. If you have a good application in mind, get in touch with your local field specialist to find out how your project may qualify.





# Two Systems are Sometimes Better than One





MAXIMIZE BUILDING PERFORMANCE  
INCREASE OCCUPANT COMFORT  
SAVE MONEY



## ENGINEERING EXPERTISE STRAIGHT TO YOUR DOOR

Thinking about a building or equipment upgrade? Take advantage of no-cost help to understand your options.

Efficiency has benefits beyond energy savings—it can improve occupant comfort, help workers get their jobs done and increase your bottom line. Your local electric utility has engineers, tools, and incentives to help you get energy-efficiency projects off the ground.

These experts will analyze your building and help you understand your building’s unique energy savings opportunities.

### BENEFITS MAY INCLUDE



Technical expertise and support



Free, customized on-site assesment



Reduced energy costs

### INCENTIVES

*Not only can you get free assistance, you may be eligible to receive incentives that cover up to 70% of incremental project costs.*

*Involve your local utility early on in the process so we can ensure you get the support and incentives for your project.*

*Call us early in the design phase!*



## How does the custom project process work?



### 1. PROPOSAL DEVELOPMENT

Your utility may require a custom project proposal as a first step.

Custom project proposals include estimated energy savings, a cost estimate, and an energy savings measurement and verification (M&V) plan.

**You tell us about the project and the Network team can help with the energy savings plan.** Contact your local utility or preferred contractor to get started.

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### 2. PROPOSAL APPROVAL

Projects sometimes require pre-approval before the utility will consider an incentive. Check with your local utility about their requirements. If pre-approval is required, wait until your project proposal is approved before proceeding.

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### 3. PROJECT IMPLEMENTATION

Proceed with project installation and continue to work with your utility and Trade Ally Network NW team if applicable.

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### 4. PROJECT CLOSE-OUT

After your project is complete, the energy savings and final incentive level need to be confirmed.

Your utility will help with this step and develop a project completion report.

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### 5. INCENTIVE PAYMENT

Incentives are based on verified savings. Payment is made after the completion report is reviewed and accepted.

Actual custom project incentives are based on the accepted completion report.

**Contact your field specialist to get started.  
Utility participation and incentives vary.**





## CASE STUDY

### **VRF Lightens Energy Load For Oregon Coast Community Center**

In 2012, the city of Yachats replaced an old diesel boiler with 12 residential mini-splits to serve its 12,400-square-foot Commons Building space. Over time, deferred maintenance on the units caused mechanical breakdowns. Users of the community spaces had free access to temperature-changing controls, adjusting settings regularly based on their comfort level and causing stress on the system. Further compounding the problem, some areas of the building were not served by the mini-splits and had no heat at all. Finally, eight of the 12 original mini-splits failed.

A commercial VRF system was installed, which allows for better zone control, improves occupant comfort and improves the efficiency of heating and cooling in the building. The new system has capacity to add more zones in the future as the existing mini-splits are phased out. Plus, it has a longer lifespan, and is expected to last 15-20 years. The city earned \$5,910 in cash incentives for the custom HVAC improvements and is expected to save an estimated \$1,858 in yearly energy costs. They'll reap even more savings from the reduction in maintenance and repair costs, and staff time spent managing the system.



# HVAC Auditing Tips: Know Before You Go

## STEP 1

Ask your site contact questions about the facility and the HVAC system.

### HVAC SYSTEM

- What type of heating?
- What type of cooling?
- How old is the system?
- What is the equipment's cooling and heating capacity?
- What is the general condition?
- How is the system controlled?

### GENERAL FACILITY

- What is the space used for?
- What is the occupancy schedule?
- Do you have a maintenance provider?
- Have you been having maintenance issues? If so, what are they?

## STEP 2

Search the facility address on Google Earth.

Google's measure distance tool (<https://www.google.com/earth/>) is useful to get a sense of building size and square footage.

Check for rooftop units, large condensing fans, gas lines, and the number of units versus building size. A visual inspection in advance offers clues as to the current building system:

- Fewer larger units (or more fans per unit) are typically multi-zone systems.
- Evenly spaced pipe supports indicate a gas line is serving these units.
- More smaller units (or ones with a few fans) are typically packaged single zone systems.
- Banks of large condensing fans indicate a central plant or refrigeration system.
- Multiple condensing fans attached to a larger unit indicate air-handler/built-up multi-zone system.

## STEP 3

Once on site, identify the current system.

SYSTEM TYPE	TYPICALLY FOUND IN	IDENTIFYING CHARACTERISTICS
<b>Heating Only</b>	Residential, commercial, and industrial buildings	Baseboard, in-the-wall units, gas unit heaters. If no gas line is found, then it is likely an electric resistance heating system. Unit heaters are commonly hung in high-bay areas.
<b>PTAC and PTHP</b>	Lodging, residential care, multifamily	Installed through the wall underneath windows. PTACs look identical to PTHPs except they use resistance heating instead of a heat pump for heating.
<b>Packaged Single Zone (PSZ), Split Systems and RTUs</b>	Most common system type in commercial and industrial buildings of all kinds	<p><b>Exterior:</b> Larger number of smaller units mounted on the roof, ground, or side of the building. Often have a gas line for heating and always have at least one condenser fan.</p> <p><b>Interior:</b> Single thermostat in the space controls the whole system.</p> <p><b>Includes:</b> RTUs, packaged split systems, and DHPs.</p>
<b>Multi-Zone (MZ)</b> <b>Sub Types:</b> - Constant Air Volume (CAV) - Variable Air Volume (VAV)	Medium to large commercial buildings	<p><b>Exterior:</b> Fewer, larger units on the roof or side of the building. Often look like PSZ but larger and with multiple condensing fans.</p> <p><b>Interior:</b> Multiple temperature sensors tied to one RTU. Terminal units located towards the end of smaller ductwork runs.</p> <p><b>VAV Systems:</b> Include a flow control device such as a VFD, discharge dampers, or inlet guide vanes on the RTU supply fan.</p>
<b>Central Plant Systems</b>	Government, hospitals, schools and universities, and large commercial facilities	<p><b>Boilers:</b> Found in designated mechanical rooms, mostly gas fired but can also be all electric.</p> <p><b>Chillers and Cooling Towers:</b> Chillers in same designated room with associated pumps. Cooling towers on roof or side of building.</p>





## STEP 4

### Understand which energy-efficiency program offerings may apply.

SYSTEM TYPE	AVAILABLE PROGRAM OFFERINGS	IDENTIFYING CHARACTERISTICS
Heating Only	<p><b>Prescriptive offerings:</b> DHP retrofit, heat pump retrofit, and VRF system.</p>	<ul style="list-style-type: none"> <li>■ Custom offerings: Controls upgrades on larger systems. Heat pump or VRF applications that don't qualify for prescriptive incentives.</li> <li>■ Would you like to have A/C as well?</li> <li>■ Do occupants complain about the temperature?</li> <li>■ Would you like to reduce temperature swings in the space?</li> </ul>
PTAC and PTHP	<p><b>Prescriptive offerings:</b> PTAC to PTHP retrofit.</p> <p><b>Custom offerings:</b> Controls upgrades that ensure usage aligns with occupancy.</p>	<ul style="list-style-type: none"> <li>■ Are the units tied to a central controls system or tied with the room occupancy?</li> <li>■ Is ventilation air delivered via the central system?</li> </ul>
Packaged Single Zone (PSZ), Split Systems, and RTUs	<p><b>Prescriptive offerings:</b> Connected thermostat, ARC full, ARC lite, heat pump retrofit or upgrade, DHP retrofit or upgrade.</p> <p><b>Custom offerings:</b> VRF/DOAS replacement. Heat pump or VRF applications that don't qualify for prescriptive incentives.</p>	<ul style="list-style-type: none"> <li>■ Is the system scheduled?</li> <li>■ What heating type?</li> <li>■ Is there a VFD or multi-speed motor for the supply fan?</li> <li>■ What are the building's occupied hours?</li> <li>■ How old is the unit?</li> <li>■ Are you having maintenance issues?</li> </ul>

## Multi-Zone (MZ)

### Sub Types:

- Constant Air Volume (CAV)
- Variable Air Volume (VAV)

### Prescriptive offerings:

VFD on an AHU.

### Custom offerings:

Retro-commissioning: controls are complex and often misconfigured, mistuned, or broken. Heat pump or VRF applications that don't qualify for prescriptive incentives. Controls upgrades, equipment upgrades: VRF/DOAS replacement, replace boxes/actuators, improved reheat control, RTU replacement.

- Is the system scheduled?
- How is the system controlled?
- What heating type?
- Is there a VFD or multi-speed motor for the supply fan?
- What are the building occupied hours?
- Is there an economizer?
- How old is the unit?
- Are you having maintenance Issues?

## Central Plant Systems

### Prescriptive offerings:

VFD on an AHU.

### Custom offerings:

Many options are available. Call a field specialist to discuss the system and/or join the site visit.

*See questions in step 1*

### REMEMBER:

- Take clear pictures of equipment that show the model and serial number on the nameplate.
- Contact a field specialist if you have any questions.









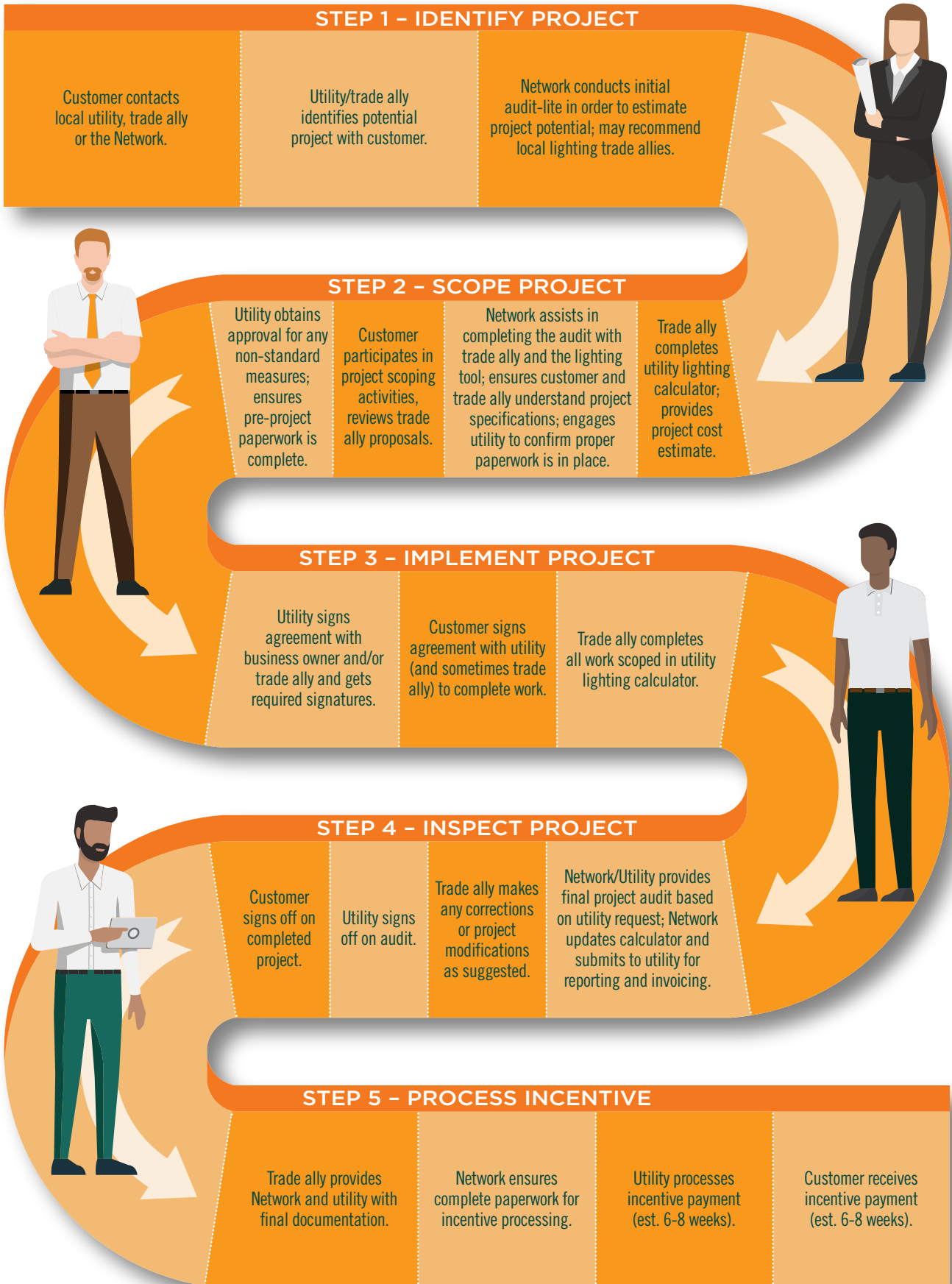


# LIGHTING

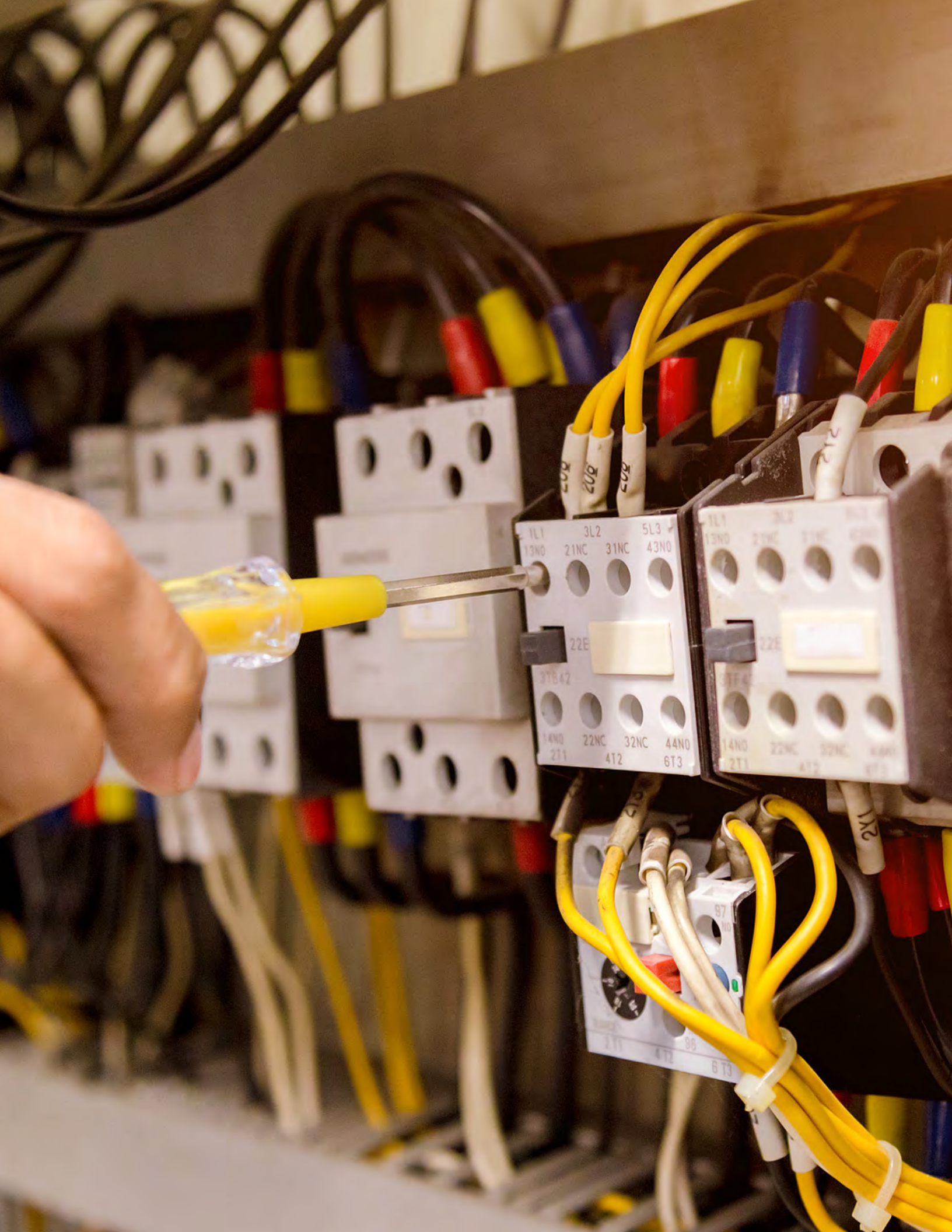




# Lighting Project Lifecycle

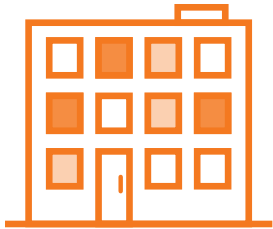








## Intelligent Lighting Controls



**B**uildings and building intelligence are stuck in the past. According to the Department of Energy (2016), almost 70% of all existing commercial buildings have no automated controls installed. That includes building automation systems as well.

Where buildings do have controls, only 1% have daylighting or connected lighting fixtures. So, there is massive potential both for installing networked lighting controls and adding automated building controls for HVAC systems.

Intelligent lighting is more than a lighting control system, it is also the nervous system of the intelligent building. That is due in part to the unique location of lighting. It is elevated above occupants and spread throughout the building. What other building system, other than light fixtures, is evenly distributed every 80-100 square feet? It also has one other important element—power access at each fixture.

### LLLC BRINGS GRANULAR VALUE

With luminaire level lighting controls (LLLC), each fixture has integrated occupancy and daylight harvesting sensors and acts as its own sensor platform, which means the wireless network can be programmed and will respond to their own area inputs for maximum lighting control. LLLC's innate architecture eliminates the need to design, wire and commission a separate control system with multiple components.

Additionally, LLLC systems require considerably fewer components and can easily be programmed with a personal device such as a tablet.

Each LLLC enabled LED fixture will have these functionalities (to name a few):

- Occupancy sensing
- Daylight harvesting
- Continuous dimming
- High-end trim/task tuning
- Controls persistence
- Individual addressability
- Networkability
- HVAC BACnet integration (if required)

These capabilities create flexible, innovative spaces for owners where the value far exceeds the cost and desired energy savings. For example, occupant comfort is maximized with the combination of occupancy sensors and daylight harvesting that provides the appropriate light levels in the space. In addition, high-end trim or task tuning reduces the maximum output of luminaires and thereby lowers energy consumption, which in turn, reduces electrical stress (heat) and can help extend LED source life. All of this means maintenance demands are diminished, saving money and labor.

Find more information here:

<https://BetterBricks.com/solutions/lighting/luminaire-level-lighting-controls>





## Benefits of Advanced Lighting

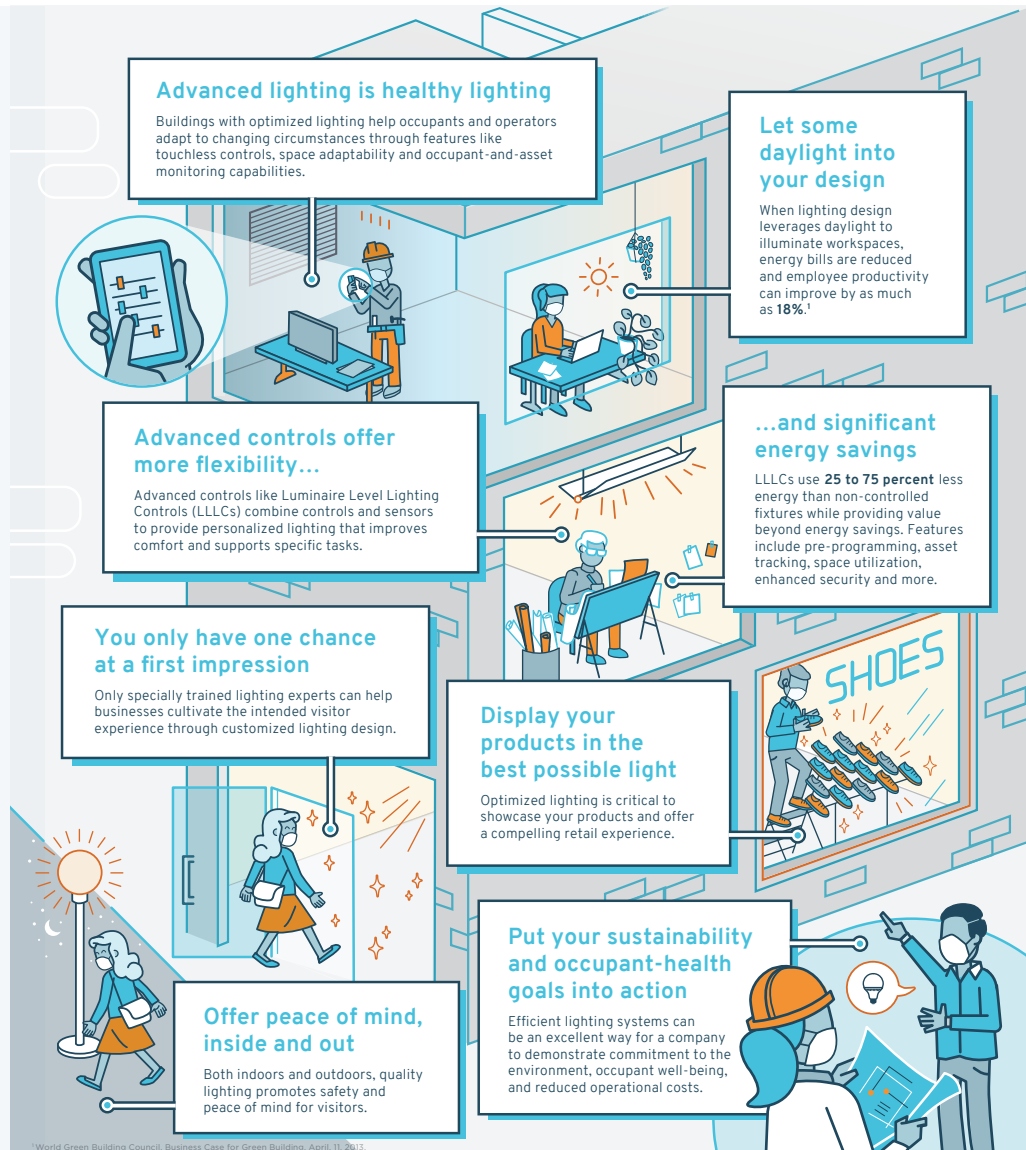
Every day, commercial lighting gets more complex—and much more beneficial.

The advent of LED technology brought an unprecedented year-over-year proliferation of commercial lighting options and applications. And while this fast-paced evolution has made commercial lighting more complex than ever, it also offers building operators and managers a wide variety of nuanced solutions to provide long-lasting energy and cost savings for building owners and everyday benefits to occupants.

**NXT**  
- LEVEL -

### THE MULTILEVELED BENEFITS OF ADVANCED LIGHTING

The latest advanced lighting techniques and technologies deliver energy savings, comfort and control like never before.



NXT Level professionals are among the best lighting experts in the Northwest. They'll work with you to find the right solution based on your specific building, occupant needs, and owner goals. Visit the NXT Level Designation List to find the best lighting experts in your area:

▶ [nxtleveltraining.com/experts](http://nxtleveltraining.com/experts)

**NXT**  
- LEVEL -

NXT Level training is a nonprofit-backed training curriculum supported by Northwest utilities. This specialized coursework equips lighting professionals with the latest advanced techniques and technologies to provide energy savings and advanced lighting solutions for Northwest commercial buildings.





## Lighting to Protect Outdoor Environments

Nighttime lighting, when done well, adds to the quality of the nighttime experience. Equally, when outdoor lighting is done poorly, every aspect of the nighttime environment suffers. Good exterior lighting:

- Provides important task visibility
- Delivers required pedestrian safety
- Enhances outdoor social experiences
- Creates more engaging communities

### BE A STEWARD OF GOOD OUTDOOR LIGHTING

Our nighttime environments are important to all and are worth protecting. There are two important concepts unique to nighttime environments, both pivotal to successful outdoor lighting applications: light trespass and light pollution.





## What is light trespass?

Light trespass is the poor control of outdoor lighting which leads to the encroachment of light across property boundaries and through neighbors' windows. These attributes detract from property values and negatively influence quality of life through glare or brightness—which cause annoyance, poor sleep environments, loss of privacy, or general nuisance.

## What is light pollution?

Light pollution is the scattering of light into the atmosphere, both near and far, through direct uplight from exterior sources (above 90 degrees), inter-reflection within cloud cover, as well as the reflection of light off outdoor surfaces.

Always reference the Illuminating Engineering Society (IES) recommended practices for exterior environments.

- Similar to a physician's oath of "do no harm," every exterior lighting project should be approached with the same concern and attention to detail. Light travels until it hits an object, so remember "a little goes a long way" at night and make sure it is directed properly.
- IES provides recommendations and standards, such as illumination levels broken down by task requirements. For example, guidelines will show that intersections or entryways should have slightly higher light levels than the general outdoors, sometimes five to ten times the light.

For more information, view the IES Guidelines in the resources section or visit [ies.org](http://ies.org) to purchase Recommended Practice for Exterior Environments (RP-33-14).

### Emerging best practices highlight outdoor lighting impacts

The DesignLight Consortium's (DLC) new LUNA requirements establish criteria for using the highest quality outdoor lighting at night—lighting that minimizes light pollution, provides appropriate visibility for people, and limits negative impacts to the environment. In addition to the benefits that appropriate lighting can provide to our outdoor environment, there are also energy savings to be captured by only using the right type of light, and only where it is needed. Note: These are DLC requirements only.

DLC will begin accepting applications to qualify products under the LUNA V1.0 Technical Requirements in early April 2022. Once qualified, these products will be searchable on the SSL Qualified Products List.

**Learn more at DLC:**

<https://www.designlights.org/our-work/luna/technical-requirements/luna-v1-0/>



## Five Principles for Responsible Outdoor Lighting

Recently, the International Dark-Sky Association (IDA) and IES formed a strategic collaboration to address the global issue of light pollution that negatively affects the environment and the human condition. The boards of both organizations adopted a set of five principles to help guide the outdoor lighting industry to be more socially and environmentally responsible.

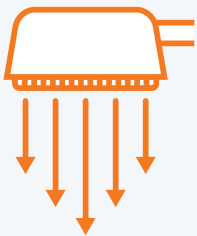
According to both organizations, light pollution has increased globally by 2% per year. Electric lighting at night leads to at least \$3 billion in wasted energy in the U.S. alone, which can harm wildlife, jeopardize important astronomical research, and obscure our view of the star-filled sky.

Consider these **five** principles for responsible outdoor lighting:



### USEFUL:

Is the lighting needed?  
How will it impact the surrounding area?  
When you install or replace lighting, make sure it has a clear purpose.



### TARGETED:

Will the lighting spill beyond where it is needed? Make sure light is directed only where intended.



### LOW LIGHT LEVELS:

Is the lighting at its lowest level? Make sure the lighting is no brighter than necessary.



### CONTROLLED:

Are timers, dimmers and motion sensors installed? Light should only be used when it is useful.



### COLOR:

Have you checked the color temperature? Use warmer lights where possible.

Learn more at <https://www.darksky.org/our-work/lighting/lighting-principles/>.  
Content repurposed from IDA and IES.





## Need-to-Know for Success: Controls Terminology

The growth of lighting controls has brought many ways to discuss systems. In the absence of industry standards, a variety of concepts and terminology have emerged.

In recent years many terms have been used to describe lighting control systems and their evolution. Because it can be confusing when researching a system, be sure to identify the needs of your customer first to find useful system options.

The DLC and other industry groups have worked together to provide agreed-upon definitions for common terms used in advanced lighting control system discussions. The intention here is to provide useful definitions that allow us to learn and operate with the same understanding. Following are the terms considered primary to getting started.

### NETWORKED LIGHTING CONTROLS TERMINOLOGY, EXCERPTED FROM DESIGNLIGHTS CONSORTIUM (DLC) TABLE 3

<b>Luminaire Level Lighting Control (LLLC, integrated)</b>	<p>The capability to have a networked occupancy sensor and ambient light sensor installed for each luminaire, and directly integrated or embedded into the luminaire form factor during the luminaire manufacturing process.</p> <p>To demonstrate commercial availability of the integrated component options, at least one family, luminaire or kit with integrated control must be verified by DLC. Manufacturers may choose whether or not to list this information publicly on the QPL.</p>
<b>Control Persistence</b>	<p>The capability of a networked lighting control system's lowest level ("edge device") luminaire controllers to execute three energy saving strategies (occupancy sensing, daylight harvesting, and high-end trim) at a room-level, or finer, resolution in the absence of communications with the next higher networked element in the system's topology.</p>
<b>Continuous Dimming</b>	<p>The capability of a control system to provide control with sufficient resolution in output (100+ steps) to support light level changes perceived as smooth as opposed to step dimming with a small number of discrete light levels.</p>
<b>Occupancy Sensing</b>	<p>The capability to affect the operation of lighting equipment based upon detecting the presence or absence of people in a space or exterior environment.</p>



# Basic Lighting

<b>Occupancy Sensing (cont.)</b>	Exterior systems must include either occupancy sensing or traffic sensing. They may include both, but that is not required.
<b>Daylight Harvesting/ Photocell Control</b>	The capability to automatically affect the operation of lighting or other equipment based on the amount of daylight and/or ambient light that is present in a space, area, or exterior environment. This capability is typically called daylight harvesting for interior systems, and photocell control for exterior systems.
<b>High-End Trim*</b>	<p>The capability to set the maximum light output to a less-than-maximum state of an individual or group of luminaires at the time of installation or commissioning. High-end trim must be field reconfigurable. This capability is distinct from automatic compensation for lumen depreciation, which automatically increases output as a system operates over time.</p> <p>*While the DLC specifically requires “high-end trim,” some manufacturers refer to this capability as “Task Tuning” or “Tuning” within their system interfaces. Refer to NEMA LSD 64-2014 for definitions of lighting controls terminology.</p>
<b>Luminaire and Device Addressability</b>	The ability to uniquely identify and/or address each individual luminaire, sensor, controller, and user interface device in the lighting system, allowing for configuration and re-configuration of devices and control zones independent of electrical circuiting.
<b>Scheduling</b>	The capability to automatically affect the operation of lighting equipment based on time of day. Scheduling capability is reported for interior systems and required for exterior systems. Exterior systems are required to have event scheduling and “astronomical” scheduling functionality for sunrise and sunset programming, based on geographical location and time of year.
<b>Zoning</b>	<p>The capability to group luminaires and form unique lighting control zones for a control strategy via software-defined means, and not via physical configuration of mechanical or electrical installation details (e.g. wiring).</p> <p><b>Interior:</b> Zoning is required for occupancy sensing, high end trim, and daylight harvesting control strategies except for systems that feature LLLC capabilities as defined in these requirements under “reported capabilities,” in which case zoning is only required for</p>



<p><b>Zoning (cont.)</b></p>	<p>occupancy sensing and high-end trim control strategies.</p> <p><b>Exterior:</b> Zoning is required for high-end trim.</p>
<p><b>Networking of Luminaires</b></p>	<p>The capability of individual luminaires and control devices to exchange digital data with other luminaires and control devices on the system. This capability is required at the room, space, or area level, but not at the whole building level or beyond (e.g. non-lighting systems or the internet).</p>
<p><b>Interoperable</b></p>	<p>The capability of systems or system components to transmit, receive, interpret, and/or react to data, and function in a defined and appropriate manner.</p> <p>This applies to either of the following types of digital communication:</p> <ul style="list-style-type: none"> <li>■ Within a system (among sensors, drivers, wall switches)</li> <li>■ Between systems (lighting, cloud, HVAC, BMS, API)</li> </ul>
<p><b>External Systems Integration</b></p>	<p>The capability to exchange data with other networked systems such as building or energy management systems (BMS/EMS), HVAC, other lighting and building systems via BACnet, application program interface (API) or other methods. The method, including formats and languages, by which the system implements this capability must be clearly described in the publicly available reference(s).</p>
<p><b>Energy Monitoring</b></p>	<p>The capability of a system to report the energy consumption of a luminaire and/or a group of luminaires.</p> <ul style="list-style-type: none"> <li>■ Individual luminaire monitoring as well as energy monitoring on dedicated lighting circuits is acceptable.</li> <li>■ The method by which the system implements this capability must be clearly described, including whether the system provides automated energy measurement or relies on numerical manual input during system setup for accurate measurement (such as inputting the wattage of each luminaire in a project).</li> <li>■ Reference consists of one or both of:             <ul style="list-style-type: none"> <li>■ Sample .CVS file with documentation</li> <li>■ API documentation</li> </ul> </li> <li>■ Energy monitoring is not required for room-based systems.</li> </ul> <p>In order for a system to qualify for this exemption, the DLC review process will confirm that the product claims only “Room or Zone” for interior scope as listed on the DLC QPL.</p>





## Non-Energy Benefits

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The availability of sophisticated controls has continued to increase, and it's important to consider the many factors that make them cost-effective for customers. These include the potential energy savings and non-energy benefits—such as maintenance savings and visual comfort.

Networked lighting controls (NLC) also offer less-recognized non-energy benefits that don't necessarily save energy, but when implemented alone or integrated with other building systems, can offer significant advantages in efficient facility planning, operation, and maintenance. The benefits to the customer's operation are often more valuable than the potential lighting energy savings alone.

Here are some examples of non-energy benefits:

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### Asset Tracking

Since lighting fixtures are laid out in uniform patterns throughout a facility, luminaire-mounted sensors can provide the coverage to accurately track equipment-mounted asset tags, allowing you to monitor the location of mobile items. This can be useful, for example, in warehouses to locate pallet jacks and hand trucks, or in hospitals to quickly locate shared medical equipment such as wheelchairs, supply carts, and even vital life-saving equipment.

Manufacturing processes, repair facilities, and any other business with mobile assets can benefit from this kind of tracking to reduce wasted time and increase productivity.

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### Indoor Positioning Wayfinding

Utilizing two-way communication between sensors and personal devices that download a store's app, retailers can use indoor positioning to offer product location assistance, or even provide coupon notices for merchandise being observed. Large campuses, such as medical centers or universities, can offer way-finding assistance to select destinations when the occupant downloads a simple app to their personal device.

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### Space Utilization

Lighting activity reports can inform facility managers of traffic congestion in a space, assisting in more efficient space planning. Excessive sensor activity at one end of a facility could indicate wasted time in floor travel to access a particular resource. This might warrant the relocation of the resource to a more central location or duplication of the resource, to reduce loss of productive time at main tasks.



## Room Scheduling

Scheduling room usage can avoid time wasted searching for available conference spaces, and LLLC-enabled occupancy sensing that indicates lack of activity can confirm available rooms via a graphic dashboard available with some LLLC systems.

## Remote Diagnostics

Sensing individual device energy usage and performance metrics can allow predictive maintenance through diagnosis and automatic problem email notification to facility managers. This can identify problems before they occur, taking a proactive, rather than reactive approach to maintenance. Graphic dashboards can give facility managers a real-time, visual operational view of the lighting system, offering historical use data and even room level plan views of activity.

## External Systems Integration

Integrating the NLC system with other building systems, such as HVAC or building management systems, can allow more consistent facility monitoring and can even improve non-lighting system efficiency by utilizing luminaire-integrated sensors. For example, HVAC systems can understand more about the occupancy of a room when luminaire-mounted sensors are feeding real-time data to the building management system.

## Security

Security personnel can also realize benefits, such as notification of space intrusion via occupancy sensing. Firefighters could monitor spaces for occupancy sensing activity, to ensure occupants have vacated in the event of an emergency.

## Future-proofing

Non-energy benefits could significantly benefit a customer while also fulfilling the goal of energy savings. Understanding your customer's operation will assist you in identifying applicable NEBs and the LLLC systems that can provide those capabilities. Also, customers who invest in LLLC today will ensure the future ability to enable control features and adapt to changing space needs.

## Scene Control

Preset room lighting control schemes related to a particular activity in a multi-use space can be selected from a labeled switchpad, providing instant adjustment on demand.

## Color Tuning

Some NLC systems allow adjusting the color temperature of the light source, to change the appearance of the space. Warmer colors work for more intimate or relaxed settings, while cooler colors are best for tasks requiring attentiveness. The ability to adjust allows multiple uses of the same space.



# Basic Lighting

## Increased Employee Satisfaction and Retention

Addressing task illumination properly and providing a more pleasant work environment has been proven to promote employee job satisfaction and productivity, with less turnover.



## CASE STUDY

### LLCs are the Smart Choice for Washington's Enumclaw High School

In 2019, Enumclaw School District, located 40 miles southeast of Seattle, celebrated the completion of a three-year, \$68 million renovation of the district's only high school. The project brings modern design and greater energy efficiency to the campus that serves more than 1,700 students and staff. To meet its variety of lighting needs from offices to classrooms and science labs, the district sought a system that was customizable and fit right in with the modernized campus. Their solution? LEDs equipped with luminaire level lighting controls (LLCs).

The district's facility managers were drawn to LLCs after learning about their savings potential and local utility incentives. With embedded sensors in each LED fixture, LLCs offer innovative controls strategies that provide maximum energy savings, easy installation, and maintenance and flexibility in space utilization.

Enumclaw Schools predicts an annual savings of more than \$13,000 in energy costs following the installation and programming of its LLC system, and the school district has now installed LLCs in three other buildings. In addition to energy savings and reduced maintenance, the district describes the level of customization that comes with LLCs as an added benefit, along with improved light quality. Teachers and staff get the exact lighting they want at the touch of a button, and without any of the "flickering" associated with the old fluorescent lamps.

*Courtesy of BetterBricks*









# RESOURCES





Thanks to local, state and federal funding, the market is seeing increased interest in capital improvement projects from Northwest school districts. This signals an opportunity for trade allies to explore new lighting and HVAC business opportunities with local school districts.

## LUMINAIRE LEVEL LIGHTING CONTROLS



### THE NEXT GENERATION OF EFFICIENT LIGHTING FOR SCHOOLS

Luminaire Level Lighting Controls (LLCs) combine LEDs, controls, connectivity and data for a flexible lighting product that can improve occupant comfort and space utilization in your school.



### LLCs AND SCHOOLS

- **Enhance learning conditions** with lighting that improves visibility and adapts to student needs
- Easily **create the ideal lighting environment** at any time of day, with energizing cool light in the morning and calming warm light later
- **Increase safety, security and efficiency** by enabling real-time tracking of building assets with many LLC systems

### WHY CHOOSE LLCs?

- 1) **Easy Installation and Use** Products include integrated sensors and controls for out-of-the-box set-up, while retrofit kits simplify installation for buildings with linear fluorescent fixtures. Many products allow remote programming and control through an app or tablet.
- 2) **Long-Term Flexibility** Fixtures with LLCs are adaptable for changes in space usage, reduce the cost of change-over to new tenants. Simply re-group to the new lighting layout and adjust settings for new tenants.
- 3) **Energy Cost Savings** LLCs use 25 to 75 percent less energy than non-controlled fixtures, reducing operating costs.
- 4) **Better Occupant Experience** The right amount of light provides staff with a better work environment, increasing efficiency and happiness.
- 5) **Additional Benefits** Many systems are more comprehensive and enable valuable benefits such as asset tracking, space utilization, enhancements to safety systems and much more.

For more information on Luminaire Level Lighting Controls, visit [tradeallynetworknw.com/industries/lighting](http://tradeallynetworknw.com/industries/lighting)





## How to Work With Local School Districts



Federal, state and local funding resources are available to help Northwest school districts invest in a range of energy-efficiency improvements. But working with school districts isn't the same as working with other private sector businesses. It takes more effort to build a relationship, and a more formal process for earning projects. Here are five tips to help you develop connections with your local school district.



### Do your homework to develop a relationship.

School improvement decisions are typically made at the school district level, not by individual schools. Whether the district is small or large, your goal is to identify and get to know the district's facility maintenance personnel. This is where projects are awarded.

In a smaller district, you may be able to "drop-in" on a facility employee, but you'll still have to work your way to the decision-maker. When you meet the facilities team, make yourself of value by bringing information about available utility incentives, issues you've observed, and possible solutions.

If your company volunteers in your community, what better place to do it than at your local school? Besides helping your community, it helps build relationships.



### Be flexible for maintenance work.

In many districts, facilities staff may be overloaded and rely on outside services to take care of some jobs. If you're willing to do smaller projects or take on maintenance tasks, you may find your services in higher demand. While larger projects often go out to bid, smaller projects may be awarded without a public bid.



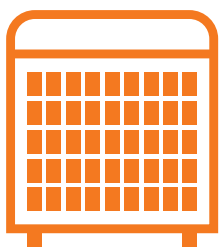
### Join the district's bid list.

School districts periodically issue a request for qualifications (RFQ) to identify contractors for future projects. This is a longer-term way to earn business, but it may put you in a pool of contractors to earn work more quickly. If you're on the list, you're also in a position to learn about larger projects that may surface.



## Educate yourself on local incentives.

Make sure you can discuss the availability of local utility incentives and how they apply to projects relevant to schools. Prepare a spreadsheet that demonstrates how upgrade opportunities in classrooms, hallways, and common areas can help reduce future energy costs.



## Understand how HVAC projects are awarded.

While many of the steps above are more applicable to lighting upgrades, HVAC contractors may still have opportunities for energy-efficiency projects.

Large HVAC replacement projects typically involve a public bid. To take on smaller projects, look for maintenance contracts or upgrade opportunities that can be pieced out, such as ductless heat pumps (DHP). Any school district with electric resistance heat can put in DHP units, giving you the chance to get your foot in the door.

Educate yourself about your local school districts to learn what types of projects they can award, budget limitations, and who has the authority to approve contracts. It will take more time and effort but will be worth the reward once you do it.





## Federal Grant Funding for Indoor Air Quality Improvements



In 2020, Congress passed the first of several rounds of funding to provide local educational agencies with emergency relief funds to address impacts from COVID-19 on elementary and secondary schools. A total of \$184 billion has been allocated nationwide.

The act allows local education agencies to use funding for many school needs, including the following HVAC related projects:

*Inspection, testing, maintenance, repair, replacement, and upgrade projects to improve the indoor air quality in school facilities, including mechanical and non-mechanical heating, ventilation, and air conditioning systems (HVAC), filtering, purification and other air cleaning, fans, control systems, and window and door repair and replacement.*

Funding HVAC systems and related controls may present new business opportunities for Northwest trade allies. Participating local utilities may offer incentives for technologies that address indoor air quality and ventilation. The listed systems and technologies could open the door for a wide variety of custom project opportunities.

Congress has distributed funding to states, then states have provided funds to qualifying districts and educational institutions. States have until September 2023 to obligate allocated funds; otherwise, unused funds will be returned to the federal government.

Distributions to states with utilities served by us are:

STATE	ESSER II (\$)	ESSER III (\$)
Oregon	449,238,502	1,008,925,861
Washington	742,367,061	1,667,250,964
Idaho	176,301,372	395,947,837
Montana	153,089,519	343,817,312
Nevada	429,590,194	964,798,553
Wyoming	121,707,810	273,338,452
California	6,038,670,479	13,561,996,091
Utah	246,664,516	553,973,463

*For more information about federal grant funding and how it might apply to your local district, contact your regional field specialist.*





## HVAC TIP

# Indoor air quality in schools

The HVAC industry has seen a massive uptick in the implementation of equipment and controls strategies that address indoor air quality. Recently approved federal pandemic relief grant funding may now be used for indoor air quality improvements to school facilities.

To learn more about equipment and controls strategies that relate to indoor air quality, talk with your regional field specialist, and view our two-part webinar recording on equipment and controls strategies:

**PART 1:**     **Ventilation.** Learn about ventilation strategies and their energy impacts as well as applicable technology eligible for utility incentives, including advanced rooftop unit controls (ARC), and connected thermostats.

**PART 2:**     **Filtration and Purification.** Learn more about technologies, such as passive filtration, electrostatic filtration, ultraviolet purification, and bipolar ionization.





## LIGHTING TIP

### Lighting Projects for Schools

Do you have a working relationship with your local K-12 schools, community college, or university? If not, now is a great time to develop meaningful contacts with these institutions.

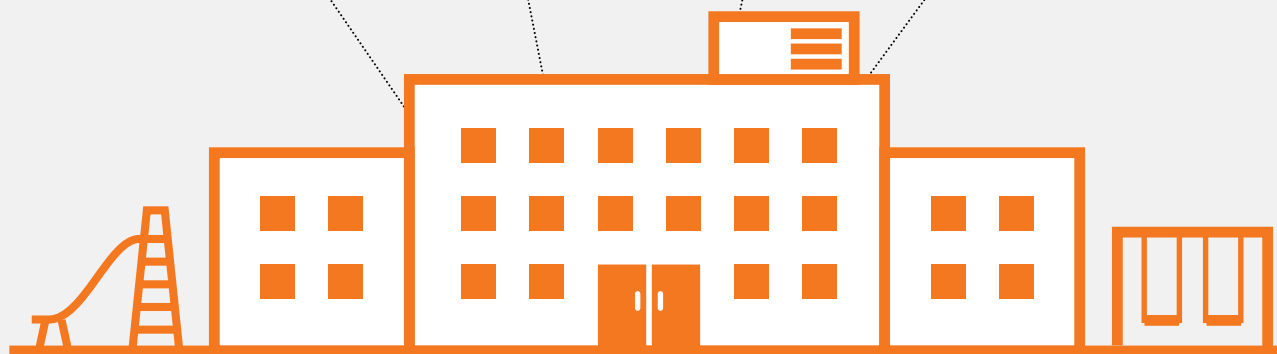
The benefits of upgrading classrooms go well beyond energy savings:

Lighting controls allow teachers to modify the light levels to enhance learning environments.

Retrofit light fixtures offer daylighting control required by code, dimming, and color tuning as needed.

Upgrades to exterior and common areas with long hours of operation offer an attractive return on lighting investments.

Many facility managers are working to improve building health ratings and find that lighting is an important tool for meeting Healthy Building initiatives.



Energy cost savings make an impact on tight school district budgets, but don't overlook non-energy saving benefits in your sales presentation. Sometimes they are the final piece of the puzzle to help move a decision forward. You may also suggest developing projects in phases to allow school administrators greater flexibility in awarding contracted work. Most utilities allow project phasing as a great way to soften budget and time constraints.

As you explore school project opportunities in your area, remember to work with your regional field specialist to determine utility incentive availability and project requirements.





## CASE STUDY

### **Tonasket School District Reduces Maintenance Costs with HVAC Upgrade**

Located in a small community in north central Washington, Tonasket School District was challenged by an old, costly, and inefficient HVAC system.

Frequent repairs cost staff time and tens of thousands of dollars each year. Plus, parts for antiquated boiler and chiller systems were no longer available. With the help of its local utility, Okanogan County PUD, the school district modernized its boiler and chiller systems to improve efficiency, maintain comfortable temperatures, and reduce the burden on maintenance staff. With these energy-saving improvements, the district estimates it is saving more than 156,000 kilowatt hours of electricity annually.









## Help Property Owners Offer a Warm Welcome to Guests

Hotel and motel properties have many opportunities to save energy and improve aesthetics, safety, and performance. If you work with a hotel or motel business or want to engage potential clients, consider these lighting and HVAC opportunities to grow your business in an industry built on satisfying customers.

### 1 GUEST ROOM


 Replace inefficient guest room packaged terminal air conditioning (PTAC) units with more efficient packaged terminal heat pumps (PTHP). PTHPs look the same, are easily swappable with existing PTACs, and produce an even, comfortable heat at a fraction of the cost to your customer.

 Choose the right color temperature for in-room lighting. Lower color temperatures offer a warmer setting than daylight colors. Replace outdated CFL lamps and fixtures with LED lighting that switches on at full brightness.

### 2 GENERAL PROPERTY

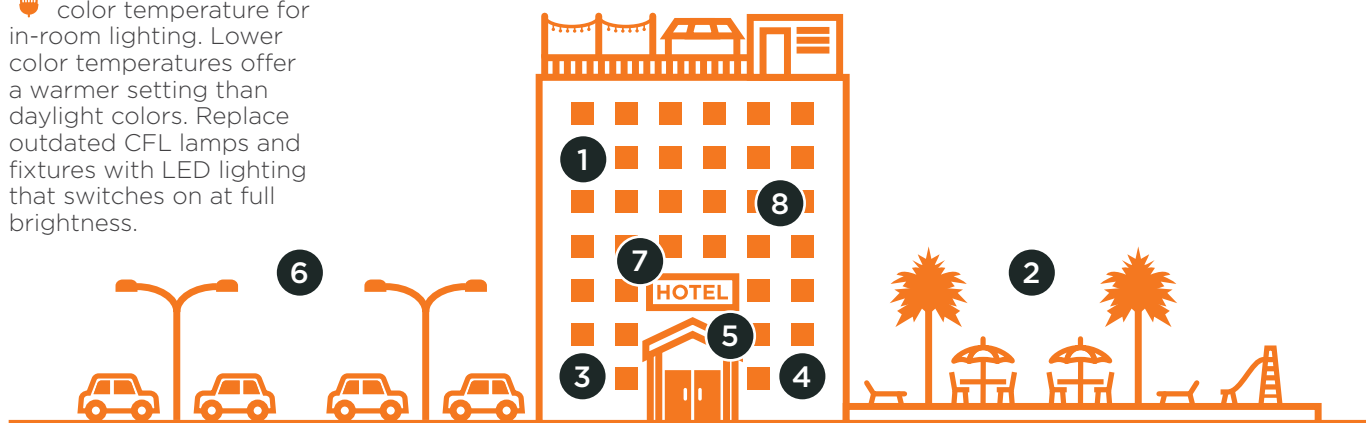
 Seasonal changes, equipment upgrades, and staffing shifts can wreak havoc on thermostat settings. Look at the set points— and setbacks— for the property’s HVAC controls and make sure they match seasonal needs and occupancy patterns.

### 3 LOBBY, CONFERENCE AREA OR RESTAURANT


 Consider incorporating heat recovery or demand control ventilation for HVAC systems serving common areas. Both approaches can result in meaningful energy cost savings due to the large ventilation needs and variable occupancy of those spaces.

### 4 LOBBY, MEETING ROOM OR DINING ROOM


 New fixtures in common areas, such as chandeliers or decorative wall sconces, add architectural interest and character. Meeting and dining areas are prime spots for additional controls, where the ability to adjust lighting can meet a specific mood or effect.




### 5 ENTRANCE AND CANOPY

 Welcome new guests with lighting that sets the tone for the property. Pendant fixtures or decorative sconces add architectural interest. Bollard lighting illuminates walkways near the entrance, especially where pole or building locations are not easily installed.


### 6 PARKING LOT AND AREA LIGHTING

 Motion controls allow area lights to be set for low lighting when no occupants are detected and go to full brightness upon detection of movement. Added security deters unwanted visitors to the property and lets guests know that safety is a priority.

### 7 ENTRY SIGNAGE

 Outdated neon or fluorescent signage is expensive to maintain. LED options are lower maintenance and flexible enough to meet signage requirements. Incentives are based on savings, and the reduction in connected load can be significant.

### 8 HALLWAYS

 Hallway lighting operates 24/7, which is a leading energy-saving opportunity. Recessed cans and wall sconces are energy-efficient and provide a more comfortable setting than fluorescent troffer fixtures.

Travelers have many choices for vacation and overnight stays. Help your customer make the right improvements to control energy costs and deliver a high-quality guest experience.





## CASE STUDY

### Hotel Makes Room for Energy Efficiency

Surrounded by breathtaking mountain views, the 73-unit Creekside Hotel & Suites occupies a prime location off I-5 in southern Oregon. A recent conversion from packaged terminal air conditioners (PTAC) to new packaged terminal heat pumps (PTHP) will make the property even more appealing by improving in-room comfort and reducing energy costs.

The hotel's existing units were almost eight years old and ready to be replaced. An estimated one-year return on their investment convinced the property owner to start the project. Units were ordered, manufactured, and delivered within a few months. The hotel's maintenance technician managed the installation, needing only 20 minutes per room to remove one unit and plug in the new one.

The local utility, Umpqua Indian Utility Cooperative (UIUC), provided incentives covering more than 80% of the upgrade cost.



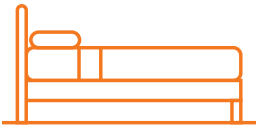


NO LIFEGUARD  
ON DUTY

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## How to Work With Hotels and Motels



The Northwest is home to more than 3,400 hotel and motel properties located in communities of every size across the region. Each offers different amenities, but all share energy consumption challenges posed by building systems that function around the clock. Today’s utility incentives and advanced equipment offerings can help trade allies build business among property owners by packaging multiple energy-efficiency upgrades together. Participating utilities may offer incentives for:



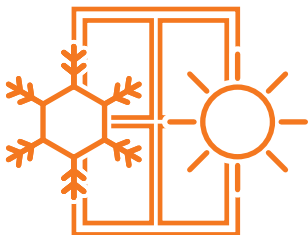
### HVAC Upgrades

HVAC systems are the leading source of energy consumption for most properties. While not every building will need HVAC upgrades, a significant portion of lodging buildings include PTACs that are prime for an upgrade. According to the 2019 Commercial Building Stock Assessment (CBSA), 45% of lodging square footage is heated with electric resistance technologies like PTACs. PTHPs are an easy-to-install and energy-efficient replacement. A PTAC to PTHP conversion is so fast, it can be implemented after one guest has checked out and before another has checked in. Many property owners are taking this approach by upgrading a few units at a time, rather than taking on a complete overhaul.



### Lighting

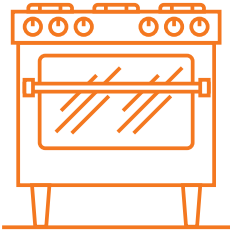
Good lighting sets the tone for a property and helps guests feel welcome, safe and secure. LED technologies and controls offer many options to upgrade in-room, common area, and outdoor or parking area lighting.



### Windows

Outdated windows waste energy and are a source of drafts, air leaks, and noise. Better insulated energy-efficient windows help owners make rooms more comfortable and lower overhead costs.





## Support System Opportunities

Many support systems serve hotels and motels beyond just lighting and HVAC systems. For example, look at replacing older, inefficient pool pumps, commercial washers and commercial dryers with newer models that consume far less energy and offer different modes of operation that better match facility usage. Also, for facilities with commercial kitchens, look to upgrade older, inefficient cooking equipment to ENERGY STAR® equipment which can save a substantial amount of energy when idle.

Talk to your regional field specialist about ways to grow business among the hotels and motels in your region.

## WANT TO LEARN MORE?

Listen and learn from our webinar on hotel and motel business opportunities.



## Watch here

<https://www.tradeallynetworknw.com/resources/network-webinar-energy-efficiency-for-hotels-motels/>





## NEEA Studies Highlight Benefits of Advanced Lighting Controls

**N**orthwest Energy Efficiency Alliance (NEEA) released two separate studies, in collaboration with University of Oregon and DesignLights Consortium respectively, to look at energy-saving aspects of advanced lighting controls.

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### **LLLC— Replacement vs Redesign**

*Conducted in conjunction  
with University of Oregon*

It is standard practice to replace legacy lighting systems, such as fluorescent and HID, with LED retrofit replacements. While there are significant savings delivered by these conversions, the technology today allows us to achieve an even higher threshold of energy savings with controls.

Recently, NEEA, in conjunction with the University of Oregon's Energy Studies in Buildings Laboratory, completed a lab study to compare using the latest technology, LLLC, in a one-for-one replacement versus that of a full redesign.

The study looked at one-for-one replacement retrofits and compared them to a fluorescent baseline and a comprehensive networked lighting control (NLC) redesign solution. They collected data on installation cost, measured savings and subjective human factor survey results from participants.

Overall, the findings revealed that LLLC systems are a cost-competitive one-for-one retrofit alternative that provide comparable performance to more comprehensive NLC redesign solutions.

Download a copy of the study here:

<https://neea.org/resources/lllc-replacement-vs-redesign-comparison-study>

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### **Results Are In— NLC/LLLC Energy Savings**

*Conducted in collaboration  
with DesignLights Consortium*

LED has become the industry retrofit standard, but there are opportunities to drive deeper energy savings than just a simple fixture replacement. Connected lighting, or networked lighting controls, are integrated controls that do more than just dim or turn off lights, they are programmable to take commands that modify behaviors and in turn deliver important data to people utilizing the space.

Connected lighting currently makes up only a very small percentage of luminaires in the U.S; however, a study from NEEA and DesignLights Consortium (DLC) details how



it can save significant energy, representing the future of commercial lighting. This report, Energy Savings from Networked Lighting Control (NLC) with and without Luminaire Level Lighting Controls (LLLC) builds upon the previous (2017) Energy Savings from Networked Lighting Control Systems that provided the industry an average projected 47% energy savings for NLC projects.

The recent study collected data from 194 buildings, located throughout 35 different states, using 12 different lighting manufacturers' products. Building types varied and included educational facilities, healthcare, manufacturing, retail, offices, and restaurants. The energy analysis showed an average of 49% savings by integrating LEDs with NLCs.

View the report on DLC's website:

<https://www.designlights.org/resources/reports/report-energy-savings-from-networked-lighting-control-nlc-systems-with-and-without-lllc/>



## 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 FOOTCANDLES (HORZ.)	LOCATION (AFF = ABOVE FINISHED FLOOR)
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<b>BANK</b>		
ATM - walk up (indoor)	20	at 3' AFF
Lobby	10	at 0' AFF
Teller Window/Writing Table	30	at 0' AFF/writing surface
<b>BAR</b>		
General Seating	5	at 2' AFF
Lounge/Work Surfaces	10	at 2' AFF or work surface
<b>CORRIDOR/INDEPENDENT PASSAGEWAY</b>	<b>10</b>	<b>AT 0' AFF</b>
<b>DINING (NON HOSPITALITY)</b>		
Cafeteria	15	at tabletop
Coffee Shop	10	at tabletop
<b>EDUCATIONAL</b>		
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		
<b>ELEVATOR (PUBLIC)</b>		
Interior/Cab/Threshold	5	at 0' AFF
<b>EXTERIOR — SEE IES 10<sup>TH</sup> EDITION HANDBOOK</b>		
<b>ENTRY VESTIBULE (INDOOR)</b>		
High Activity	15/10	Day/Night at 5' AFF
Medium Activity	10/5	“”””
Low Activity	7.5/4	“”””





## IES LIGHTING LEVEL GUIDELINES\*\*

## AVERAGE MAINTAINED FOOTCANDLES (HORZ.)

## LOCATION (AFF = ABOVE FINISHED FLOOR)

<b>FILING</b>	<b>30/15/10</b>	<b>ACTIVE/MODERATE/ INACTIVE - 2.5' AFF</b>
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## FITNESS CENTER

Aerobics	15	at 0' AFF
Group Exercise	30	at 0' AFF
Personal/Strength Training	40	at 0' AFF

## GARAGES - SERVICE

Active traffic areas	15	at 0' AFF
Repairs	75	at 0' AFF
Write-up	30	at 3' AFF

## GYM

General exercise & recreation	30	at 0' AFF
School exhibitions & matches	50	at 0' AFF

\*see IES 10th Edition Handbook for Tournament, University Level & Televised Events

## HOSPITALITY — SEE IES 10<sup>TH</sup> EDITION HANDBOOK

## IT AREA

Admin	30	at 2.5' AFF
Programming	10	at 2.5' AFF

## LOBBY\*

Day	10/5	Day/Night at 0' AFF
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\*should also be based on interior/exterior adaptation and steps/curbs/ramps

## MACHINE AREA

Equipment Service	50	at 0' AFF
General	10	at 0' AFF

## KITCHEN

Dishwashing/Equipment Storage	20	at 2.5' AFF
Food Prep	50	at work surface
Food Storage	10	at 0' AFF



# Resources

## IES LIGHTING LEVEL GUIDELINES\*\*

## AVERAGE MAINTAINED FOOTCANDLES (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

### READING & WRITING (CONT.)

#### 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



IES LIGHTING LEVEL GUIDELINES**	AVERAGE MAINTAINED FOOTCANDLES (HORZ.)	LOCATION (AFF = ABOVE FINISHED FLOOR)
<b>RESTAURANT</b>		
Casual Dining	10	at tabletop
Fast Food Dining	20	at tabletop
Fine Dining	3	at tabletop
<b>RECEIVING/SHIPPING</b>		
Dock	10	at 0' AFF
Receiving/Staging	30	at 0' AFF
<b>RESTROOM</b>		
Fixtures	15	at top of plumbing fixture
Showers	10	at floor
Lockers	5	at floor
<b>RETAIL* — GENERAL HORIZONTAL</b>	<b>(2.5' AFF)</b>	<b>CIRCULATION HORIZONTAL ( 0' AFF)</b>
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		
<b>SPORTS — SEE IES 10<sup>TH</sup> EDITION HANDBOOK</b>		
<b>STAIRS</b>		
High Activity	10	at 0' AFF
Typical	5	at 0' AFF





# Resources

## IES LIGHTING LEVEL GUIDELINES\*\*

## AVERAGE MAINTAINED FOOTCANDLES (HORZ.)

## LOCATION (AFF = ABOVE FINISHED FLOOR)

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 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.



# Controlled Environment Agriculture: Food, Decorative Plants, and Hemp



**C**ontrolled Environment Agriculture (CEA) is a term that describes the use of technologies to grow plants indoors. The indoor environment may be completely enclosed, or it may be an enclosed greenhouse that uses natural light. The market is seeing more projects throughout the region that use both lighting and HVAC technologies to perfect the process of growing food and plants

indoors.

## CONTROLLING GROWING CONDITIONS

A controlled indoor environment maintains the perfect situation for a specific plant consisting of exact temperature, humidity control, lighting, watering schedules, air purification, air flow, healthy soils, pest control and more.

Indoor crops can be grown year-round to produce more product with higher yields and quality plants. There are higher costs associated with indoor grow applications; however, increased yields and higher quality products bring greater demand along with increased profits and local food sources.

LED technology is now a proven source for plant growth from a clone to a mature plant. LED provides spectral options and advanced dimming and trimming capabilities to save energy and manipulate specific characteristics of the plant.

## CEA REQUIRES LEARNING A NEW LANGUAGE

The rise in controlled environment agriculture operations opens new opportunities for lighting trade allies. To be successful, trade allies will have to learn more about these types of facilities and understand a new language and terminology. See the glossary on page 80 for a list of lighting terms and how they differ for plants and for people.

BPA no longer excludes hemp and hemp associated load from energy-efficiency programs in states where such activities have received USDA approval. This allowance includes all hemp cultivation, processing, manufacture, and marketing of hemp and hemp-derived products (inclusive of hemp-derived products containing CBD), and will begin for projects completed on or after the date of USDA approval in each state.

Additionally, as a federal entity, BPA follows the legal direction provided by the Department of Energy and the Department of Justice as it pertains to marijuana-related business loads. BPA will not knowingly pay any incentives to customers for measures/projects involving marijuana-related business load. As such, BPA will not allow for EEI reimbursement for the implementation of a project at a site involved in the growth, distribution or sale of marijuana or products containing marijuana. Projects that are excluded by these policies can, however, be self-funded by utilities and reported to BPA as qualifying savings if all other program requirements are met.



## Why CEA is a Growth Opportunity for You



- It could be the last of the low-hanging fruit within the HID market for upgrade potential.
- Indoor ag operational hours are high, meaning opportunity for more kWh savings per project.
- Lighting loads are one of the highest demands at this capacity.
- Projects often require high capital expenditures providing higher profit equipment sales.
- Operations that use legacy technologies are prime candidates for an upgrade. The yellow glow in a greenhouse means opportunity.












## Glossary of Controlled Environment Agriculture (CEA) Terms

If you're used to lighting for people, you know the terminology and understand the application. Lighting for plants is not like lighting for humans. Trade allies interested in adding CEA lighting to their portfolio will need to understand how plants see light differently than people do and how they would apply light differently based on the type of plant

### LIGHTING FOR PEOPLE, LIGHTING FOR PLANTS:

*A comparison of familiar lighting terms and their CEA equivalents*

 <b>LIGHTING TERM</b>	 <b>FOR PLANTS</b>	 <b>FOR PEOPLE</b>
<b>Micromole (<math>\mu\text{mol}</math>)</b>	A unit of measurement described as one-millionth of a mole (often written as $\mu\text{mol}/\text{m}^2/\text{s}$ ). This term is commonly used to count the number of photons in a plant grow light system.	Compares to the amount of light on a given surface, lux or footcandle. A foot-candle is the illuminance on a one square foot surface from a uniform source of light.
<b>Photosynthetic Active Radiation (PAR)</b>	The term describes the range, in nanometers, of electromagnetic radiation in the most used areas of the light spectrum for each type of application.	PAR is compared to human visible light in the 380-770 spectrum. It is what we see, and PAR is what plants see.
<b>Photosynthetic Photo Flux (PPF)</b>	Total output of light, per second, in the 380-770 nm range. There is no directional information described in PPF.	PPF is compared to delivered lumens from a light source.
<b>Photosynthetic Photon Flux Density (PPFD)</b>	The density of light on the area of interest, often called the task plane or for plants, the designated canopy. PPFD is a measurement of light like $\mu\text{mol}/\text{m}^2/\text{s}$ above.	PPFD is compared to lux or footcandle. It's the measurement of light at the designated task plane (desk, floor, vertical service in a warehouse).





<b>Photosynthetic Photon Intensity (PPI)</b>	The direction and intensity of the light leaving the luminaire. This data allows designers to plan the spacing of the luminaire to evenly distribute the light over the task plane.	PPI is compared to luminaire distribution patterns and intensity, such as symmetric, asymmetric down light, wall wash, and more that can be found in luminaire specification sheets.
<b>Photosynthetic Photon Efficiency (PPE)</b>	How efficiently a fixture takes electrical power and converts it to photons in the range of interest expressed in $\mu\text{mol}/\text{joule}$ .	PPI compares to fixture efficiency or lumens per watt.
<b>Daily Light Integral (DLI)</b>	The number of photosynthetic photons that are delivered to a specific area over a 24-hour period. For plants, it is critical they have a specific amount of light for a set amount of time.	DLI is less applicable as humans, unlike plants, do not require a specific amount of daily light.





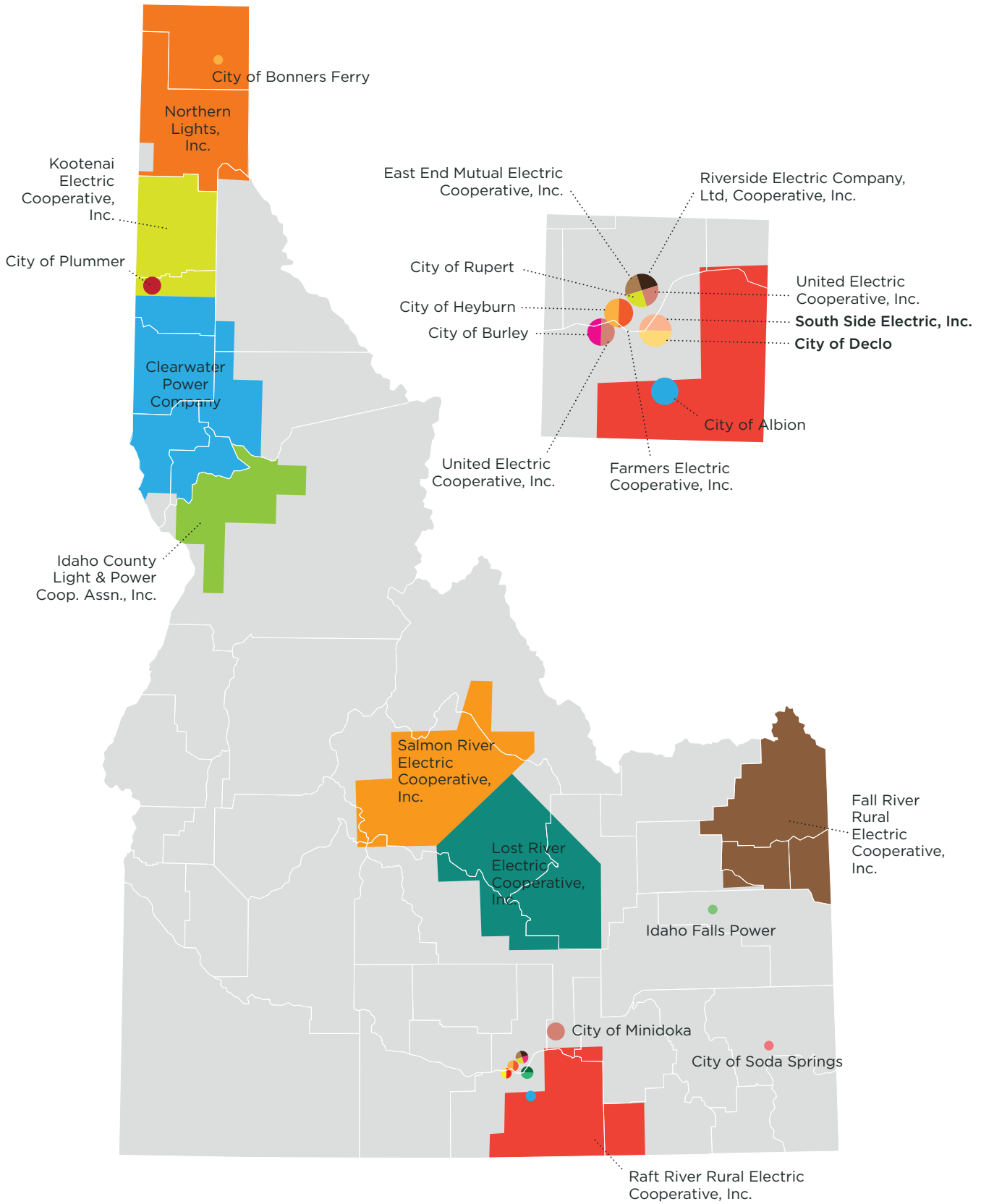


# Utility Program Manager Contact Lists



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City of Albion	Debbie Swanson/ Michelle Ouellette	(888) 883-9879	rebates@esgroupllc.com
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# Utility Program Manager Contact Lists





# Utility Program Manager Contact Lists



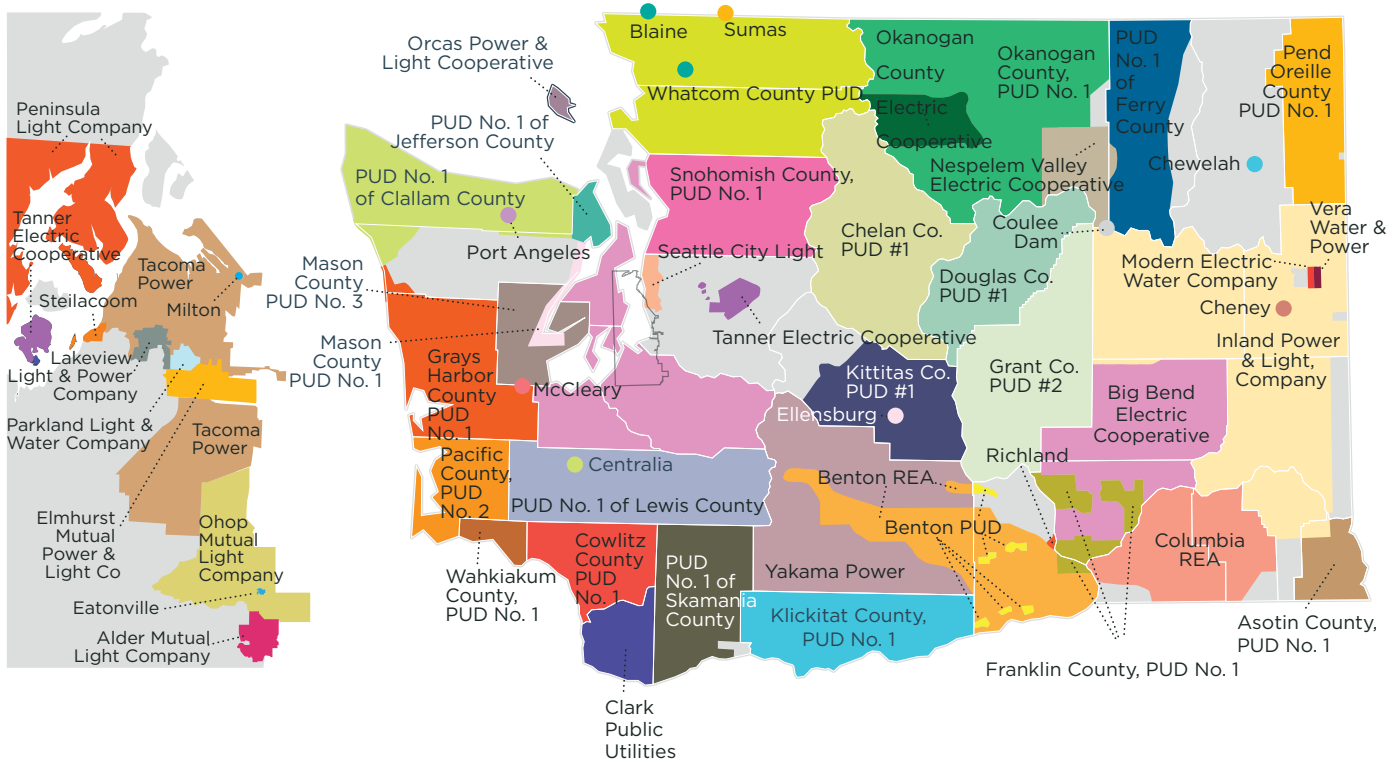
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Mason County PUD No. 3	Koral Miller	(360) 426-0777	koral.miller@masonpud3.org
Modern Electric Water Co.	Terri Richey/ Debbie Swanson /Michelle Ouellette	(509) 755-9003	trichey@modernelectricwater.com
Nespelem Valley Electric Co-op, Inc.	Renee Tillman	(509) 634-4571	renee@nvec.org
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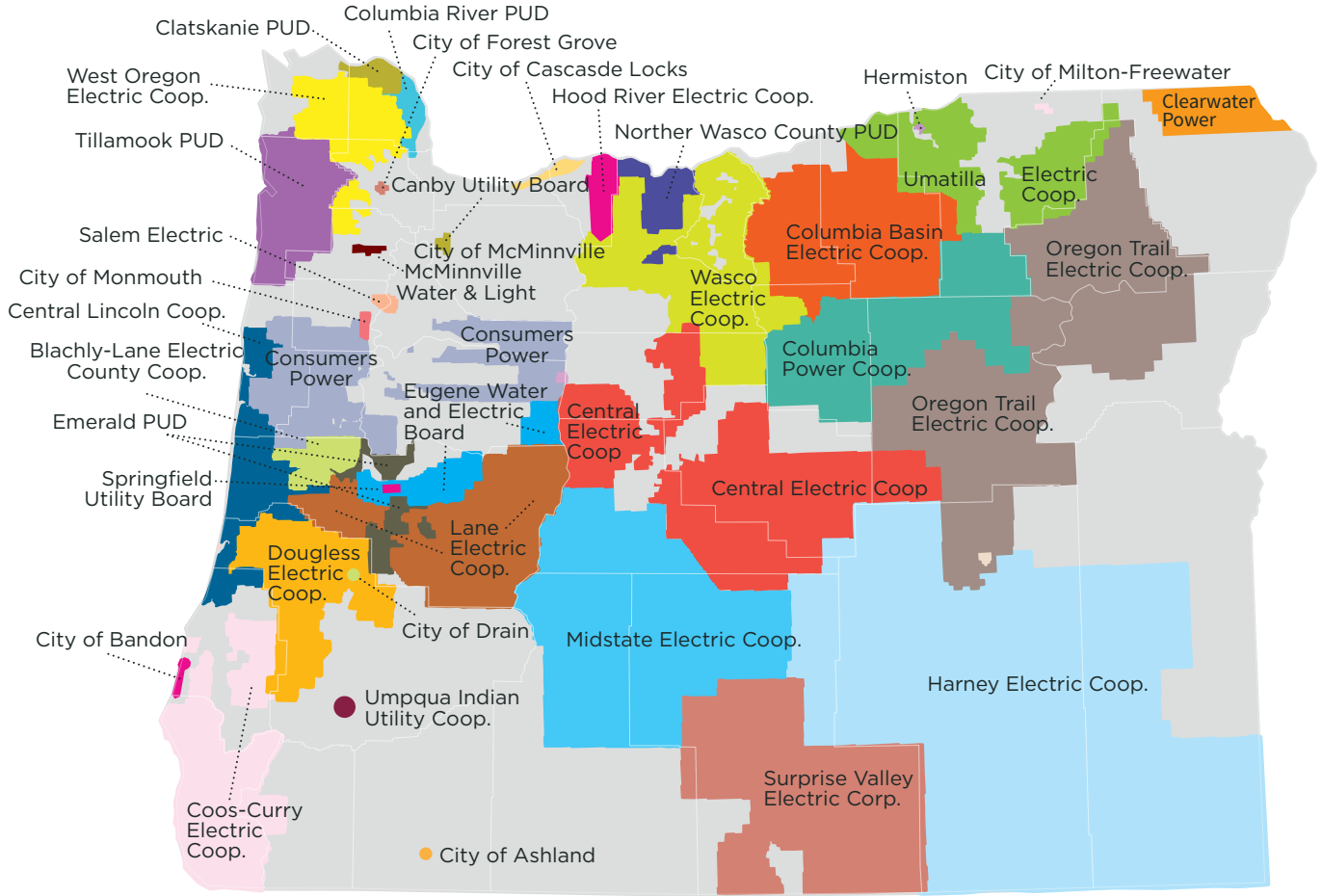


# Utility Program Manager Contact Lists

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UTILITY	REP	PHONE	EMAIL
Canby Utility Board	Debbie Swanson / Michelle Ouellette	(888) 883-9879	rebates@esgroupplc.com
Central Electric Cooperative - Redmond	Thomas Elzinga	(541) 312-7741	telzinga@cec.coop
Central Lincoln People's Utility District	Debbie Swanson / Michelle Ouellette	(888) 883-9879	rebates@esgroupplc.com
City of Ashland	Larry Giardina	(541) 552-2065	larry.giardina@ashland.or.us
City of Bandon	Debbie Swanson / Michelle Ouellette	(888) 883-9879	rebates@esgroupplc.com
City of Cascade Locks	Debbie Swanson / Michelle Ouellette	(888) 883-9879	rebates@esgroupplc.com
City of Drain	Jeni Stevens	(541) 836-2417 ex.3002	city.admin@cityofdrain.org
City of Milton-Freewater	Ryan Westman	(541) 938-3230	ryan.Westman@milton-freewater-or.gov
Clatskanie People's Utility District	Brian Fawcett	(503) 308-4575	bfawcett@clatskaniepud.com
Clearwater Power Co.	Greg Hansen	(208) 743-1501	ghansen@clearwaterpower.com
Columbia Power Coop Association	Payden Robison	(541) 934-2311	payden.robison@centurytel.net
Columbia River PUD	Tim Lammers	(503) 397-8155	tlammers@crpud.org
Consumers Power Inc.	Debbie Swanson / Michelle Ouellette	(888) 883-9879	rebates@esgroupplc.com
Coos-Curry Electric Coop, Inc.	Sharon Champlain	(541) 247-6638 x300	sharon.champlain@cooscurryelectric.com
Douglas Electric Cooperative	Debbie Swanson / Michelle Ouellette	(888) 883-9879	rebates@esgroupplc.com
Emerald People's Utility District	Tyler Boehringer	(541) 744-7480	tylerb@epud.org
Eugene Water & Electric Board	Billy Curtiss	(541) 685-7737	billy.curtiss@eweb.org
Forest Grove Light & Power	Michelle Stromberg	(503) 992-3249	mstromberg@forestgrove-or.gov
Hermiston Energy Services	Jackie Caldera	(541)567-6414	jackie.caldera@umatillaelectric.com
Hood River Electric Co-op	Debbie Swanson / Michelle Ouellette	(888) 883-9879	rebates@esgroupplc.com
Lane Electric Cooperative	John Murray	(541) 484-1151	john.murray@laneelectric.com
McMinnville Water & Light	Sara Bernards	(503) 435-3115	sarab@mc-power.com
Midstate Electric Cooperative	Joe Hull	(541) 536-7234	jhull@mse.coop
Monmouth Power & Light	Randy Wells	(503) 838-3526	rwells@ci.monmouth.or.us
Northern Wasco County PUD	Travis Hardy	(541) 298-3311	travis-hardy@nwascopud.org
Oregon Trail Electric Cooperative	Susie Snyder	(541) 575-5426	ssnyder@otec.coop
Salem Electric	Marcos Huerta	(503) 362-3601	huerta@salemelectric.com
Springfield Utility Board	David Harris	(541) 744-3775	davidh@subutil.com
Surprise Valley Electrification Cooperative	DJ Northrup	(530) 233-3511	djnsvec@frontier.com
Tillamook People's Utility District	Dave Wimpy	(503) 842-2535	davew@tpud.org
Umatilla Electric Cooperative	Jackie Caldera	(541)567-6414	jackie.caldera@umatillaelectric.com
Umpqua Indian Utility Cooperative	Brian Boswell	(541) 839-3150	bboswell@cowcreek.com
Wasco Electric Cooperative	Traci Brock	(541) 296-5051	tracib@wascoelectric.com
West Oregon Electric Cooperative	Debbie Swanson / Michelle Ouellette	(888) 883-9879	rebates@esgroupplc.com

# Utility Program Manager Contact Lists



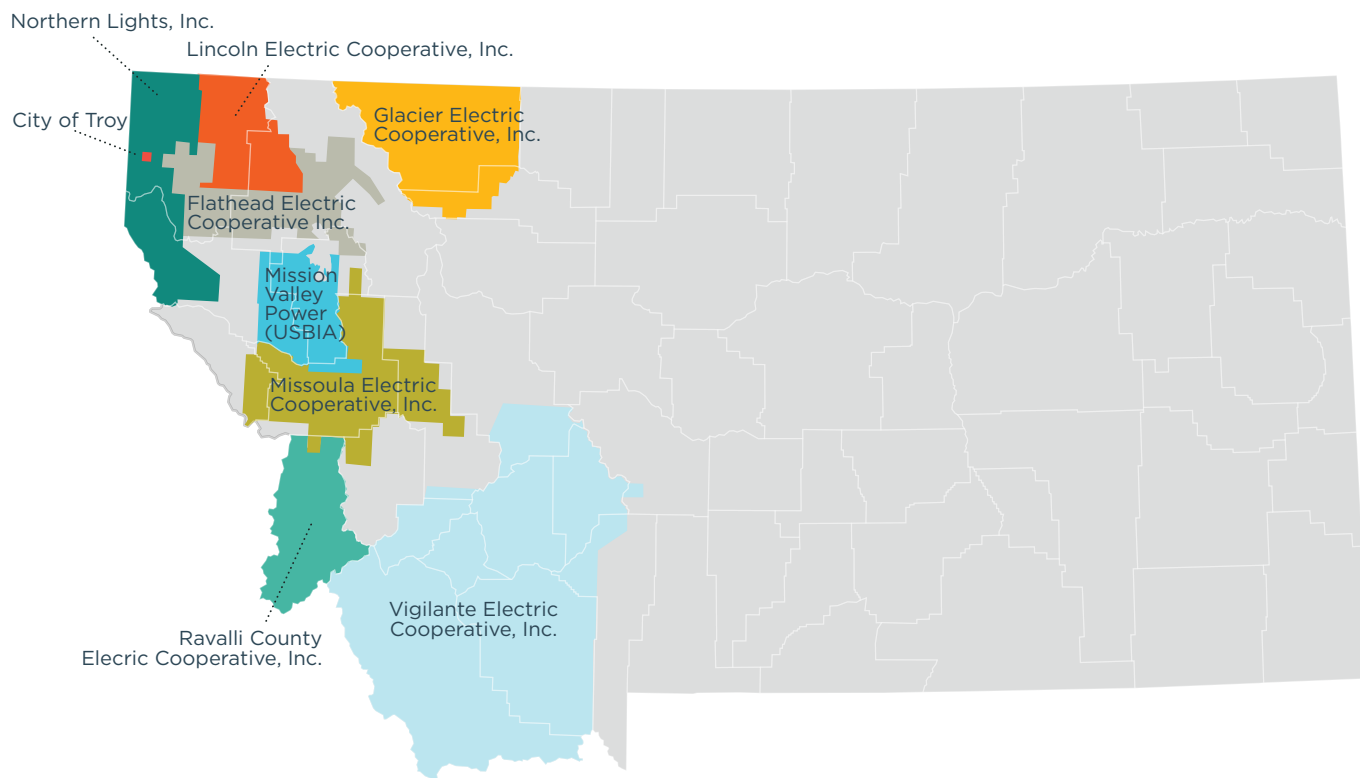




# Utility Program Manager Contact Lists



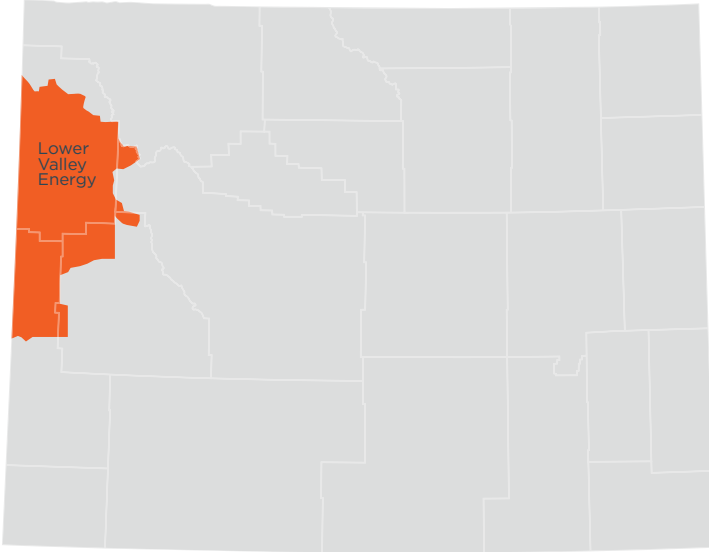
UTILITY	REP	PHONE	EMAIL
City of Troy	Clay Campbell	(406) 295-4151 x134	pwrmgr@troymt.net
Flathead Electric Cooperative	Mike Stahlberg	(406) 751-1876	m.stahlberg@flathead.coop
Glacier Electric Coop., Inc.	Jonnalea Tatsey	(406) 873-5566	jtatsey@glacierelectric.com
Lincoln Electric Cooperative, Inc	Brent Holder	(406) 882-3307	brentholder@lincolnelectric.coop
Mission Valley Power	Lyle Neiss	(406) 883-7910	neiss@missionvalleypower.org
Missoula Electric Cooperative	Dan Rogers	(406) 541-6333	danr@meccoop.com
Northern Lights, Inc.	Elissa Glassman	(208) 263-5141	elissa@nli.coop
Ravalli County Electric Co-op	Joanne Meier	(406) 961-3001	joannem@ravallielectric.com
Vigilante Electric Cooperative	Rod Siring	(406) 683-2327	contact@vec.coop





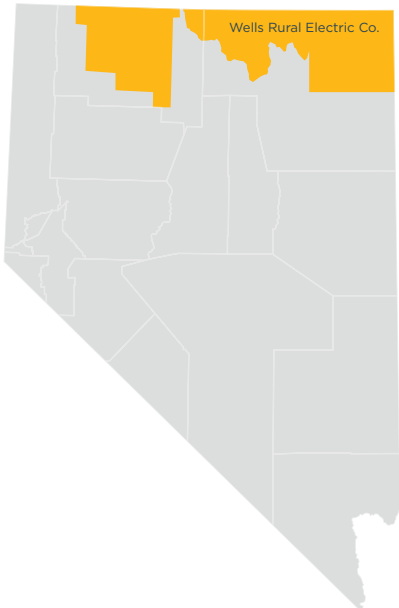
## WYOMING

UTILITY	REP	PHONE	EMAIL
Lower Valley Energy	Amy Walton	(307) 739-6045	amyw@lvenergy.com



## NEVADA

UTILITY	REP	PHONE	EMAIL
Wells Rural Electric Co.	Debbie Swanson	(888) 883-9879	rebates@esgroupllc.com





# Lighting & HVAC Field Specialists

The Trade Ally Network NW team of field specialists is here to support lighting and HVAC contractors throughout the region. Contact the specialist serving your geographic region when you have questions, challenges, or need information.

## WASHINGTON



**Jeff Anderson**

Northwest Washington  
360.707.8950  
jeff.anderson@evergreen-efficiency.com



**Keanan Williams**

Southwest Washington, Northwest Oregon  
503.730.7130  
keanan.williams@evergreen-efficiency.com



**Andy Gerde**

Northwest Washington,  
Olympic Peninsula/Coastal  
206.999.5606  
andy.gerde@evergreen-efficiency.com



**Nick Jones**

Tri-Cities/Yakima  
509.947.6305  
nick.jones@evergreen-efficiency.com



**John Wilmoth**

Northeast Washington  
509.342.5217  
john.wilmoth@evergreen-efficiency.com





## OREGON



**Kandis Bray**  
Central Oregon  
503.828.4665  
kandis.bray@evergreen-efficiency.com



**Nick Jones**  
Northeast Oregon  
509.947.6305  
nick.jones@evergreen-efficiency.com



**Mike Hughes**  
Central Oregon, Central Valley/Coast,  
Southern Valley/Coast (includes parts  
of Northern California)  
541.513.5570  
mike.hughes@evergreen-efficiency.com

## IDAHO



**John Wilmoth**  
Northern Idaho  
509.342.5217  
john.wilmoth@evergreen-efficiency.com



**Dean Paler**  
Southern Idaho, Jackson, Wyoming  
208.431.6625  
dean.paler@evergreen-efficiency.com



## MONTANA



**Scott Mayfield**

Montana

509.290.0534

[scott.mayfield@evergreen-efficiency.com](mailto:scott.mayfield@evergreen-efficiency.com)

## WESTERN WYOMING, NORTHEAST NEVADA



**Dean Paler**

Southern Idaho, Jackson, Wyoming

208.431.6625

[dean.paler@evergreen-efficiency.com](mailto:dean.paler@evergreen-efficiency.com)



## Regional HVAC Resources

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Several trade associations are available around the region that may offer additional value to HVAC trade allies. Services provided may include technical trainings, networking, and updates on codes and applicable legislation.

### **Oregon Air Conditioning Contractors Association**

<https://oracca.org/>

P.O. Box 70126 Vancouver, WA.98665

(360) 834-3805

dan@oracca.org

### **Washington Air Conditioning Contractors Association**

<http://waacca.com>

(877) 460-5880

office@waacca.com

### **Northwest HVAC/R Association and Training Center**

<https://www.inwhvac.org/>

204 E. Nora Ave Spokane, WA 99207

(509) 747-8810

staff@inwhvac.org

### **Montana Contractors Association**

<https://www.mtagc.org/>

1717 11th Avenue Helena, MT 59601

(406) 442-4162

info@mtagc.org

### **Eastern Idaho HVAC Contractors Association**

<https://eihvacca.org/>

PRESIDENT: JIM CONAN

jimconan08@gmail.com

VICE PRESIDENT: MAX MORA

max@qualityheatingfireplace.com

CHAIRMAN: BOB BIDSTRUP

bob@firstcalljewel.com

STATE REPRESENTATIVE: TED SERMON

serm09@msn.com





## How to get the most out of Trade Ally Network NW

- 1 Are you enrolled as a member of the Network? On page 4 of this guide, you'll find all the benefits that come with free membership. Sign up today!
- 2 Have you met with your regional field specialist? Your field specialist will help you learn more about the Network and understand your local utility incentives. Visit pages 92-94 to find the field specialist in your area.
- 3 Have you signed up for our Online Learning Center? We have online classes for both HVAC and lighting trade allies at no cost to you. You and your staff can learn from anywhere at any time. Sign up today!
- 4 Have you taken a free webinar? Watch your email for our upcoming slate of virtual workshop dates and topics. Visit our website for webinar recordings from previous years.
- 5 Have you signed up for Trade Talk NW? Our monthly newsletter highlights lighting and HVAC tips, sales strategies, case studies and Network news. Sign up today at [tradeallynetworknw.com](http://tradeallynetworknw.com).
- 6 Do you follow us on LinkedIn and Facebook? Our social channels feature up-to-date news and information to help support your business.

*Thank you for participating  
in Trade Ally Network NW!*



# ComfortReady HOME

## Boost Your Business with Comfort Ready Home

Comfort Ready Home provides contractors and utilities with tools, resources and services that enhance their residential weatherization, HVAC and water heating offers.

### Why Join?

Participation in the Comfort Ready Home program for contractors is free. All services, materials and support are also provided at no cost.

The benefits of participation include:

- Access to new customers and a listing on Comfort Ready Home's contractor search webpage.
- Resources to help you market and perform energy-efficient residential upgrades, while saving your customers money.
- Access to the Comfort Ready Home Learning Center's growing list of courses covering everything from building your business to performing quality installations.
- Connections to local utilities and their incentive programs.
- Customized support from Comfort Ready Home Field Specialists in your region who can answer questions and connect you with local utility representatives.



[ComfortReadyHome.com/Join](https://ComfortReadyHome.com/Join)



## ENERGY EFFICIENCY FOR INDUSTRY



**The Energy Smart Industrial (ESI)** program is offered through BPA's public utility customers to help the region's industries achieve measurable and cost-effective energy savings.



**Access streamlined analysis tools** for air compressors, battery chargers, welders, and select variable frequency drive applications. BPA's regional lighting calculator may be used to process industrial lighting project opportunities.



**Learn more about financial incentives and technical support** available through the ESI program by contacting the serving utility or the assigned Energy Smart Industrial Partner (ESIP).

For a list of participating utilities and ESIP contacts, visit: [www.bpa.gov/-/media/Aep/energy-efficiency/industrial/industrial-energy-smart-program/esi-utility-participants.pdf](http://www.bpa.gov/-/media/Aep/energy-efficiency/industrial/industrial-energy-smart-program/esi-utility-participants.pdf)

### INDUSTRIES SERVED

- Pulp and paper
- Food processing
- Wood products
- High-tech manufacturing
- Cold storage
- Chemical processing
- Water and wastewater
- General manufacturing
- Metal manufacturing
- Plastics manufacturing
- Mining
- Industrial agriculture

For more information, visit [www.bpa.gov/energy-and-services/efficiency/industrial](http://www.bpa.gov/energy-and-services/efficiency/industrial) or call 1-800-941-3867.

















# TRADE ALLY NETWORK<sup>NW</sup>

Building Success Together

888-205-5756

[tradeallynetworknw@evergreen-efficiency.com](mailto:tradeallynetworknw@evergreen-efficiency.com)

[tradeallynetworknw.com](http://tradeallynetworknw.com)