

Products Coordinating Committee



Q4 2023 Meeting

DAY 1

WEDNESDAY NOVEMBER 15TH, 2023

12:30 PM – 4:15 PM

DAY 2

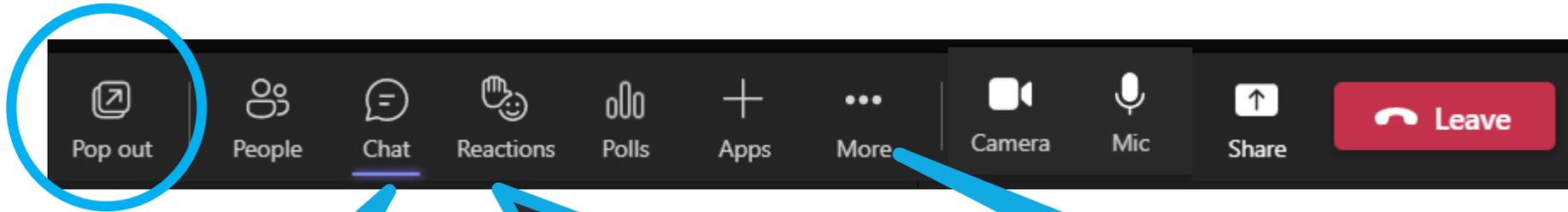
THURSDAY, NOVEMBER 16TH 2023

9:15 AM – 12:00 PM





Tools for Today: Engaging on Teams



The chat is not captured in the recording.

Do you have any accessibility challenges with this technology today?

Comments/Questions?
Please raise your virtual hand or chime in
Chat & reactions also welcome

“...” More includes:

- ✓ Settings: mic & video
- ✓ Background effects



Agenda

All times Pacific

12:30-12:40	Welcome, Agenda & Packet Review
12:40-2:00	Introductions & Regional Roundtable
<i>(10 min)</i>	<i>BREAK</i>
2:10-2:55	<u>MOTOR-DRIVEN PRODUCTS REGIONAL PRIORITY TOPIC:</u> Role of VFD's & Smart Pumps
2:55-3:40	<u>WATER HEATING REGIONAL PRIORITY TOPIC:</u> Multifamily
<i>(5 min)</i>	<i>STRETCH BREAK</i>
3:45-3:55	PCC Annual Workplan Check-in
3:55-4:05	Housekeeping
4:05-4:15	Recap, Next Steps, Adjourn



Packet Review & Informational Updates



- Tier 1: Agenda Items

- ✓ *REGIONAL TOPIC: Motors – Smart Pumps & VFDs (pg. 5)*
- ✓ *REGIONAL TOPIC: Water Heating – Multifamily (pg. 6)*
- ✓ *PCC Workplan Check-in: Annual Planning – (pg. 7)*

- Tier 2: Informational Updates

- ✓ *Program Swap for ISCC, PCC starting w/ 2024 annual planning (pg. 8)*

- Bi-Annual Program Activity Reports

- ✓ *Heat Pump Water Heaters (pg. 10)*
- ✓ *RPP / Consumer Products (pg. 14)*
- ✓ *XMP Pumps & Circulators (pg. 18)*
- ✓ *Efficient Fans (pg. 23)*

- Tier 3: Additional Resources (links on pg. 2)

Market Progress Report, committee materials (charters & recent meeting resources, functional newsletters (Market Research & Eval, Emerg Tech, Codes + Standards + New Construction)





Acknowledgement:

Dr. Tina Jayaweera, NW Power & Conservation Council



Introductions + Committee Roundtable



Introduction Prompt (All)

- Name
- Organization
- *And...*

XXX



Roundtable Focus (NEEA PMs & PCC members)

- Highlights since August
 - Programmatic updates
 - Organizational updates

Please aim for 3-5 min max, thanks!



**You deserve
a break!**

Thanks for all
you do!



Break!



Placeholder



Agenda

All times Pacific

12:30-12:40	Welcome, Agenda & Packet Review
12:40-2:00	Introductions & Regional Roundtable
(10 min)	BREAK
2:10-2:55	<u>MOTOR-DRIVEN PRODUCTS REGIONAL PRIORITY TOPIC:</u> Role of VFD's & Smart Pumps
2:55-3:40	<u>WATER HEATING REGIONAL PRIORITY TOPIC:</u> Multifamily
(5 min)	STRETCH BREAK
3:45-3:55	PCC Annual Workplan Check-in
3:55-4:05	Housekeeping
4:05-4:15	Recap, Next Steps, Adjourn





Smart Pumps & VFDs

Warren Fish, XMP Program Manager

Nick Michel, Market Transformation Manager - Motors



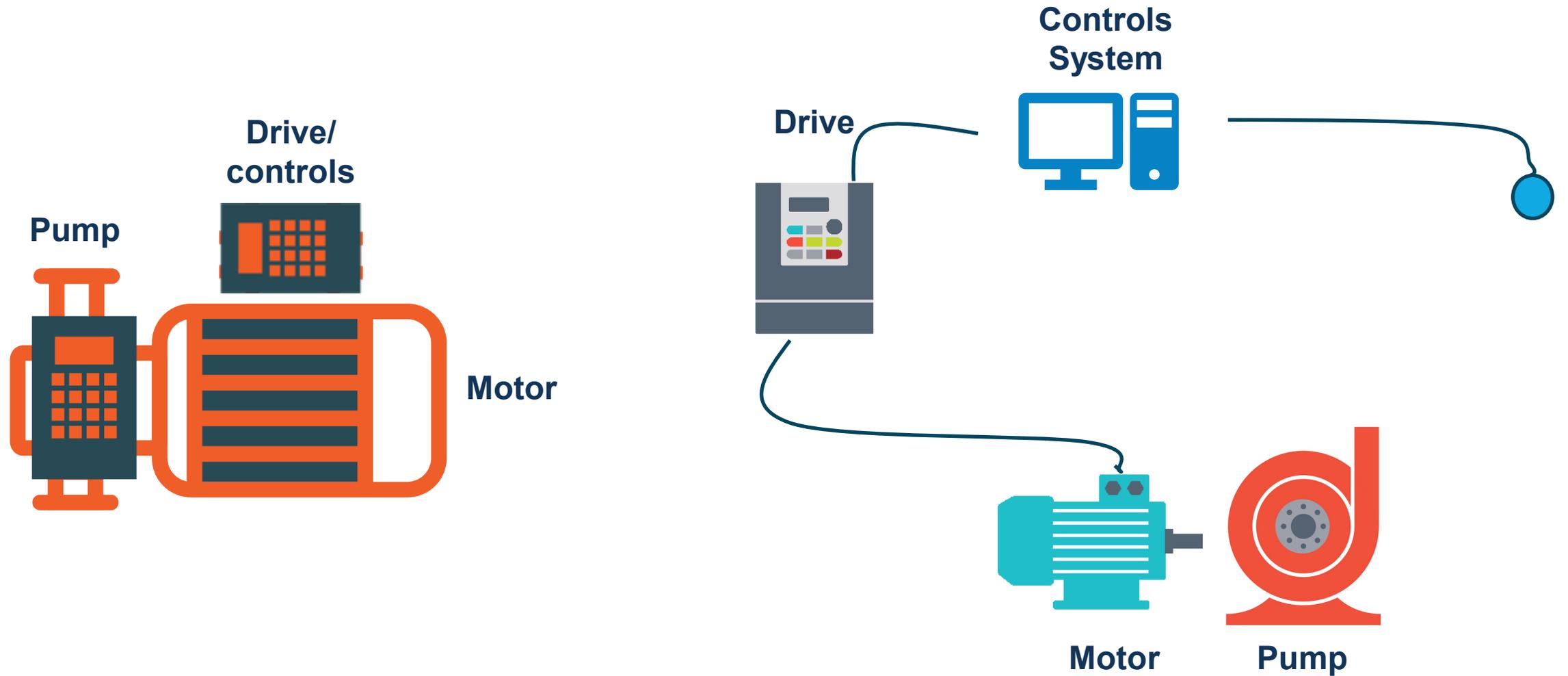


Role of VFDs and Smart Pumps

Warren Fish

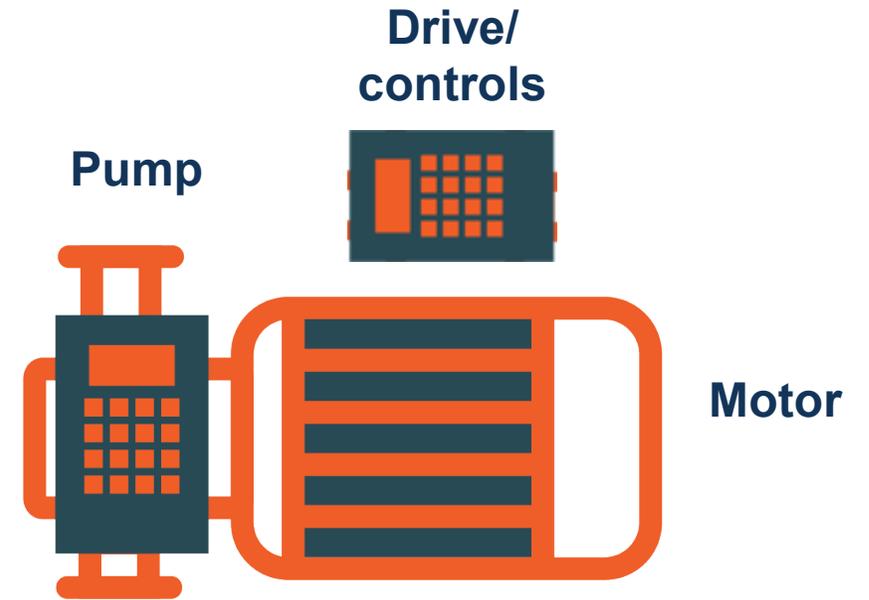


Smart Pump vs Pump + Drive on the wall





What makes a Smart Pump so smart?



- Integrated variable speed controls
- Allows the pump to automatically optimize to the required load
- Mapped performance curve for optimum efficiency
- Aka "Sensorless" or "self-sensing"



Smart Pumps: more than a Variable Frequency Drive

- Pump-specific performance maps allow the pump to self-optimize
- Doesn't require downstream sensors
- Doesn't require a controls contractor
- Adaptive control capabilities
- “Less cooks in the kitchen” = more likely to succeed
- Electronic balancing saves set-up time





Availability

Sizes	Fractional up to several hundred hp
Pump type	<ul style="list-style-type: none"> • In-line • End-suction • Horizontal and vertical multi-stage
Configuration	<ul style="list-style-type: none"> • Single • Duplex • Multi-pump skids
Motor types	<ul style="list-style-type: none"> • Induction • ECM • Synchronous reluctance

Grundfos:
Hydro MPC HVAC



Taco:
Self-sensing

SelfSensing Series
WITH ProBalance



Armstrong:
Design Envelope



B&G:
e-SVe



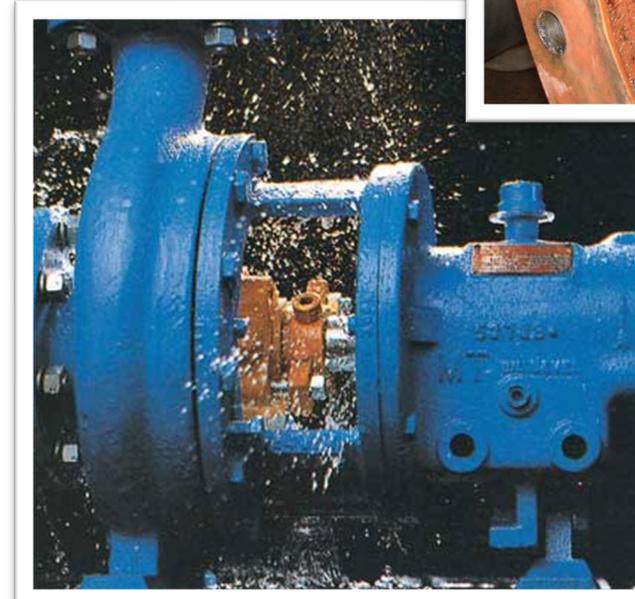
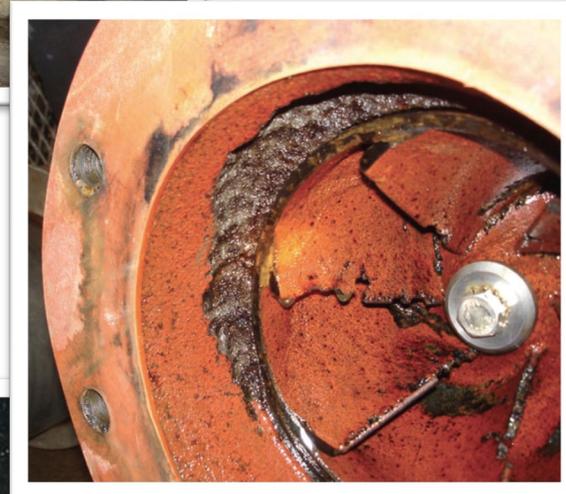
Consider adding a smart pump...

New Construction or Remodel

- Any time designing or re-designing a hydronic or DHW system

Existing Buildings

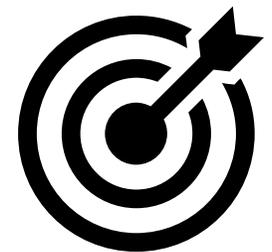
- Pump cycles on/off
- Pump has excessive noise/ cavitation
- Balancing valve > 20% closed
- Pump doesn't operate at full capacity
- Pump needs constant bearing and/or seal maintenance





Case Study Opportunities

- Collect smart pump energy **usage data**
- Show **energy savings benefits**
- Demonstrate **non-energy related benefits**
- Compile feedback on **usefulness & barriers**
- **In-depth** picture on building owner decisions
- Thanks to **utilities** for help with prior case studies
- Commercial **HVAC** case studies especially



PUMPS CASE STUDY

Class-A Office Building Finds Grade-A Booster Pump Solution



Built in 2008, Tower 333 is a 20-story office tower in Bellevue, Wash., featuring more than 400,000 sq. ft. of rentable space. LEED- and ENERGY STAR®-certified, this Class-A office building also includes a half-acre outdoor plaza and a ground-floor restaurant.

Due to its height, Tower 333 requires a domestic water-booster system to deliver reliable water pressure all the way to the top floor. The original system consisted of three 20-horsepower constant-speed booster pumps that operated in a staged sequence, bringing on successive pumps as demand changed.

When Urban Renaissance Group recently purchased the building, the aging and inefficient water-booster system needed to be replaced. With a commitment to occupant comfort and maintaining the building's energy-efficiency certifications, the company knew they had to find a replacement for the building's aging water-booster system that would save energy and improve performance.

Noisy and oversized constant-speed pumps.

Urban Renaissance Group's chief facilities engineer, Kidron Cobb, encountered a variety of issues caused by the original booster pumps, including:

- **Noise:** The basement-located pumps were so loud, they continually interrupted occupants of the conference room above.
- **Waste:** The flow of water was controlled by throttling valves, a common but wasteful control strategy in which the pumps always operate at full speed, rather than operating in proportion to demand.
- **Maintenance demands:** Due to their size and constant speed, the system created a pressure surge – also known as a water hammer – throughout the facility's piping whenever a pump was shut down. This water hammer effect caused frequent maintenance demands to replace the failed system components and rebuild the pumps.

Project Overview



Building Type
20-story office building



Year Built
2008



Location
Bellevue, Wash.



Utility
Puget Sound Energy



Project Floor Area
400,000+ sq. ft.

<https://betterbricks.com/case-studies/class-a-office-building-finds-grade-a-booster-pump-solution>





Variable Frequency Drives (VFDs)
NEEA Activities & Outlook

Nick Michel

VSD / VFD - What are we talking about

- Variable Speed Drives = Variable Frequency Drives
 - Not mechanical variable speed drives
 - Not clutch-based adjustable speed drives
- Electronic
- Controls flow of power
- Can be integrated or separate

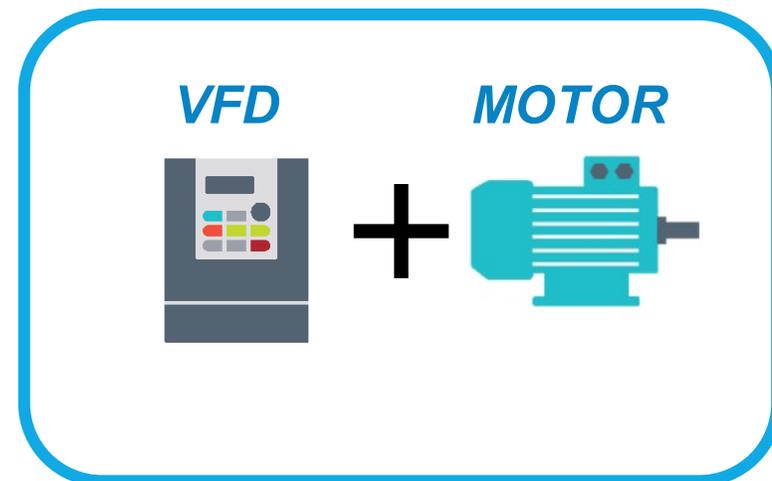


Why are we interested in Drives

- Solid energy saving potential and mature technology
- Lagging adoption, especially in commercial retrofits
- Flexible load management, future proof, system solution
- Power Index Metric



Power Drive System



What have we done so far

- Established two programs that include VFD in their product definition, but are not the sole focus
- Reviewed existing research
- Conducting new research
- Begun manufacturer/distributor/rep/market actor informal conversations

What have we learned

- VFDs are the biggest driver of savings by far
- Industrial sector and new construction are more saturated
- Commercial retrofit less than 50 HP has more opportunity
- Mature technology, but complex and low awareness of benefits
- Motors and drives in different sales channels

Where are we going (we think!)

- Filling in some market gaps
- Commercial retrofit applications
- VFD/Motor integration as a potential future state
- Just exploring at this point



Questions

- What has been your utility's experience with Drives?
- What trends are you seeing in the market?
- Which customers or market segments are installing Drives more than others?
- What challenges do you see in getting more commercial retrofit projects to embrace Drives?
- What coordination challenges do you see?

» Thank you, PCC!

Warren Fish → Wfish@neea.org

Nick Michel → Nmichel@neea.org





Water Heating: Multifamily

Emily Rosenbloom, HPWH Program Manager

Geoff Wickes, HPWH Product Manager

Guest: Shelly Carlton, Energy Trust of Oregon





Topic Agenda

- Multifamily 101
- NEEA Updates
 - Markets
 - Savings Potential
 - AWHS
 - Amazing Shrinking Room
 - Design Charrette Solutions
 - Involvement in Projects
- Energy Trust Share-out: Multifamily
- Regional Discussion



What does this building stock look like?

One to one



One to many



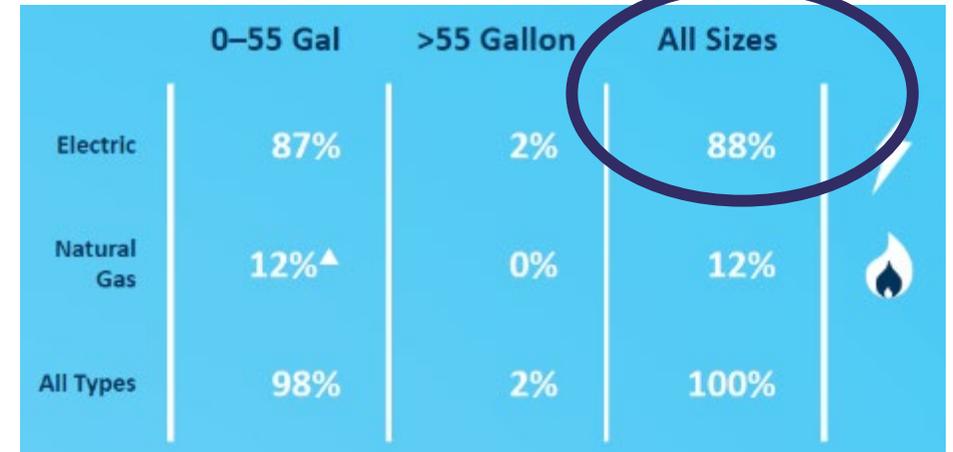
Few to many





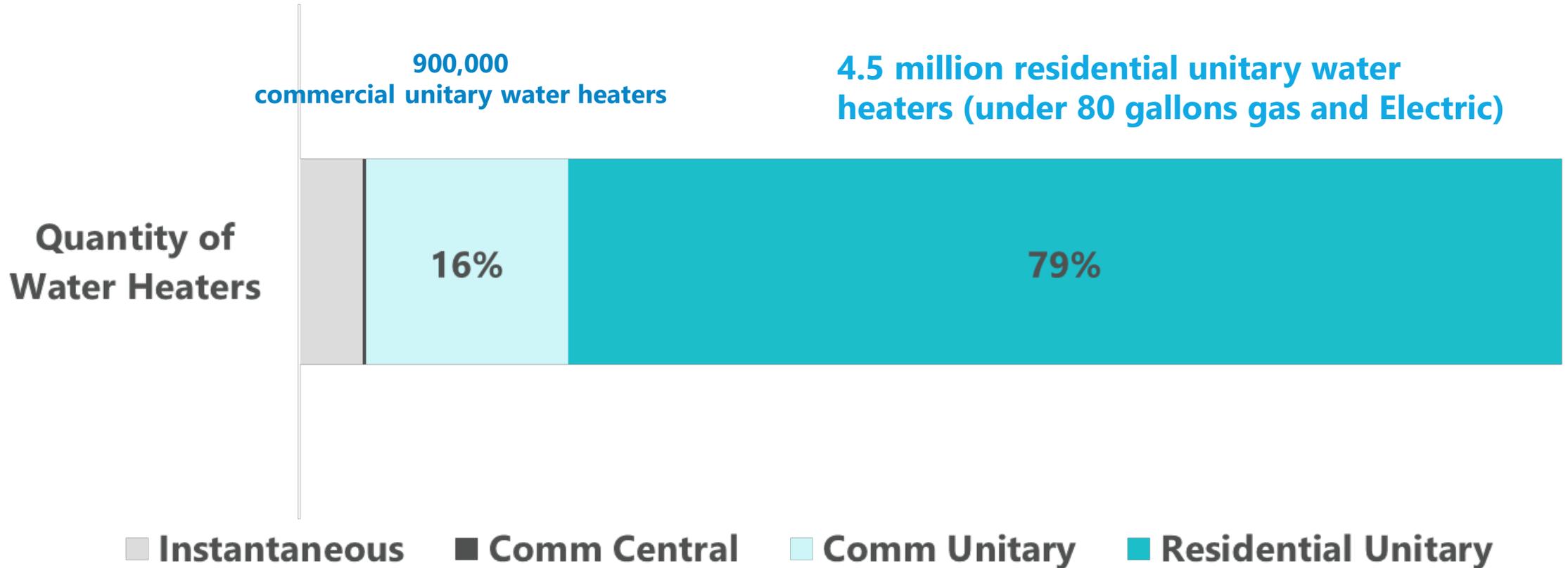
How is the load spread out by building type?

- According to Residential Building Stock Assessment II (RBSA II)
 - Most Low-Rise buildings...
 - have in-unit water heater,
 - which is electrically heated,
 - and is installed within the dwelling unit in a space <1,000 ft³.
- This is for all existing buildings, but new construction can be designed for HPWH.
- In the 2021 Power Plan, the Northwest Power and Conservation Council expects construction of **20,000+** low-rise dwelling units per year for the foreseeable future.





Residential unitary water heaters represent 79% of the existing water heaters in the Pacific Northwest





What Technology is NEEA looking at for solutions on the electric side?

Consumer (Residential) Unitary



- 40 – 80 gallons
- ~1 ton heat pump, 9 kW resistance backup
- Residential, Small office/retail, warehouse

Consumer (Residential) Split System



- 40 – 120 gal*
- ~1 ton heat pump
- Smaller multifamily, lodging

Commercial Unitary



- 120 gallons
- ~3 ton heat pump, 12 kW resistance backup
- Restaurants, grocery

Commercial Split System (“Central HPWH” or “Built-Up”)



- >> 120 gallons (e.g. 500-1000+)
- 10-30 tons per heat pump
- Large multifamily, lodging, residential care

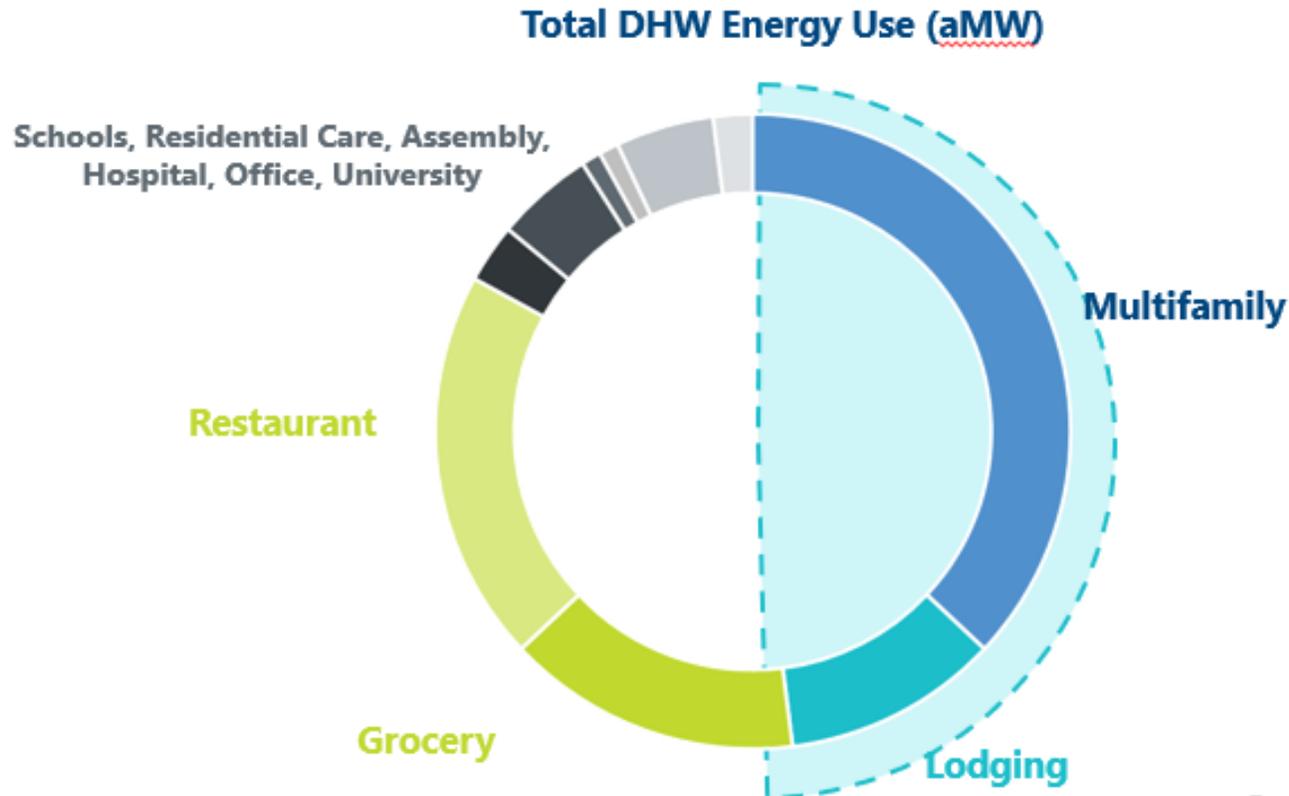
*Can scale to > 120 gal with larger tanks, multiple tanks, and multiple heat pump stages

Slide Source: RTF Comm Unitary HPWH March 2022 Presentation



Solutions for multifamily non – one to one

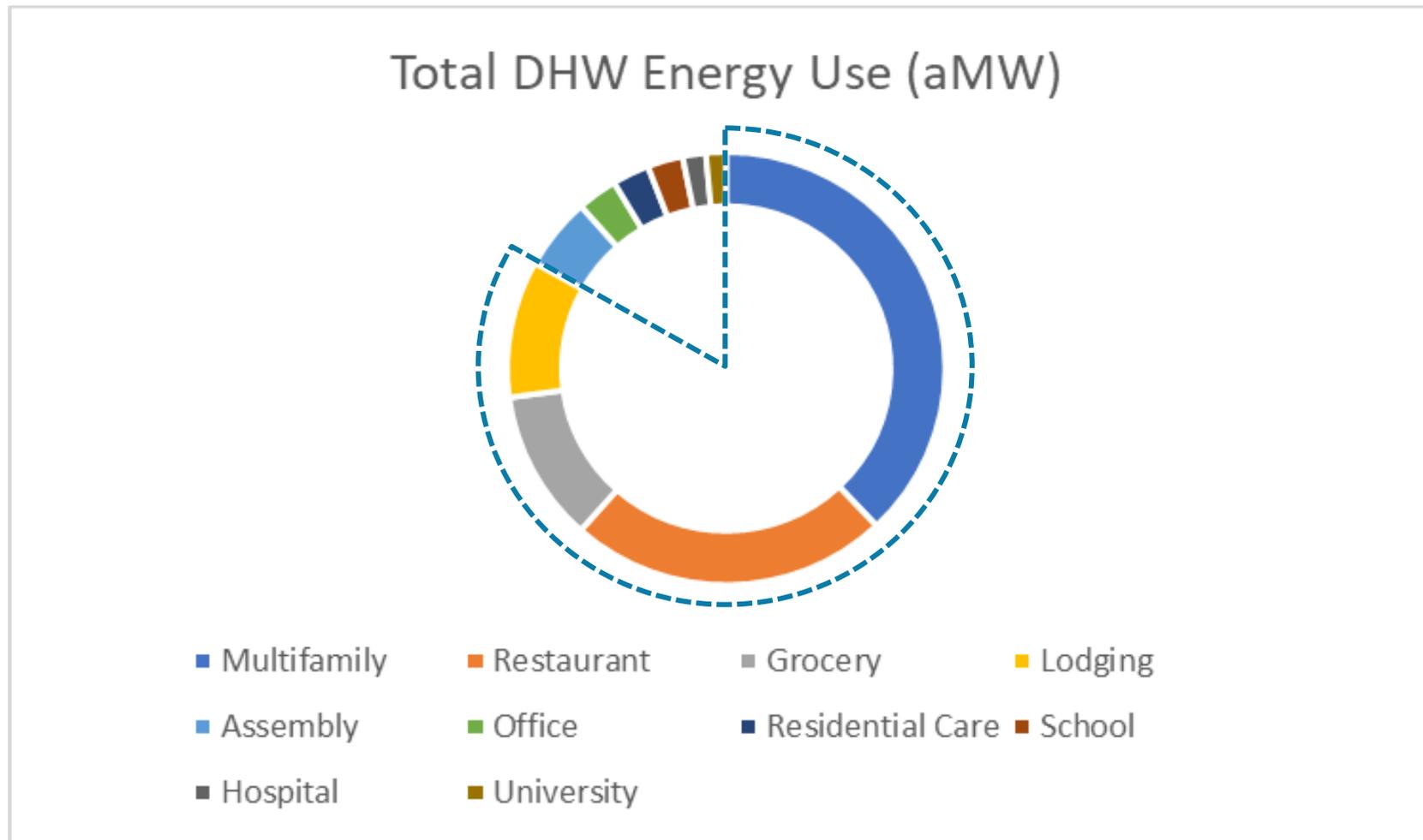
Up to half of the commercial & multifamily hot water load potentially could be met with a **central HPWH solution**



Source: Ecotope Analysis



Targeting Commercial Sectors by Energy Use – PNW Region

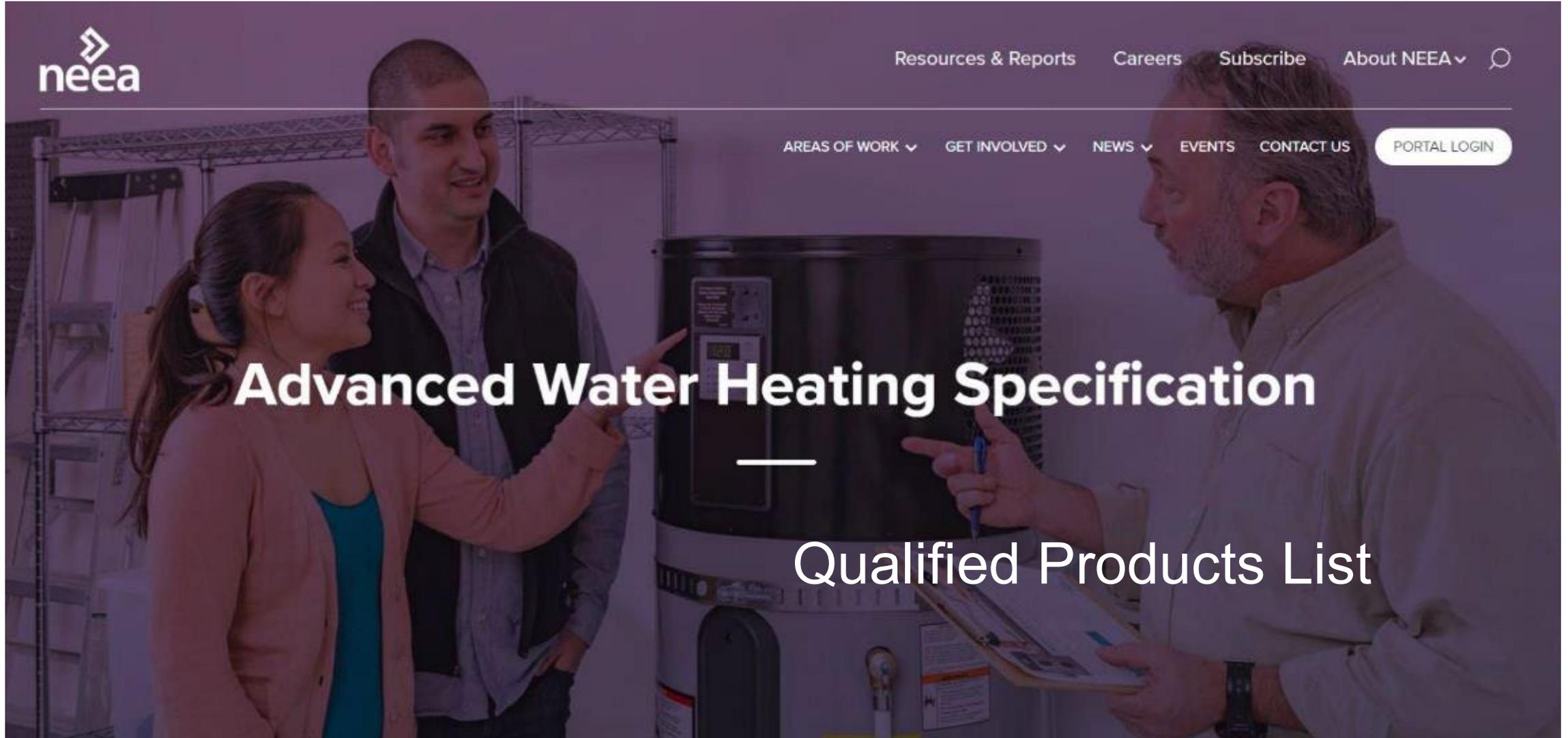


Four building types represent over 80% of total DHW load

- Lodging
- Grocery
- Food Service
- Multifamily



Advanced Water Heating Specification and QPL

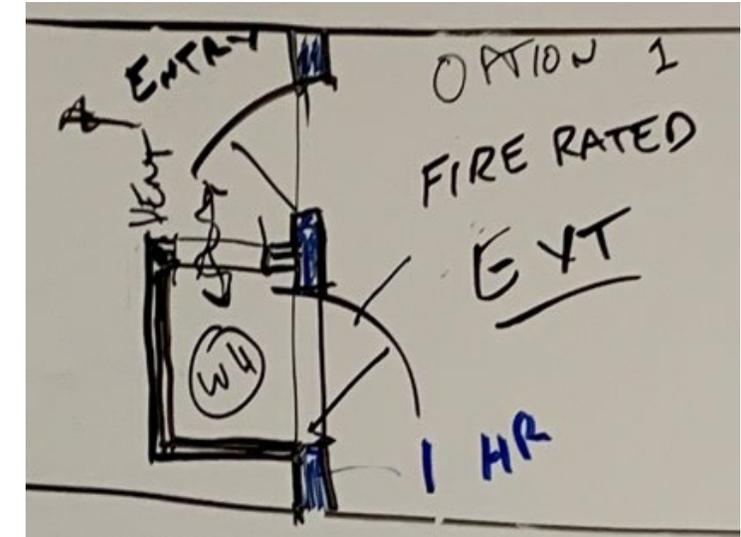
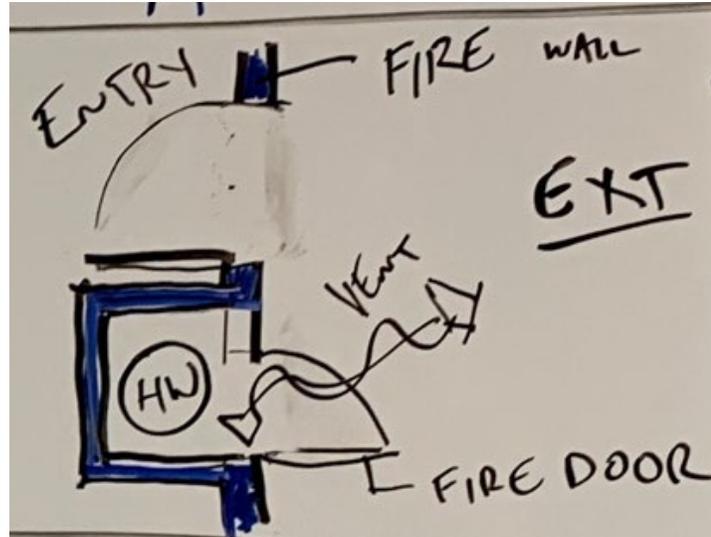




Multifamily Design Charrette Solutions

• Integrated HPWH

- Corridor Closet
 - Exchange air with building corridor
- Exterior Closet
 - Exchange air with the outside
- Interior Closet
 - Exchange air within the dwelling

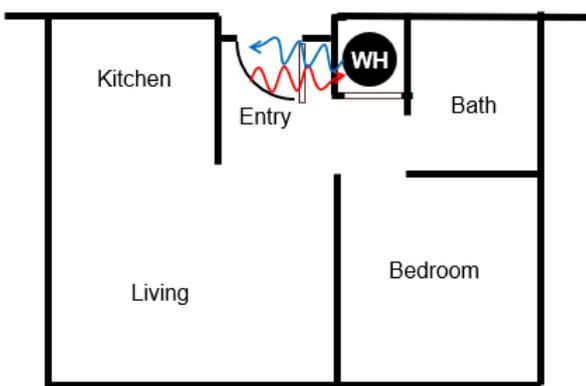
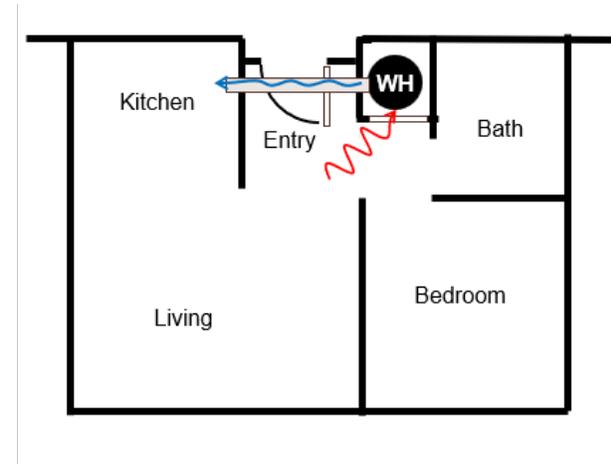
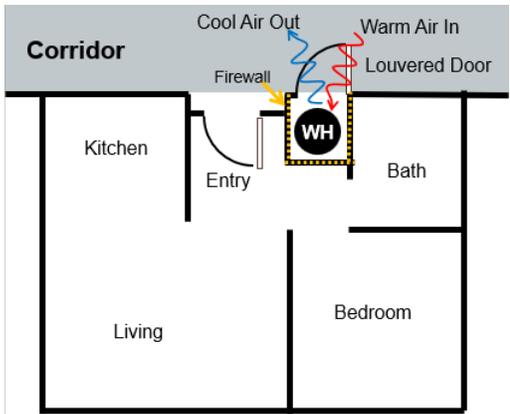
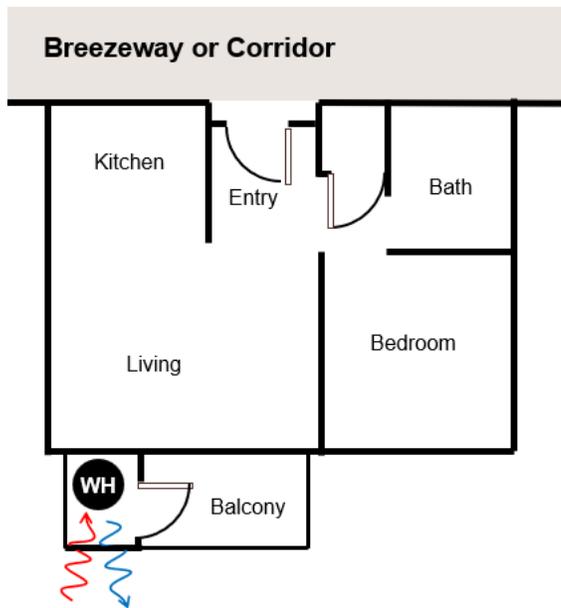


Outdoor Split HPWH

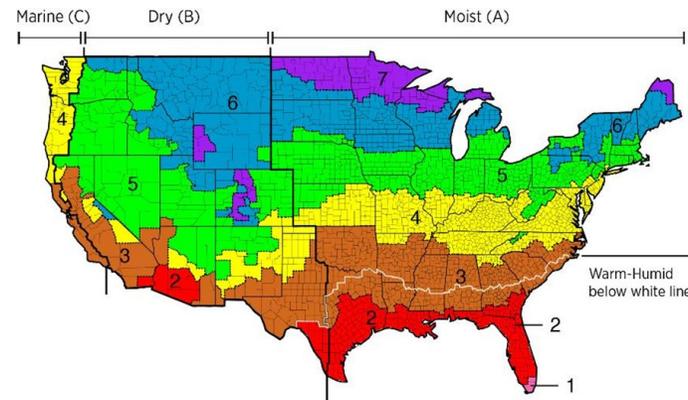
- Tank within unit. Heat pump outside.
(not covered today)



Examples of Designs and Locations



Climate Zone	Corridor Closet	Exterior Closet	Interior Closet
1			
2			
3			
4 A+B			
4 C			
5			
6			
7			





Samples of Multifamily Projects we Support

Location	Type of water heating	Units	Flexible Load Management
Tacoma Housing Authority	Central	231	Yes
Meridian Gardens	Central	85	Yes
Bayview Tower	Central	100	Yes
Pepsi Blocks	Multiple Central	120	Yes
Market Rate Development	One to One	12	Yes
Low Income NE PDX	Commercial Unitary	56	No
Low Income Hood River	One to one, one to few and central	120	?



Major Goals of Multifamily Water Heating Solutions

- Clearly identify the opportunity (Scope and Scale)
- Work with manufacturers
- Identify key influencers (Arch, MEPs, Builder, portfolio managers and maintenance staff)
- Train and support market to move to systems solutions
- Integrate Flexible load Management
- Leverage the Advanced Water Heating Spec and QPL
- Other interests?



Optional / Reference Slides



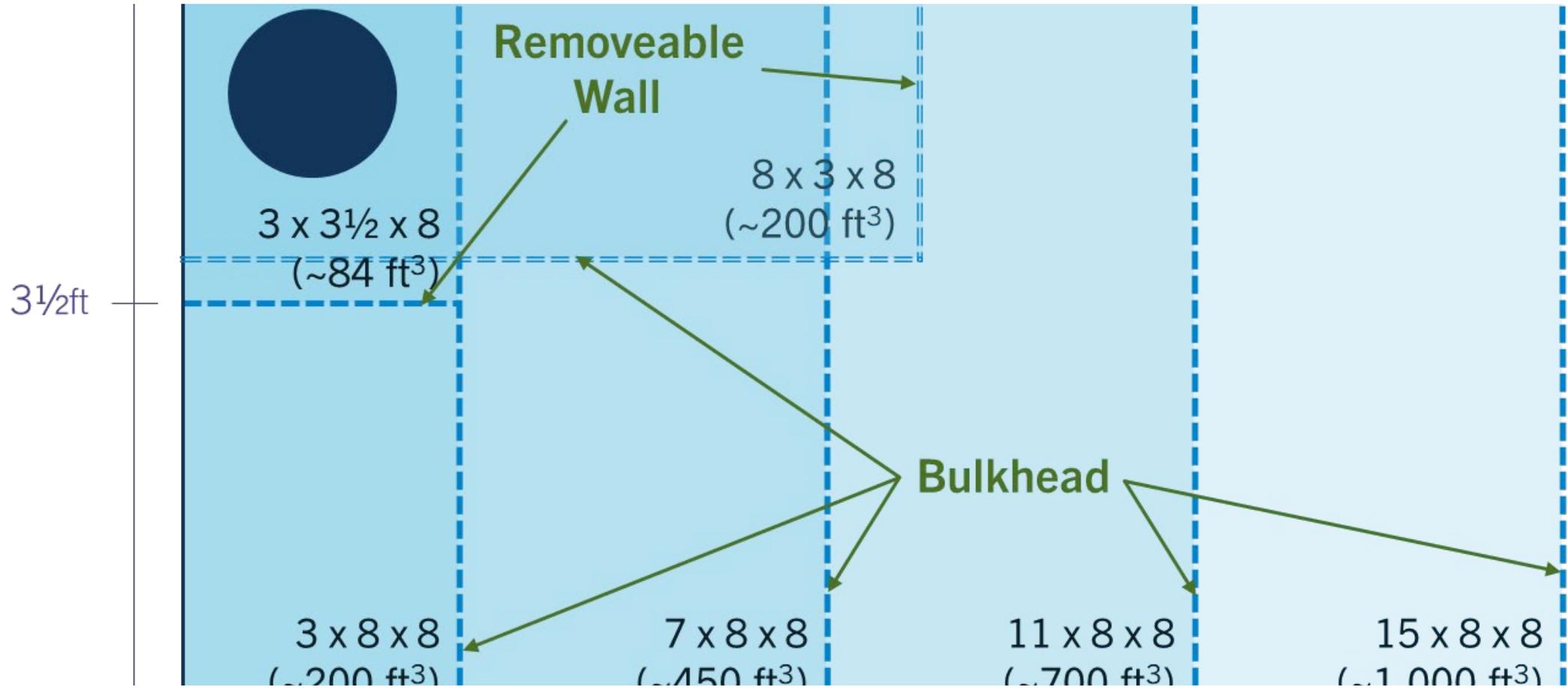
Amazing Shrinking Room



Video: [June 2022 Product Council presentation](#)



Amazing Shrinking Room



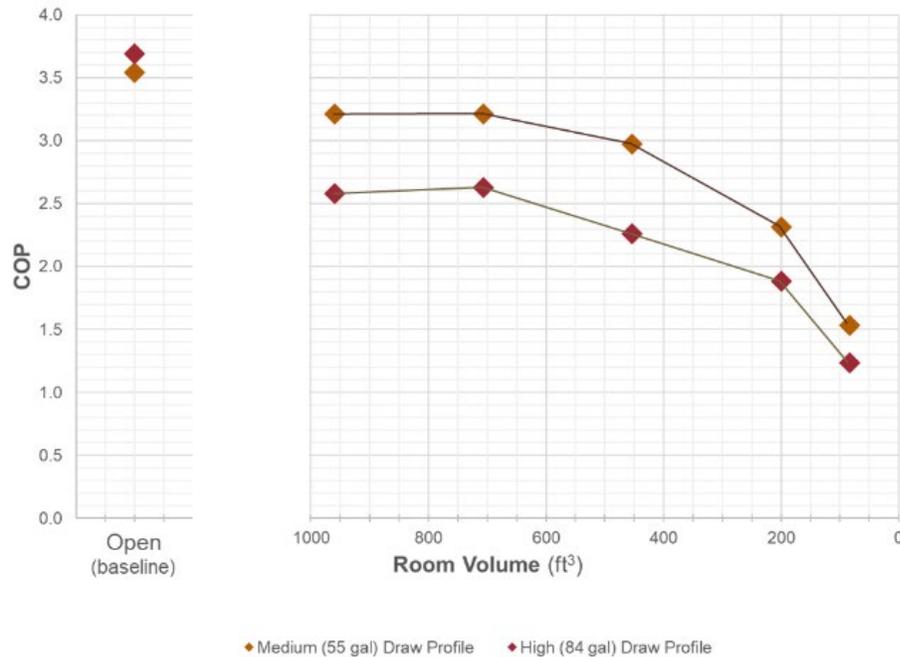


Amazing Shrinking Room





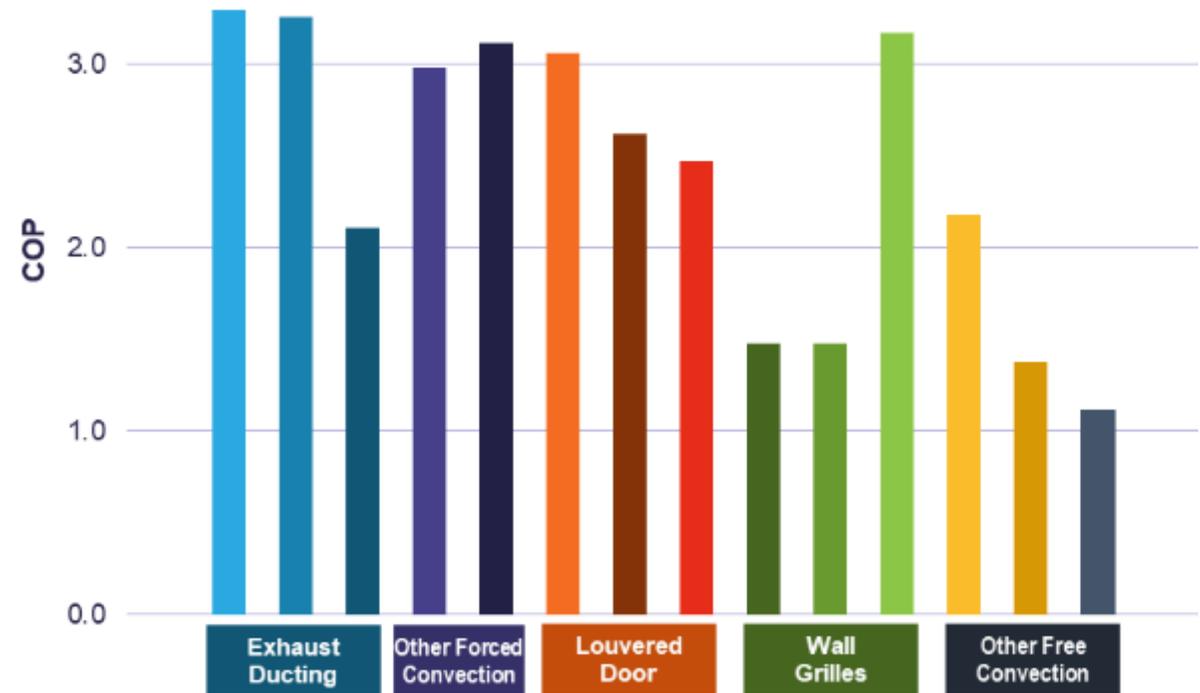
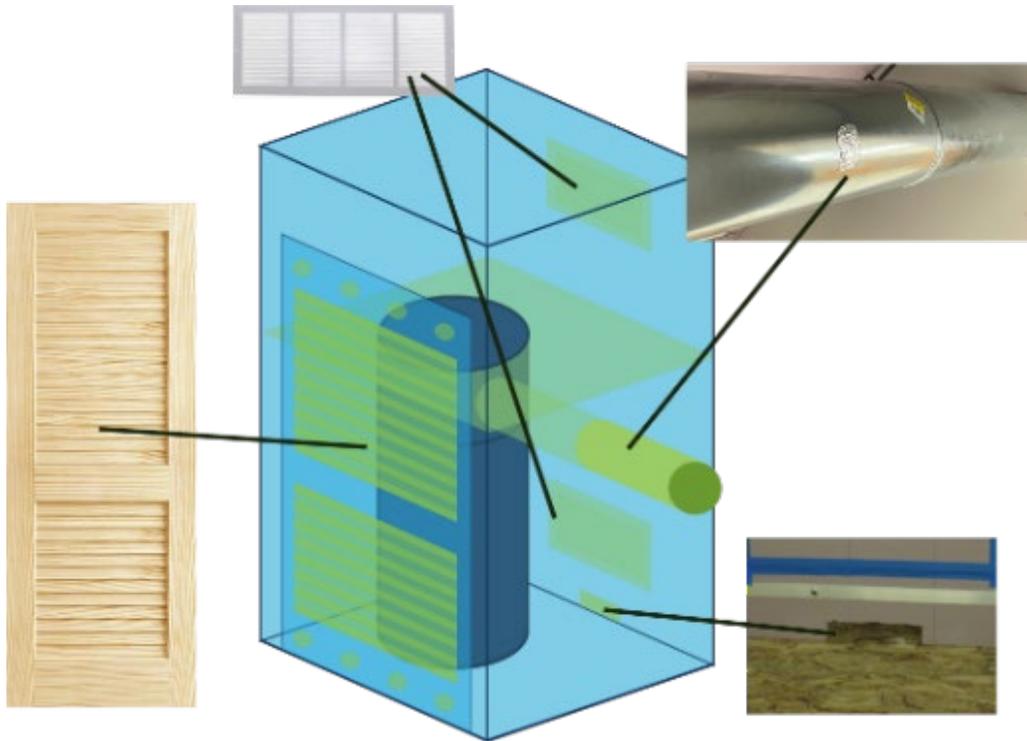
As install room volume decreases, so does efficiency



- Even with install spaces of 450 ft³, HPWHs are likely to use less than a third the energy of an ER water heater.
- Lifetime cost benefit of HPWH over other technologies depends on many factors. Installation site conditions – including room size – are the most significant, controllable variables.
- >> With a new building, you determine the efficiency of the HPWH for the life of the building – not just the water heater.



I'm Stuck with a Small Closet. What Works?

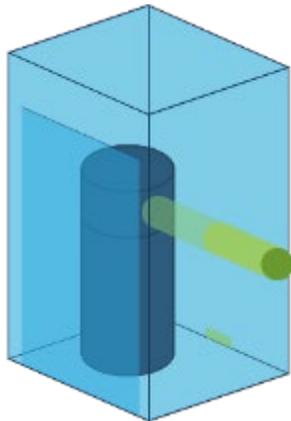


*Exhaust ducting is to adjacent space only
– does not cross building envelope

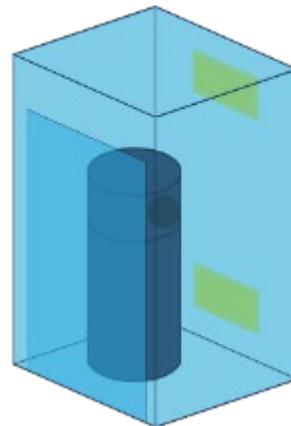


Methods that Work

- Methods of improving make-up air (or thermal resource) availability differ in both effectiveness and cost.
- Best solution dependent on site factors.

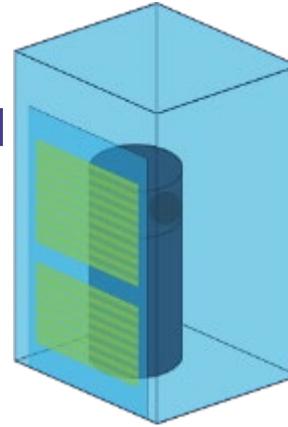


Ducting
COP 3.3



Wall
Grilles
COP 3.2

Louvered
Door
COP 3.1



COP 3



COP 3



Amazing Takeaways



- Ideal HPWH install: garage or basement
- If necessary to install inside dwelling, rooms as small as 450 ft³ (7' x 8' x 8') allow reasonable efficiency
- For smaller spaces, do the following to achieve good efficiency
 - Louvered doors or wall grilles with net free area > 300 in²
 - Openings both high and low critical to success
 - Duct to adjacent space inside the house (do not cross air barrier)
 - Provide for adequate make up air

» Thank you, PCC!

Emily Rosenbloom → Erosenbloom@neea.org

Geoff Wickes → Gwickes@neea.org



A large, faint, light-orange diamond shape is centered in the background, containing a stylized geometric pattern of nested lines.

Shelly Carlton
Energy Trust of Oregon
Multifamily



Multifamily: Regional Discussion

Observations, progress, opportunities, challenges:

- *How are you engaging with the multifamily market with this technology?*
- *What are you hearing from local market actors?*
- *What opportunities do you see? What challenges / barriers do you see/experience?*
- *What are you excited about?*
- *Do you have any needs/ questions/ thoughts for NEEA?*

A tabby cat is captured in a full-body stretch on a light-colored ledge. The cat's front legs are extended far forward, and its hind legs are also stretched out, with its tail held high and curved. The cat's eyes are closed, and its expression is one of relaxation. The background consists of a wall with vertical wooden slats. The lighting is bright, casting soft shadows of the cat onto the wall behind it.

Stretch Break!



Agenda

All times Pacific

12:30-12:40	Welcome, Agenda & Packet Review
12:40-2:00	Introductions & Regional Roundtable
(10 min)	BREAK
2:10-2:55	<u>MOTOR-DRIVEN PRODUCTS REGIONAL PRIORITY TOPIC:</u> Role of VFD's & Smart Pumps
2:55-3:40	<u>WATER HEATING REGIONAL PRIORITY TOPIC:</u> Multifamily
(5 min)	STRETCH BREAK
3:45-3:55	PCC Annual Workplan Check-in
3:55-4:05	Housekeeping
4:05-4:15	Recap, Next Steps, Adjourn





Tomorrow! *PCC Annual Topic Planning*

- Time: 9:15 - ? (NLT Noon)
- Mural platform (visual guide only for discussion)
- Focus = topic development (review/discuss topic survey results)





Coordinating Committees Update: Program Swap

Residential Focused Committee members

Products
Facilitator:
Alisyn Maggiora

Residential Programs
Consumer Products
Retail Products Portfolio
Water Heating
Heat Pump Water Heaters

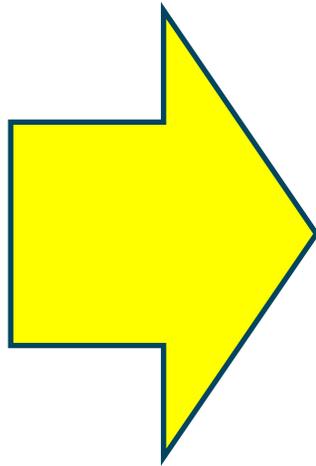
Commercial &/or Industrial Programs
Motor-Driven Products
XMP Pumps
Efficient Fans

C&I Focused Committee members

Integrated Systems
Facilitator:
Anouksha Gardner

Residential Programs
HVAC
Advanced Heat Pumps
Envelope
High-Performance Windows

Commercial &/or Industrial Programs
Lighting
Luminaire Level Lighting Controls
HVAC
High-Performance HVAC



Proposed Structure: 2024 +

Products
Facilitator:
Anouksha Gardner

Residential Programs
Consumer Products
Retail Products Portfolio
Water Heating
Heat Pump Water Heaters
HVAC
Advanced Heat Pumps
Envelope
High-Performance Windows

Integrated Systems
Facilitator:
Anouksha Gardner

Commercial &/or Industrial Programs
Lighting
Luminaire Level Lighting Controls
HVAC
High-Performance HVAC
Motor-Driven Products
XMP Pumps
Efficient Fans



PCC 2024 Annual Workplan Proposed Structure Changes

1 half
day

Q1

- **1 Regional Topic**
- **Ad-Hoc Topic**
- Roundtable
- Priority topic check-in

2 half
days

Q2

- **2 Regional Topics**
- **Program Activity Reports**
- Roundtable
- Priority topic check-in

1 half
day

Q3

- **1 Regional Topic**
- **Ad-Hoc Topic**
- Roundtable
- Priority topic check-in

2 half
days

Q4

- **2 Regional Topics**
- **Annual Planning**
- **Program Activity Reports**
- Roundtable



Agenda

All times Pacific

12:30-12:40	Welcome, Agenda & Packet Review
12:40-2:00	Introductions & Regional Roundtable
(10 min)	BREAK
2:10-2:55	<u>MOTOR-DRIVEN PRODUCTS REGIONAL PRIORITY TOPIC:</u> Role of VFD's & Smart Pumps
2:55-3:40	<u>WATER HEATING REGIONAL PRIORITY TOPIC:</u> Multifamily
(5 min)	STRETCH BREAK
3:45-3:55	PCC Annual Workplan Check-in
3:55-4:05	Housekeeping
4:05-4:15	Recap, Next Steps, Adjourn



➤ *Housekeeping and Looking Ahead*

2023

- *Leadership in Energy Efficiency Awards*
- *Upcoming NEEA meetings*

2024

- *Stakeholder Satisfaction Survey*
- *2024 PCC Meeting Dates*
- *Efficiency Exchange*
- *Other regional events?*





➤ Join us for the hybrid ceremony!

NEEA's Board and staff will recognize individuals and teams for their exemplary dedication and performance in energy efficiency during the NEEA Board Annual Meeting on **December 4**.

**Rising Star
Innovative Collaboration
Lifetime Achievement**

To RSVP* go to: nea.org/leadershipawards

**in-person attendees must RSVP by Nov. 17*



Upcoming NEEA Meetings

November

- 30th Cost Effectiveness & Evaluation Advisory Committee

December

- 4th Leadership in Energy Efficiency Awards
- 5th Q4 Board Meeting (Portland)
- 14th Regional Emerging Technology Advisory Committee



Q1-Q2 Stakeholder Engagement Activities



Stakeholder Satisfaction Survey

- Launch = Jan 16, 2024
- Focus = NEEA value, forums, processes
- Sent every 2-3 years
- Encourage individual responses



In-Person Stakeholder Visits

- Expected timing = Mar / Apr
- Discuss results of survey
- General marketing needs/alignment
- Socialize C7 business plan





2024 MEETING DATES



Q1

- Thursday, March 21

Q2

- Monday, June 24
- Tuesday, June 25

Q3

- Thursday, September 12

Q4

- Tuesday, December 3
- Wednesday, December 4

Efficiency Exchange Conference 2024



Save the Date

May 14-15, 2024

Coeur d'Alene, Idaho

For more information:

www.neea.org/EFX



*Other regional /
industry events or
announcements?*





Agenda

All times Pacific

12:30-12:40	Welcome, Agenda & Packet Review
12:40-2:00	Introductions & Regional Roundtable
(10 min)	BREAK
2:10-2:55	<u>MOTOR-DRIVEN PRODUCTS REGIONAL PRIORITY TOPIC:</u> Role of VFD's & Smart Pumps
2:55-3:40	<u>WATER HEATING REGIONAL PRIORITY TOPIC:</u> Multifamily
(5 min)	STRETCH BREAK
3:45-3:55	PCC Annual Workplan Check-in
3:55-4:05	Housekeeping
4:05-4:15	Recap, Next Steps, Adjourn



A piece of brown paper with a string tied in a bow around it. The string is a light brown, twisted cord. It is wrapped horizontally across the middle of the paper, and a vertical string is wrapped around it, crossing at the center. The string is tied in a bow, with two loops extending outwards and two ends hanging down. The background is a solid, textured brown paper.

Let's wrap it up!

Public Comment?
Action Items?
Closing Remarks?



Thank you, PCC

See you tomorrow for Annual Planning at 9:15 am!

