

Regional Emerging Technology Advisory Committee (RETAC)

Northwest Energy Efficiency Alliance

Q4 2024 Meeting

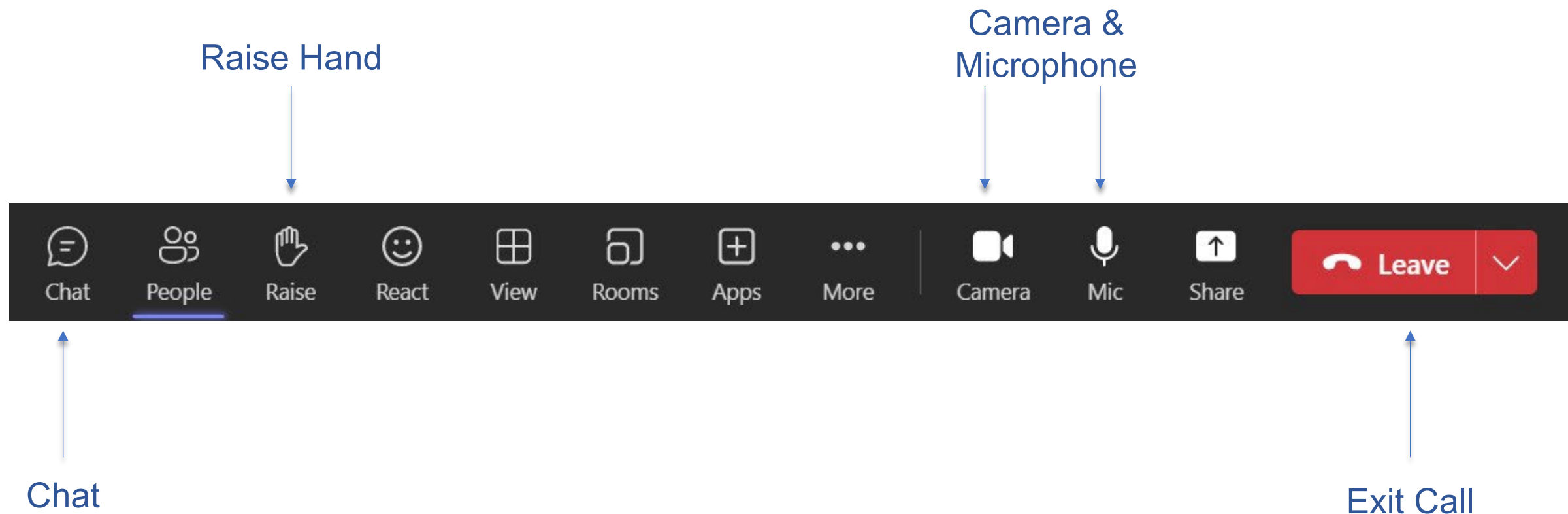
December 12, 2024

8:30 a.m. – 12:00 p.m.





Navigating MS Teams Layout



Note: These options may vary, depending on which version you're using.

***Name, Title,
Organization
and...***

***What is your favorite
winter holiday
tradition?***



Agenda

8:30 am	Welcome and Announcements
9:00 am	Residential HVAC Research
9:45 am	Emerging Technology Year-In-Review
<i>10:45 am</i>	<i>Break</i>
11:00 am	Water Heating
11:45 am	Wrap-Up





Q4 2024 Emerging Tech Newsletter

2024

Q4

Emerging Technology
Quarterly Newsletter

WHAT'S NEW:

NEEA's Emerging Technology team is concluding a successful 2024 with the completion of several key projects, including:

- A Residential Laundry Field Study;
- A commercial display test procedure;
- A study of heat pump rating representativeness;
- A room heat pump field study;
- An analysis of Commercial Heat Pump Dryers; and
- And a residential dual-fuel configuration analysis.

The launch of a long-awaited field study on Luminaire Level Lighting Controls (LLLC) combined with HVAC control in a commercial building constitute a highlight of the year. Led by Senior Product Manager Chris Wolgamott, this study, delayed by the COVID-19 pandemic, finally secured the necessary building owner, manufacturer and contractor partners earlier this year. The LLLC system, installed in August 2024 and inspected in Q4 2024, will be monitored through Q3 2025 to assess its energy-saving potential. By dynamically adjusting HVAC and lighting based on occupancy, the technology promises significant savings beyond the 50%-80% already demonstrated for LLLC lighting alone. The study has garnered considerable interest from extra-regional agencies, including the U.S. Department of Energy (U.S. DOE), Pacific Northwest National Laboratory (PNNL), and DesignLights Consortium (DLC), who eagerly await the results of this pioneering research.

Recent and Upcoming Product Councils:

- November 5, 2024 – [Heat Pump Water Heater Installation Tool](#)
- December 3, 2024 – [FEL Rated Fans and Flue Gas Thermo-Cooling: The Last Steps in Building Efficiency](#)
- December 17, 2024 – [Integrated Design Lab Series: Montana State University](#)

Information on upcoming Product Councils is always available at <https://neea.org/get-involved/product-council>.

Please reach out to any of NEEA's product managers with questions or suggestions on NEEA's emerging technology work. NEEA staff would love to hear from you.

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Questions about this report may be addressed to:

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PUBLISH DATE: DECEMBER 2, 2024

2025

Meeting Dates

Q1	Thursday, March 13
Q2	Wednesday, June 18
Q3	Wednesday, September 24
Q4	Thursday, December 4





Conferences & Product Councils



Conferences

Past Conferences

- Grid Forward – October
- California Emerging Technologies Summit – October
- BOMA Oregon Products and Services Expo – October
- American Society of Plumbing Engineers (ASPE) Convention & Expo – October
- ASHRAE Decarbonization Conference – October
- AMCA 2024 Annual Meeting – October
- GTI Emerging Technology Meeting – October
- Montana Joint Engineers Conference – November
- Peak Load Management Association 2025 Fall Conference – November
- Fan Efficiency Symposium – December





Conferences

Upcoming Conferences

- Consumer Electronics Show – January
- CEE Winter Member Meeting – January
- 2025 Dry Climate Forum – January
- MEEA Conference – January
- AHR Expo – February
- ASHRAE Winter Conference – February
- ACEEE Hot Air and Hot Water Forums – March
- Urban Land Institute Idaho Sustainability Conference – March
- ARPA-E Conference – March
- HVAC Excellence Education Conference - March



Q4 2024 Product Council Presentations

Presenter	Topic	Date Scheduled	Webinar Recording
VEIC	Refrigerant Regulations & Compliance Requirements	October 15, 2024	<u>Northwest Energy Efficiency Alliance (NEEA) Refrigerant Regulations...</u>
PNNL	HPWH Installation Tool	November 5, 2024	<u>Northwest Energy Efficiency Alliance (NEEA) Heat Pump Water Heater...</u>
Energex	FEI Rated Fans and Flue Gas Thermo-Cooling	December 3, 2024	<u>Northwest Energy Efficiency Alliance (NEEA) FEI Rated Fans and Flue...</u>

Upcoming Product Council Presentations

Product Council Submit a Topic Form

The Product Council offers an opportunity for utilities and energy efficiency organizations within the Northwest (and other interested parties) to explore and discuss new products, technologies and market trends that could help the region meet its energy goals. The forum is causal to foster deep discussion of the merits and challenges with the products and services reviewed.

Interested in submitting a topic idea for an upcoming Product Council meeting? Fill out the form below:

Note: To ensure successful submission of your topic, please make sure to refresh this screen prior to inputting any information if you have left it open for a period of time before submitting the form. To avoid inadvertent loss of information we recommend completing your submission in Word and then copy/pasting here.

You should receive a confirmation email upon successful completion of submission. Have questions or need support? [Please reach out to us directly.](#)

Scheduling

Scheduling Support

If you simply need to schedule your presentation for an upcoming Product Council agenda, select Option #1. If you have an idea and need help scheduling, select Option #2.

- ☐ #1: I have a topic/date in mind and am ready to schedule
- ☐ #2: I have an idea for a topic and need help scheduling

Preferred Presentation Date

Please include preferred attendance dates for the suggested topic. Product Council is scheduled on Tuesdays from 10:30 a.m. - 12 p.m. (PST).

Input preferred date option(s) here

Your Information

<https://neea.org/product-council-submit-a-topic-form>



Residential HVAC Research



ResHVAC 2024 – NEEA Research

Electric

Low Load Efficiency

- Investigation
- Lab Testing
- Field Data Analysis

Connected Commissioning

Cold Climate + MSH

Cold Room Heat Pump Field Study

Gas & Dual Fuel

- Modeling of Dual Fuel Systems Architypes
- Field Testing - iFlow



ResHVAC 2024 – Standards Update

Test Procedures

- AHRI 210/240 major update
- AHRI 1600 – 2029 version?
- AHRI 1380 – No update
- EPA Room Heat Pump Test Finalized
- C700 – Canadian test procedure on path to national standard and accreditation

Standards & Criteria

- DOE federal min --- negotiation failed
- CEE Tax Credit – Simplified (see below)
- ENERGYSTAR – v6.2, ESME, RHP

Data & QPL Improvements

- NEEP Database
- AHRI Directory

2026 CEE Split ASHP Specification						
CEE Level	SEER2	EER2	HSPF2	COP at 5°F*	Capacity Ratio~	Load Management†
CEE Tier 1						
Path A	≥ 16.0	≥ 9.8	≥ 8.5	≥ 1.75	≥ 65% at 5°F/47°F	AHRI 1380
Path B	≥ 16.0	≥ 11.0	≥ 8.0	≥ 1.75	≥ 50% at 5°F/47°F	AHRI 1380
CEE Advanced Tier						
Refer to the DOE Cold Climate Heat Pump Challenge Specification						



Market Changes

A2L Refrigerants in 2025

- R32
- R454B

Supply chain

- Back to “normal”
- significant price increases
- R410 equipment – EOY hording

A3 Refrigerants in 203?

- European shifting to R290
(Propane) mono block designs

Notable New Tech

- Cold Climate Room HP
- Trimode (heat, cool, water) combi systems both hydronic and refrigerant driven
- Machine learning driven virtual energy assessments



NW Utility Investigations

- RTF CAT
- Chelan PUD
- Tacoma Power
- BPA High Performance High Capacity



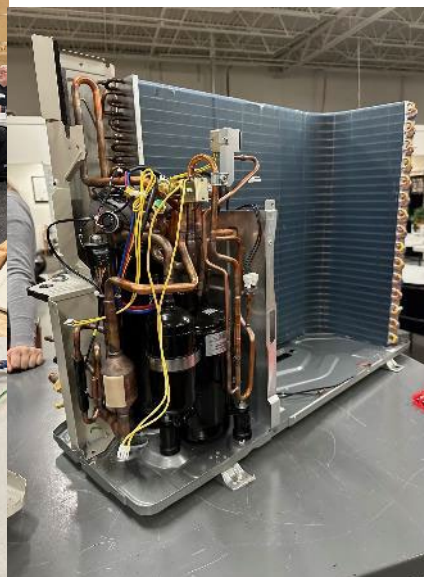
Hot Off the Press – LLE Heat Pump Teardown

- History

- Next Step Homes
- VCHP Archetype Study
- Perform Data
- OEM Interviews
- Virtual Teardown
- LLE lab testing
- LLE teardown Workshop

- Teardown Workshop

- Munro & Associates
- National Labs
- EPA ENERGY STAR
- Natural Resources Canada
- Subject matter experts
- Design Engineers from OEMs





Rating Representativeness

Overview

- Comparison of 2 different test methods (AHRI 210/240 and CSA SPE07)
- 6 Systems (3 ducted, 3 ductless) tested in field and then lab
- University of Nebraska and DNV with bi-national technical advisory committee

Outcomes

- Unique lab quality performance data
- SPE07 load based testing does better job of partial load performance evaluation
- SPE07 provides is better, though not dramatically so.
- Updated SPE07 test is repeatable, reproducibility still being evaluated by NRCan
- Project had impact on revised AHRI 210/240 test procedure --- resulting in inclusion of a controls verification procedure

Figure 7-3. Rank order of cooling SCOP values from field and lab data – normalized to Mixed climate

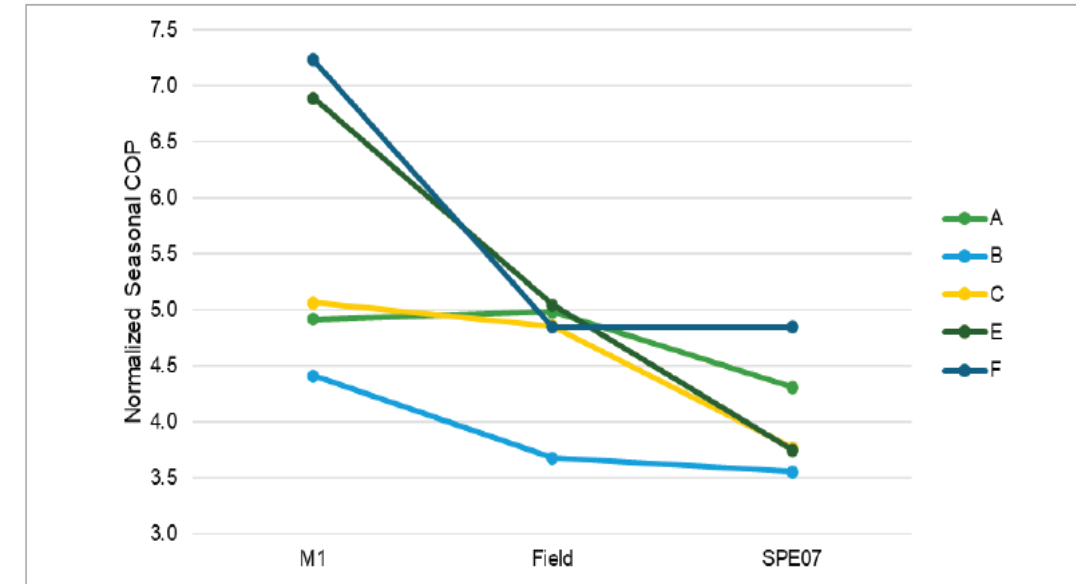
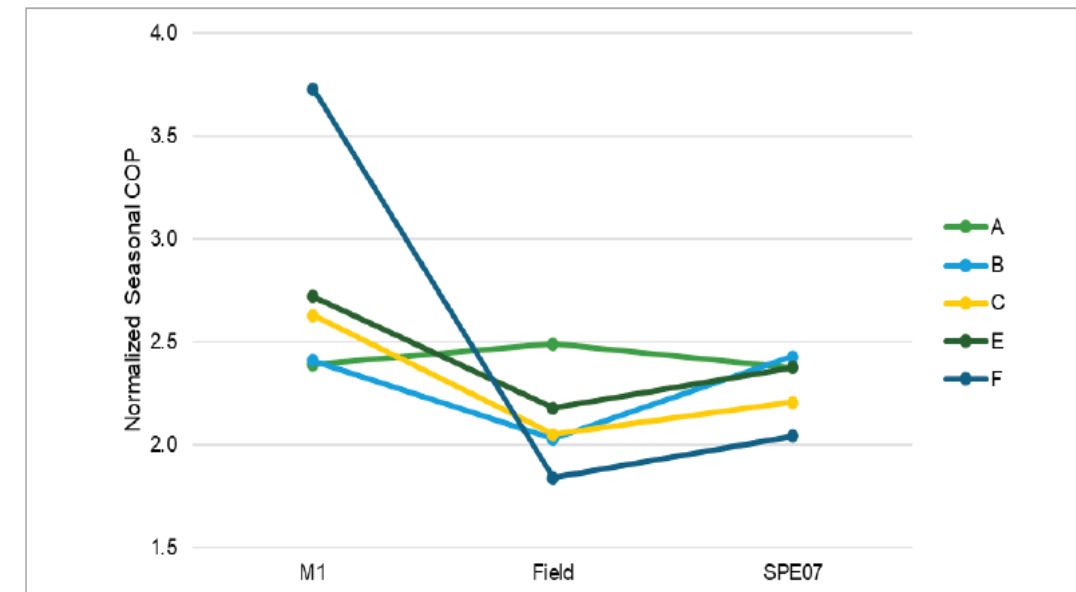


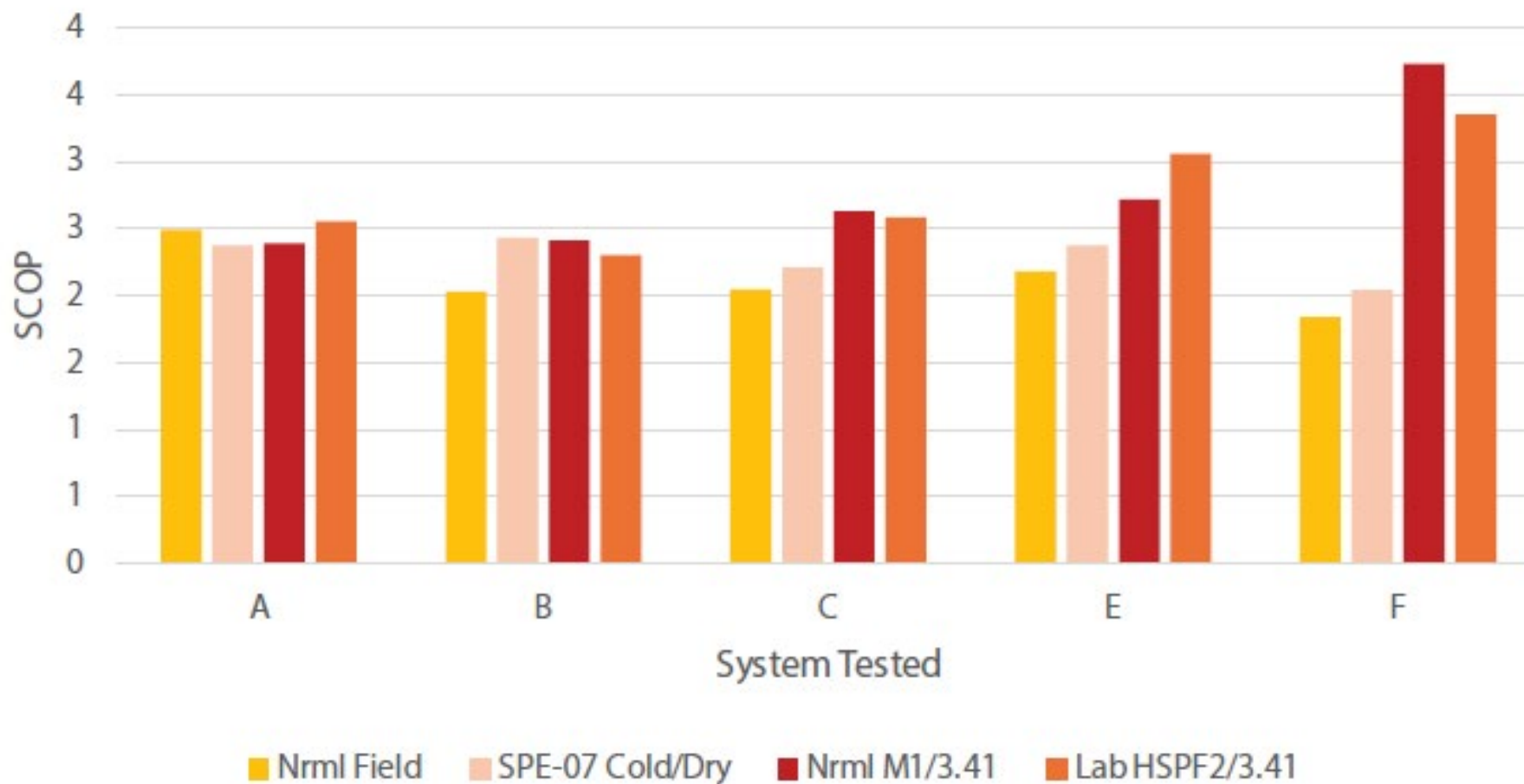
Figure 7-4. Rank order of heating SCOP values from field and lab data – normalized to Cold/Dry climate





Rating Representativeness

Comparison of heating SCOP values calculated from field and lab data





Rating Representativeness

Small sample size n=5

Root Mean Square Error
With Field SCOP as reference

	Cooling		Heating	
	SPE-07	M1	SPE-07	M1
Ducted	0.74	0.45	0.26	0.40
Ductless	0.92	2.14	0.20	1.39
Combined	0.82	1.40	0.24	0.93

Mean Absolute Percent Error
With Field SCOP as reference

	Cooling		Heating	
	SPE-07	M1	SPE-07	M1
Ducted	13%	9%	11%	17%
Ductless	13%	43%	10%	64%
Combined	13%	22%	10%	36%



2025 ResHVAC Research

Continuing

- Cold Climate Room Heat Pumps
- iFlow Dual Fuel system
- TriMode Heat Pumps

status

22/30 sites identified
installed
report due Q2

New Projects

- NW Basecase Study and Modeling Calibration
- Whole Home ductless solutions (aka No Duct Loss)
- Market Research – possible contractor focus groups
- Dual Fuel – Thermostat optimization
- AHRI 1380 updates and market adoption strategy

- What Else?

started
started
likely
maybe
maybe



Emerging Technology Year-In- Review



Consumer Products



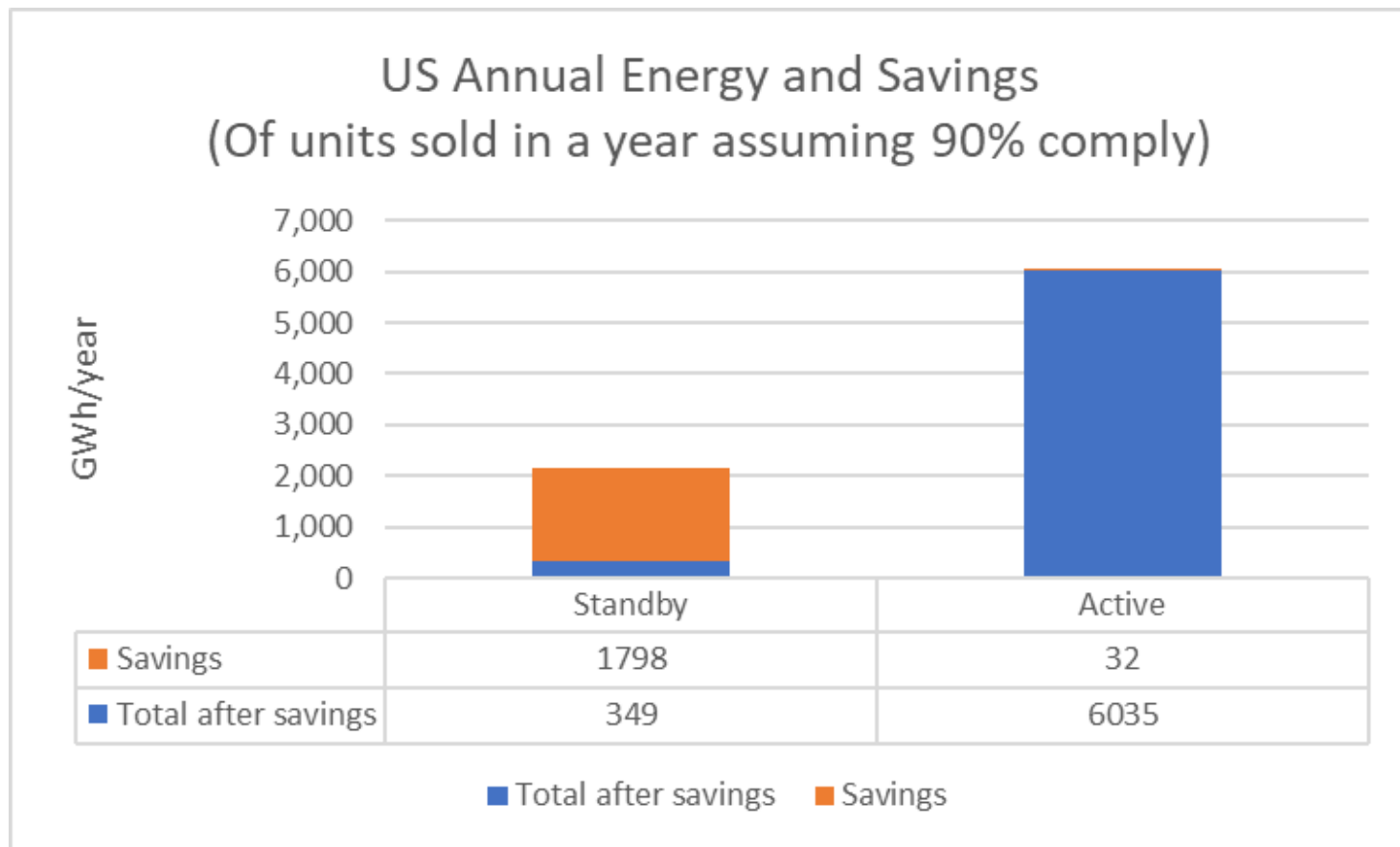
Consumer Products – TV Opportunity



- TV energy consumption is rising.
 - Smart wake
 - Picture quality innovations
 - Screen size
 - Streaming content
 - HDR content
- NEEA drove development of a test method to fairly evaluate technology advancements.
- NEEA supported industry VA representing 70%+ share of market tasked with agreeing upon performance standards.



Highest Potential Savings Consumer Product



- TV Voluntary Agreement
 - Standby Mode levels were agreed upon at <2 watts.
 - On-mode discussions progressing slower than anticipated.
 - With proper framework savings could be considerable.
- Commercial Display and Monitors
 - Test method adaptations are complete.
 - Model testing continues.



Consumer Products- Commercial Heat Pump Dryers



Source: Bruce Becker, Hotel Marcel.



- Partnered with International Hotel Chain and Manufacturer to study viability of Heat Pump Dryers in a hotel application.
- One model available with max 44 pounds of stated capacity.
- Lab-tested versus popular gas and electric models using hotel provided textiles.
- Behavior of the equipment was difficult to predict, but manufacturer believes that with additional R&D this can be addressed.
- Included AHAM and Momie textile runs to inform EPA consideration of commercial dryer specifications.
- Connected with US hotel implementing HP dryer conversion.



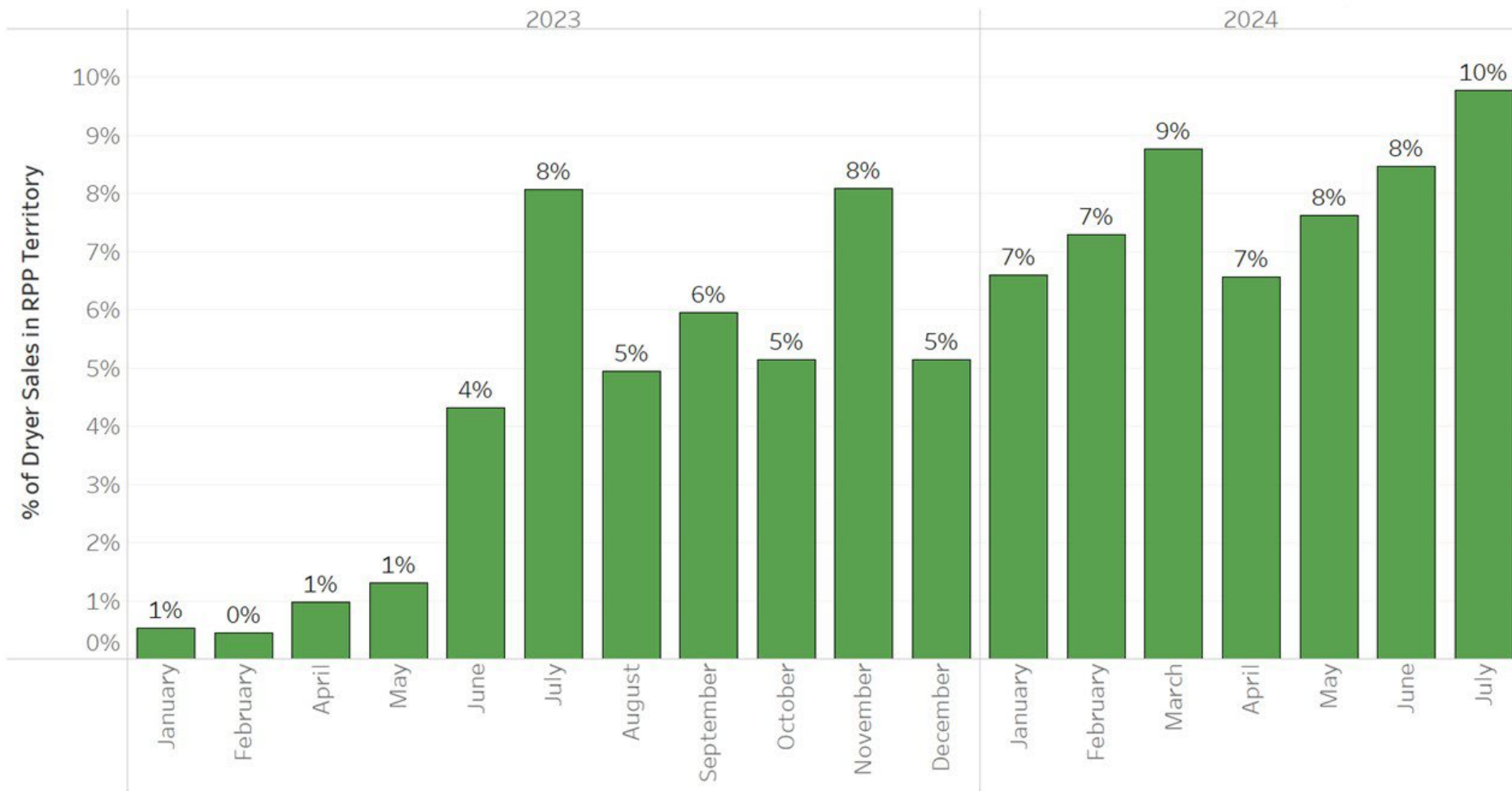
Momentum Shift in Residential Heat Pump Dryers

- NEEA Has Advocated for Efficient Dryers Since 2012
- Heat Pump Dryers Have Been a Slow Build
 - Significant Per Unit Energy Savings
 - Real and Perceived Barriers to Adoption
- Hurrah! All-in-One Combos are Breaking Through!
- More Innovation?



Growth in Market Share of HP Dryers

Heat Pump Dryer Sales - Percentage of Total ENERGY STAR Retail Products Platform (ESRPP) Sales





Current Full-size Combo Heat Pump Models Available



GE Profile - 4.8 cu. ft. UltraFast Combo Washer & Electric Dryer with Ventless Heat Pump Technology - Carbon Graphite

\$1999



Profile 4.6 cu. ft. Smart UltraFast Electric Washer and Dryer Combo in White with Ventless Heat Pump Technology

\$1799



LG - 5.0 Cu. Ft. Extra-Large Capacity WashCombo All-In-One Electric Washer/Dryer with Steam and Ventless Heat Pump Technology - Black Steel

\$1899



Samsung - Bespoke AI Laundry Combo 5.3 Cu. Ft. Ultra Capacity All-in-One Washer with Super Speed and Ventless Heat Pump Dryer - Dark Steel

\$1899



Consumer Products Activities - Laundry

- Laundry Combos
 - Enabled data reporting to have Combos and Laundry Centers **added to ENERGY STAR QPL and ESRPP Product Tiers**
 - Testing for NEEA QPL
 - Pursued industry input on new test procedure
 - Lukewarm response
 - Redirecting efforts
- Laundry Field Study
 - Publishing imminent
 - Engaged with EPA on specification development
 - Consumers use Eco-mode on ENERGY STAR dryers about half the time
 - Confirmed that Normal program and small loads continue to be common
 - Included data on sub-set of Heat Pump Dryers



Consumer Products Activities - 2025 Focus Projects



- TV Policy Initiative
 - Continue current path
- Residential Laundry Field Study
 - Leveraging insights to support dryer specification development
 - Post analysis planned to extend to gas powered dryers
- Combo and Laundry Center Testing
 - Fitness for Use Testing
 - Consumer Experience

Pumps

Fans

Power Driven

Systems = Motor +

Variable Speed

Drive



Motor-Driven Systems - Pumps

- DOE test procedure scope expanded include 4 New Pump Categories:
 - (A) Radially-split, multi-stage, horizontal, end-suction diffuser casing (RSHES);
 - (B) Radially-split, multi-stage, horizontal, in-line diffuser casing (RSHIL);
 - (C) Small vertical in-line (SVIL); and
 - (D) Vertical Turbine (VT)
 - Already Covered: ESCC, ESFM, IL, RSV, ST
 - Highlight Ag Space Submersible Turbine QuickPAK
 - Up to 5 hp
 - For constant pressure systems
 - All-in-one package:
 - submersible pump + MagForce motor + drive





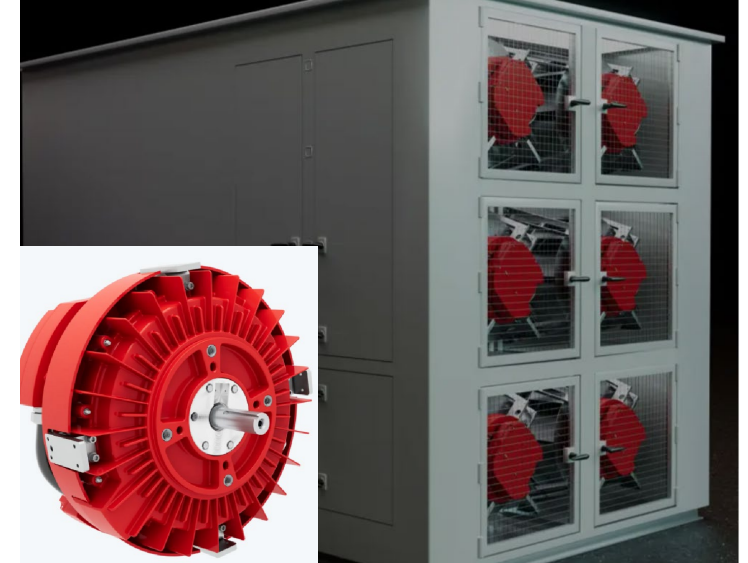
Motor-Driven Systems - Pumps

- ANSI / ASME B73 Process Pumps
 - Scoping opportunity for clean water & non-clean water applications
 - Highlight: Sulzer AHLSTAR A process pump
 - Centrifugal single-stage, modular design, customizable
 - Enhanced efficiency over conventional off-shelf CPE process pump



Motor-Driven Systems

- Fans & Blowers – Upcoming Research
 - Upcoming Research:
 - Feasibility of Calculating in-Situ FEI for installed fans (in-field)
 - Results expected in Q2 2024
 - Supports RTF's research strategy
 - Highlight Product: Infinitum Aircore EC Motors
 - Designed for data centers
 - PCB stators + axial flux design
 - Smaller, lighter, less copper
 - Integrated VFD



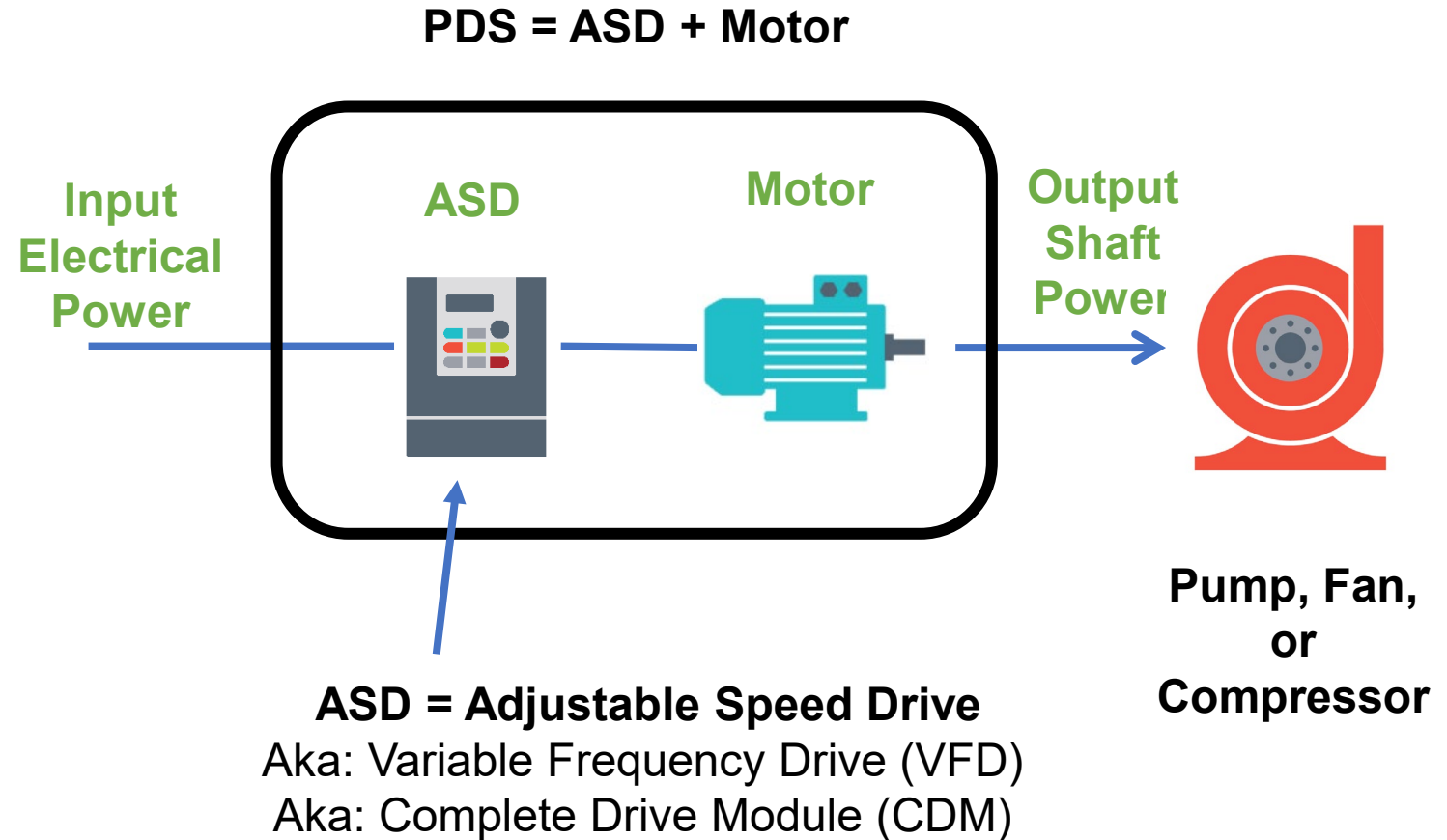


Motor-Driven Systems

- Power Driven Systems = Motor + Controller
 - Motor + Drive - Independent of / does not include end-use equipment
 - Power Index (PI) Calculation & Metric
 - Calculation procedure quantifies energy savings from PDS
 - Metric rates motors with an index that indicates energy savings obtained with and without a paired VSD (bigger is better)
 - PI Developed by NEMA & motors coalition
 - First published in 2021; PI 2.0 calculation published in 2024
 - validation testing has begun

What are Power Drive Systems (PDS)?

- A PDS can be:
 - 1-piece (e.g., ECM or other Integrated Motor and Controls)
 - 2-pieces (Separate Motor & Drive)
- A PDS does **not** include end-use Equipment





Motor-Driven Systems

- PI is an **index** used compare the relative energy savings of a rated PDS to a standard baseline motor.

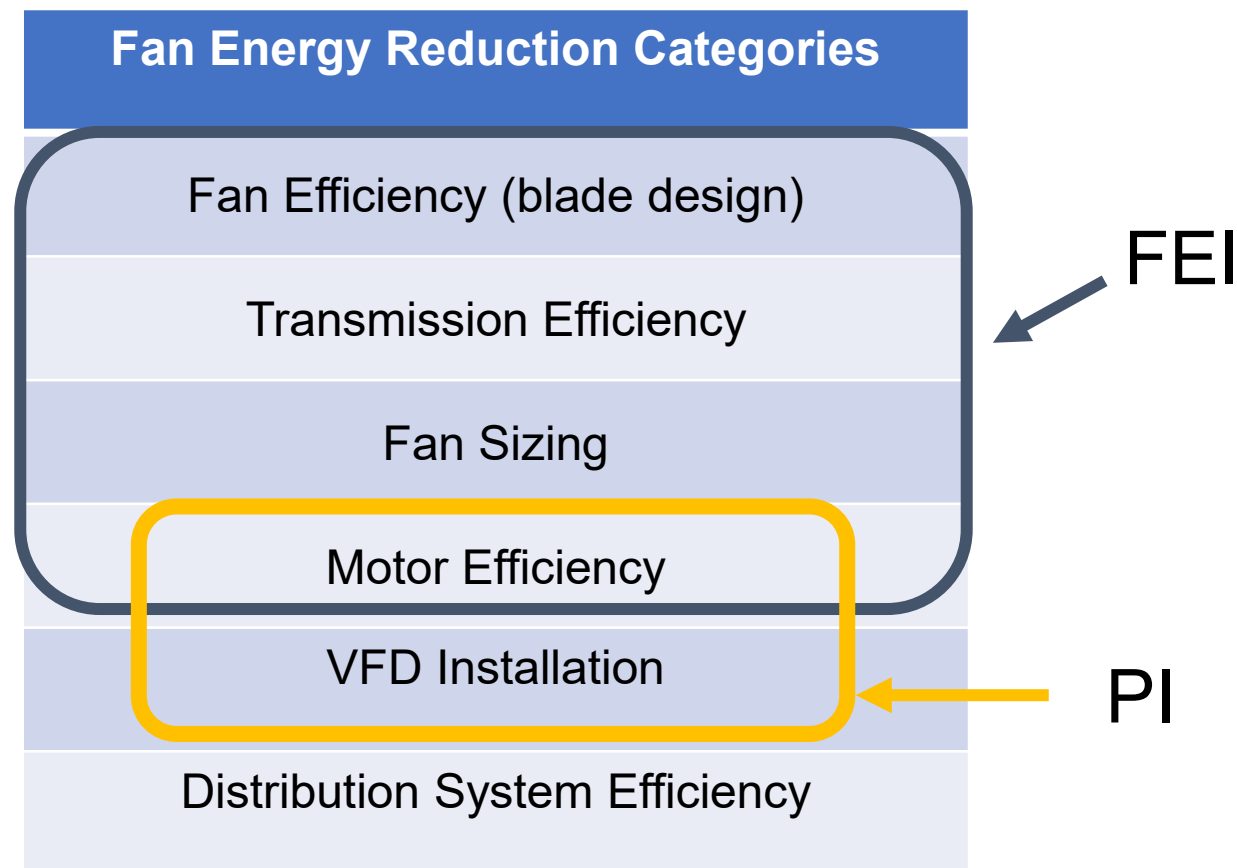
$$PI = 1 - \frac{\text{Rated Input Power}}{\text{Baseline Input Power}}$$

- The metric provides a calculation method for fixed speed, synchronous, and inverter-only motors, both standalone and in PDS.
- PI characterizes **average power savings** relative to a standard baseline motor operating at full load.

Power Drive System	Full Load Motor Efficiency	PI
10 HP IE3 Motor	91.7%	0
10 HP IE3 Motor w/ VFD	91.7%	52.5
10 HP IE4 Motor	93.4%	1.2
10 HP IE4 Motor w/ VFD	93.4%	53.2

Motor-Driven Systems

- Full Fan Systems Savings
 - FEI is measured at a single design point, but does not capture reduced speed savings
 - PI can quantify impact of VSD on fan energy use





Motor-Driven Systems

- Pumps
- Fans
- Variable Speed Drives
- One more thing - Compressed Air Challenge
 - Continued NEEA participation as board members
 - Limited number of free trainings available – inquire for more info if interested



Lighting and Commercial HVAC

NEEA 2024 LLLC/HVAC Integration Project

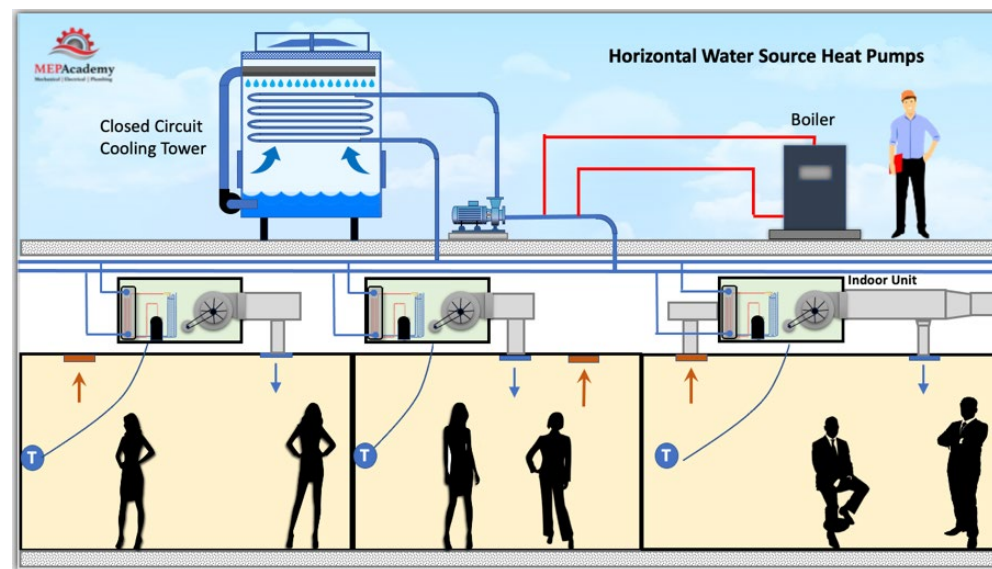
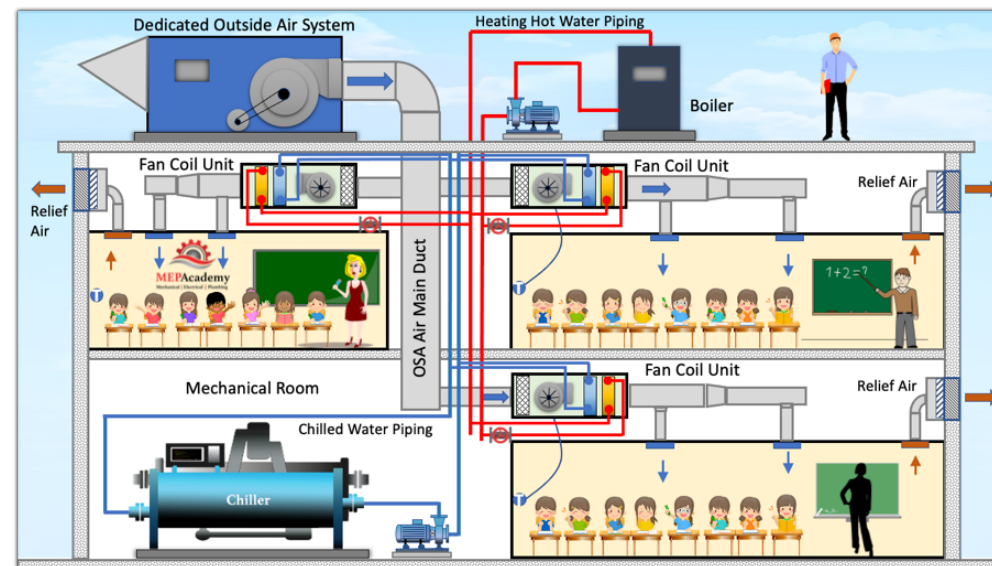
Launched in September 2024, the goal of the project is to measure how occupancy data from an integral fixture sensor can inform and optimize HVAC system operation in a typical small/medium commercial building. The field demonstration was deployed in a 12,500 sqft office in Northern California consisting of private offices, conference rooms, open plan, reception and employee lunch/breakroom. The area is served by five thermostatically controlled, single zone, constant volume rooftop HVAC units.

- **Lighting System Retrofit** (88) 3 lamp F32T8 fluorescent parabolic fixtures were renewed with a custom LED retrofit kit that included a certified DALI D4i driver, and an integral D4i and Zhaga Book 20 compatible sensor/controller.
- **HVAC Thermostat Retrofit** (5) Older programmable thermostats were replaced with state-of-the-art BACnet and Modbus enabled Wi-Fi thermostats.
- **Gateway** An edge gateway was installed to facilitate local communication with the Wi-Fi thermostats over Modbus TCP, communicate with the Bluetooth Mesh NLC lighting sensors/controllers, and host the evolving LLLC/HVAC setback logic.
- **Energy Metering System** A commercial grade energy meter/datalogger/web server was installed to measure and log real-time RTU energy usage and support M&V data collection.



Gas High Efficient Dedicated Outside Air System

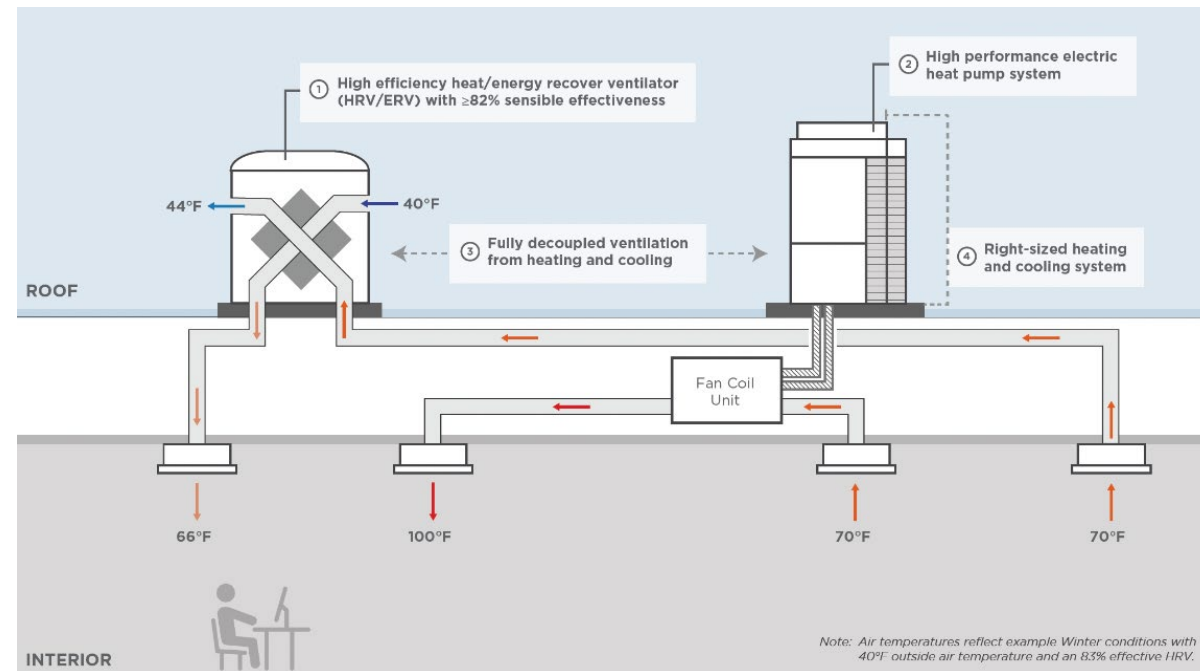
- Aims to Expand existing VHE DOAS Program
- Should have both Natural Gas and Electric savings
- Will include larger commercial buildings with Hydronic heating and cooling systems



GHE DOAS Next Steps

- Field testing
- Modeling work
- Market research
- Spec Development
- Shooting for late Q3 early

Q4 2025



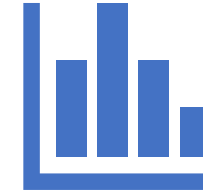
Current VHE DOAS diagram

Efficient Rooftop Unit Modeling

*Why are we
doing more
Modeling?*



Potential expansion to include
electric savings



Push towards a whole box
metrics for defining how
efficient the whole unit is



Whole box metrics like CSA P.8's $TCOP_{HS}$ better account for RTU performance



Included



Partially
Included



Not
Included

◆ NEEA focus

RTU Feature/Metric	Heating Metrics			Cooling Metrics		
	TE	TE2	$TCOP_{HS}$ ◆	EER	IEER	IVEC
Full load efficiency	Included	Included	Included	Included	Included	Included
Part load efficiency	Not Included	Included	Included	Not Included	Included	Included
Seasonal weighting	Not Included	Not Included	Included	Not Included	Included	Included
Supply fan energy	Not Included	Not Included	Included	Partially Included	Included	Included
Economizing ability (free cooling)	Not Included	Not Included	Not Included	Not Included	Not Included	Included
Furnace jacket losses	Not Included	Included	Included	Not Included	Not Included	Not Included
Cabinet insulation ◆	Not Included	Not Included	Included	Not Included	Partially Included	Partially Included
Cabinet leakage	Not Included	Not Included	Not Included	Not Included	Partially Included	Partially Included
Damper leakage ◆	Not Included	Not Included	Included	Not Included	Not Included	Not Included
Heat or energy recovery credit ◆	Not Included	Not Included	Included	Not Included	Not Included	Not Included
Dual fuel interactive effects	Not Included	Not Included	Not Included	Not Included	Not Included	Not Included
Energy saving control methods	Not Included	Not Included	Not Included	Not Included	Not Included	Not Included
Controls verification procedure	Not Included	Not Included	Not Included	Not Included	Not Included	Not Included

Efficient Rooftop Unit Modeling



This modeling effort includes various building types, climate zones, and HVAC system types, detailed below:



HVAC system types: Gas packaged RTU with AC, gas packaged RTU with AC and high ventilation, packaged ASHP with electric resistance backup heating, and packaged ASHP with gas backup heating.



Building types: Medium Office, Single-story Medium Office, Stand-alone Retail, Strip Mall Retail, Grocery, Warehouse, and Primary School.

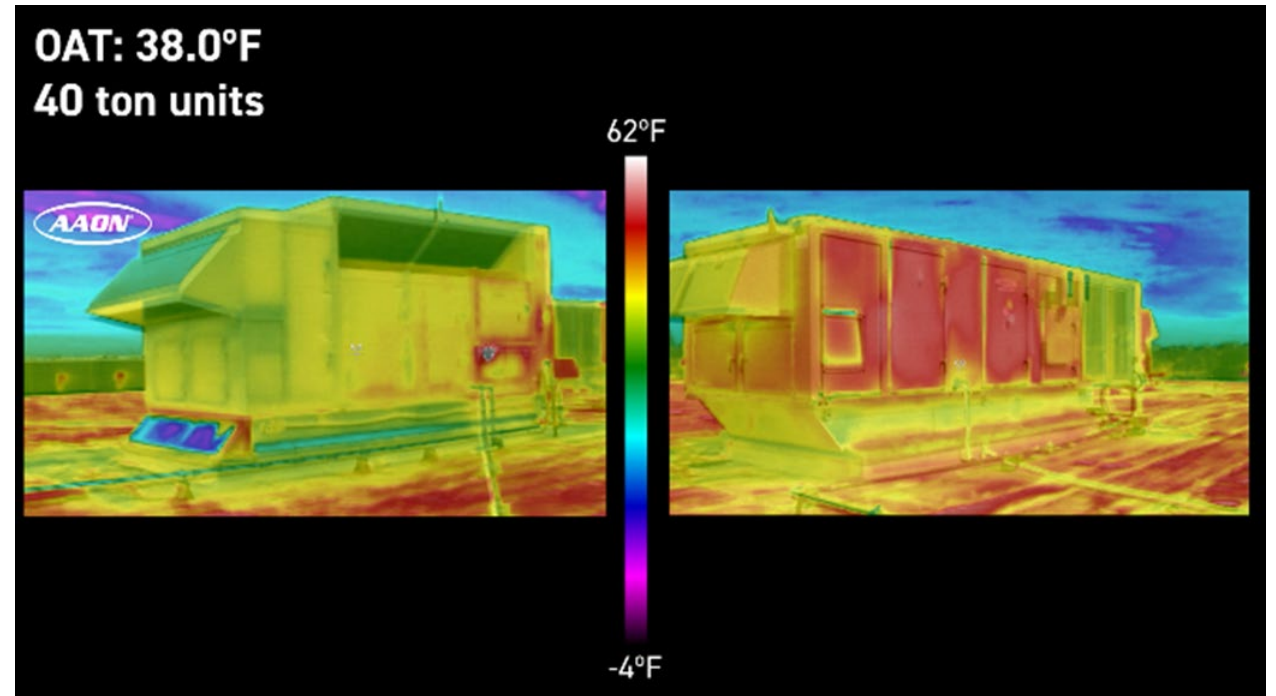


Climate zones: ASHRAE 90.1 Reference Cities, including Seattle, WA (4C), San Diego, CA (3C), Denver, CO (5B), Great Falls, MT (6B), Tucson, AZ (2B), El Paso, TX (3B), Atlanta, GA (3A), Tampa, FL (2A), Chicago, IL (5A), 3 New York City, NY (4A), and Minneapolis, MN (6A).



Efficient Rooftop Unit Modeling cont.

- Energy Efficient Measures:
- R8 Enclosure Insulation
- R12 Enclosure Insulation
- Low-Leakage Dampers
- Efficient Cooling
- Enclosure Leakage
- Energy Recovery Ventilation (ERV)
- NEEA Tier 1
- NEEA Tier 2
- Low Switchover Temperature
- Cold Climate Heat Pump





Break

Return at 11:00

Agenda

8:30 am	Welcome and Announcements
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9:45 am	Emerging Technology Year-In-Review
10:45 am	<i>Break</i>
11:00 am	Water Heating
11:45 am	Wrap-Up



Water Heating



Key Activities for 2024

Residential

- ✓ DOE standard for residential water heaters
- ✓ Advanced Water Heating Specification (AWHS) 8.1 and Qualified Products List (QPL) Updates
- ✓ AWHS Product Evaluation
- ✓ Advised multifamily integrated HPWH developers (Garden Park, Bosworth, Polyphon, LSW Architects)
- ✓ Support the Hot Water Innovation Prize

Commercial

- ✓ AWHS 8.1 and QPL Updates
- ✓ Mamook-Tokatee case study
- ✓ Splash Blocks case study and virtual tour



2024 Product Councils

- ✓ Simple Solutions for Complex Problems – Light Commercial HPWH (June)
 - ✓ ACEEE Boring but Efficient: HPWH Opportunities in Commercial Buildings
- ✓ Central HPWH Trainings for Multifamily - Splash Blocks case study, virtual tour (September)
- ✓ Heat Pump Water Heater Installation Tool (November)

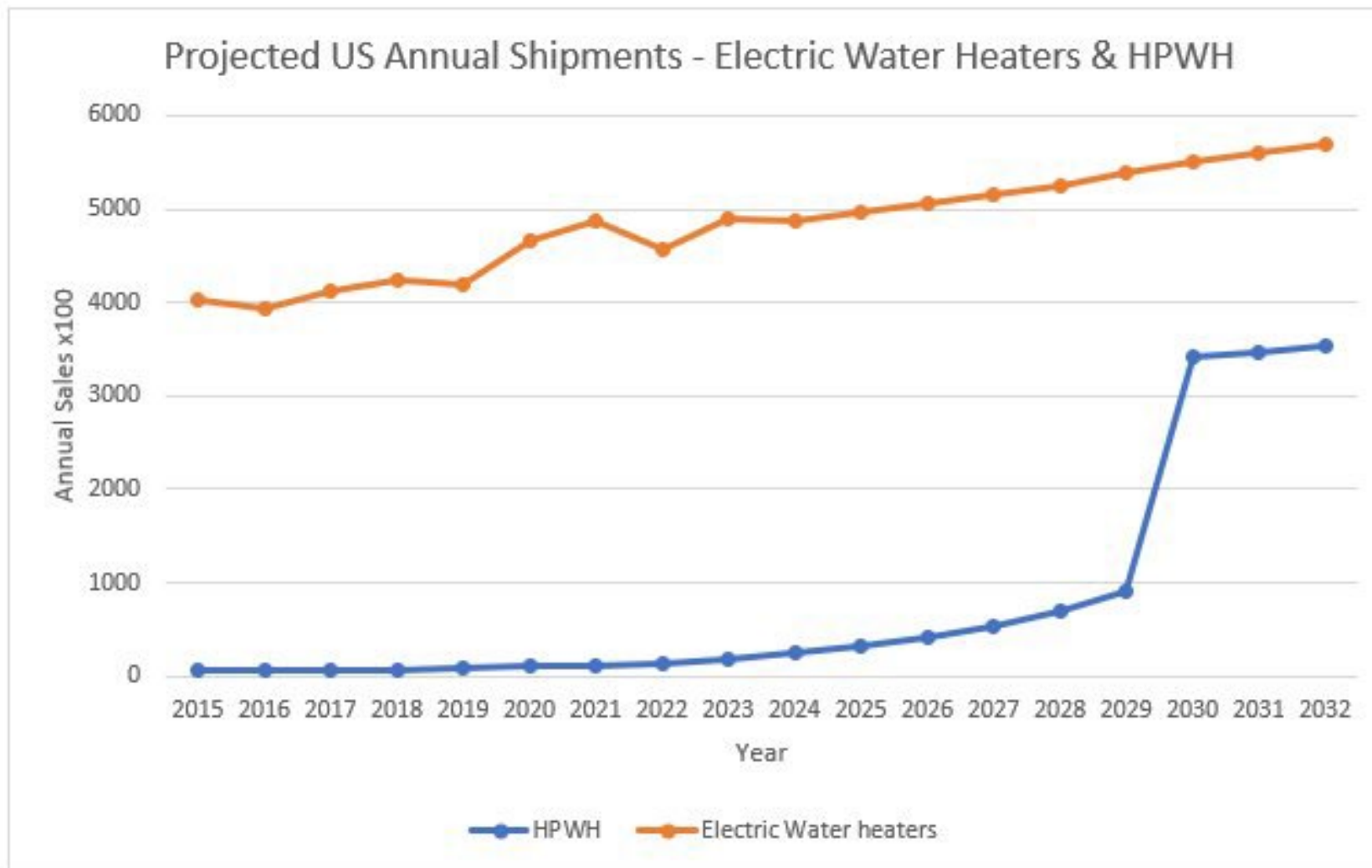


DOE Standard Key Takeaways

- NEEA convened a group of stakeholders to discuss standards
 - “Coalition of the Willing” approach
 - Included manufacturers, energy efficiency advocates, environmental groups, and consumer advocates
- Goal was to make a recommendation to DOE that would be both good for consumers and avoid unintended consequences
- Joint comment submitted in October 2022, with the final DOE rule largely following recommendations from joint comment letter
- DOE finalized new water heater efficiency standards in May 2024. Compliance with the new standards is required May 6, 2029



Projected Electric WH & HPWH Annual Sales











AWHS 8.1 Updates

- Specification Updates
 - Residential
 - Demand response requirements are met through OpenADR Alliance's EcoPort Certification or AHRI Standard 1430
 - Plug-ins (120v) will be evaluated with the same requirements as 240v HPWHs
 - Split systems are qualifiable for interior, exterior or both applications
 - Commercial
 - Streamlines listing of CHPWH
 - Creates pathway for integrated CHPWHs
 - Defines three market delivery methods



Residential Qualified Products List (QPL)

Residential HPWH Qualified Products List											
Brand	Model Number	Storage Volume	 Indoor Rating	 Outdoor Rating	Configuration	Endorsements		Qualified			
			Tier	CCE		Tier	SCOP	Flex Load Connectivity	Plug-In	Date	Version
A. O. Smith	HP1050H45DV ***	50	3	2.9		 Integrated			3/14/17	6.0	
A. O. Smith	HP1050H45DVCTA-130	50	3	2.9		 Integrated	SC		1/18/21	7.0	
A. O. Smith	HP1080H45DV ***	80	3	2.9		 Integrated			3/14/17	6.0	
A. O. Smith	HP1080H45DVCTA-130	80	3	2.9		 Integrated	SC		1/18/21	7.0	
A. O. Smith	HPA10-40H45DV 2**	40	4	3.1		 Integrated	SC		3/8/24	8.0	
A. O. Smith	HPA10-50H45DV 2**	50	4	3.2		 Integrated	SC		3/8/24	8.0	
A. O. Smith	HPA10-66H45DV 2**	66	4	3.3		 Integrated	SC		3/8/24	8.0	



Residential AWHs Product Evaluation

- Secret shopping exercise of 4 HPWH
 - Performed a series of inspections, observations and simulations
- Next steps
 - Share information with each manufacturer
 - Continue documenting updates to the AWHs for a future release

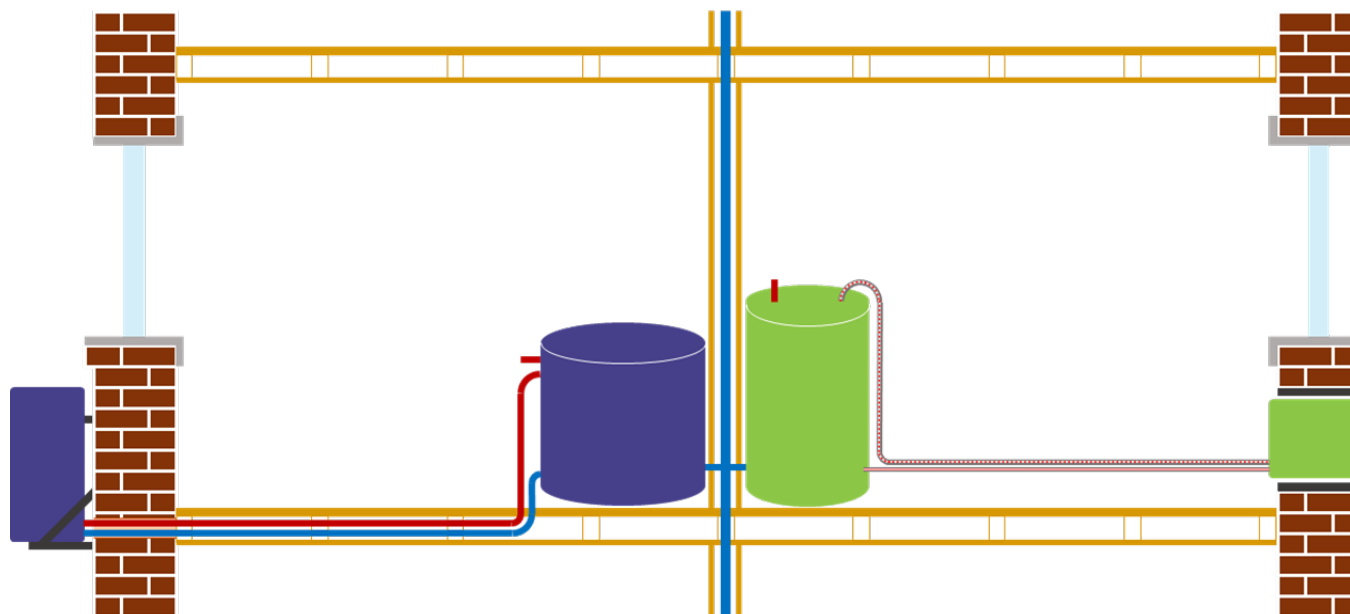
Item	AWHS Requirement		Finding
	v8.0	v8.1	
Compressor Lower Temperature Operating Limit	App. B.2	App. A.2	Satisfactory
Limitation of Lower ER Element	2.7.1	2.4.3	Satisfactory
Condensate Blockage	2.5.4.2	2.4.6	Satisfactory
Compressor Shutdown, Normal Event	2.5.2	2.4.3.4	Satisfactory
Compressor Shutdown, Product Failure	2.5.2	2.4.3.5	Satisfactory
Air Filter Maintenance Notification	2.6.3	2.4.7	Satisfactory
Default Operating Mode	2.6.1	2.4.3.2	Satisfactory
72-hr Timeout on Less Efficient Modes	2.6.1	2.4.3.2	Satisfactory
Recovery from Power Loss	2.6.1	2.4.3.3	Satisfactory
Sound Pressure Level	Table 1	2.4.5.1	Satisfactory



Hot Water Innovation Prize

HOT WATER
INNOVATION PRIZE

- The Hot Water Innovation Prize intends to reward those that develop innovative split system HPWHs and bring the technology to market.
- The prize is for an affordable, easy to install - HPWH split system with an indoor tank and separately housed compressor-evaporator that operates in an outdoor climate.
- These split system HPWHs are expected to improve equity by bringing energy-efficient water heating and savings to *low-rise multifamily dwellings*, disproportionately occupied by lower-income families and households of color.





Commercial Case Studies – Multifamily Central Systems

- Mamook Tokatee
 - A.O. Smith CHP120 HPWHs
 - Low income
- Splash Blocks
 - Nyle e360 HPWH central system
 - Market rate





2025 Planned Activity - Residential

- AWHs and ENERGY STAR® specification alignment
- HPWH sound research and test procedure standardization
- Explore how accessories affect performance of HPWHs
- Review Hot Water Solutions and update/create technical bulletins
- Continue PGE Test Bed support
 - Garden Park (Integrated HPWH) – low income SE Portland, 117 units some retrofit, some new construction
 - Bosworth (Integrated HPWH) – market rate N Portland, 12 units new construction
- Continue supporting the Hot Water Innovation Prize





Residential HPWH Accessory Research

- Hot water circulation
 - Continuous, on-demand & timed
- Mixing/tempering valve
- Drain water heat recovery





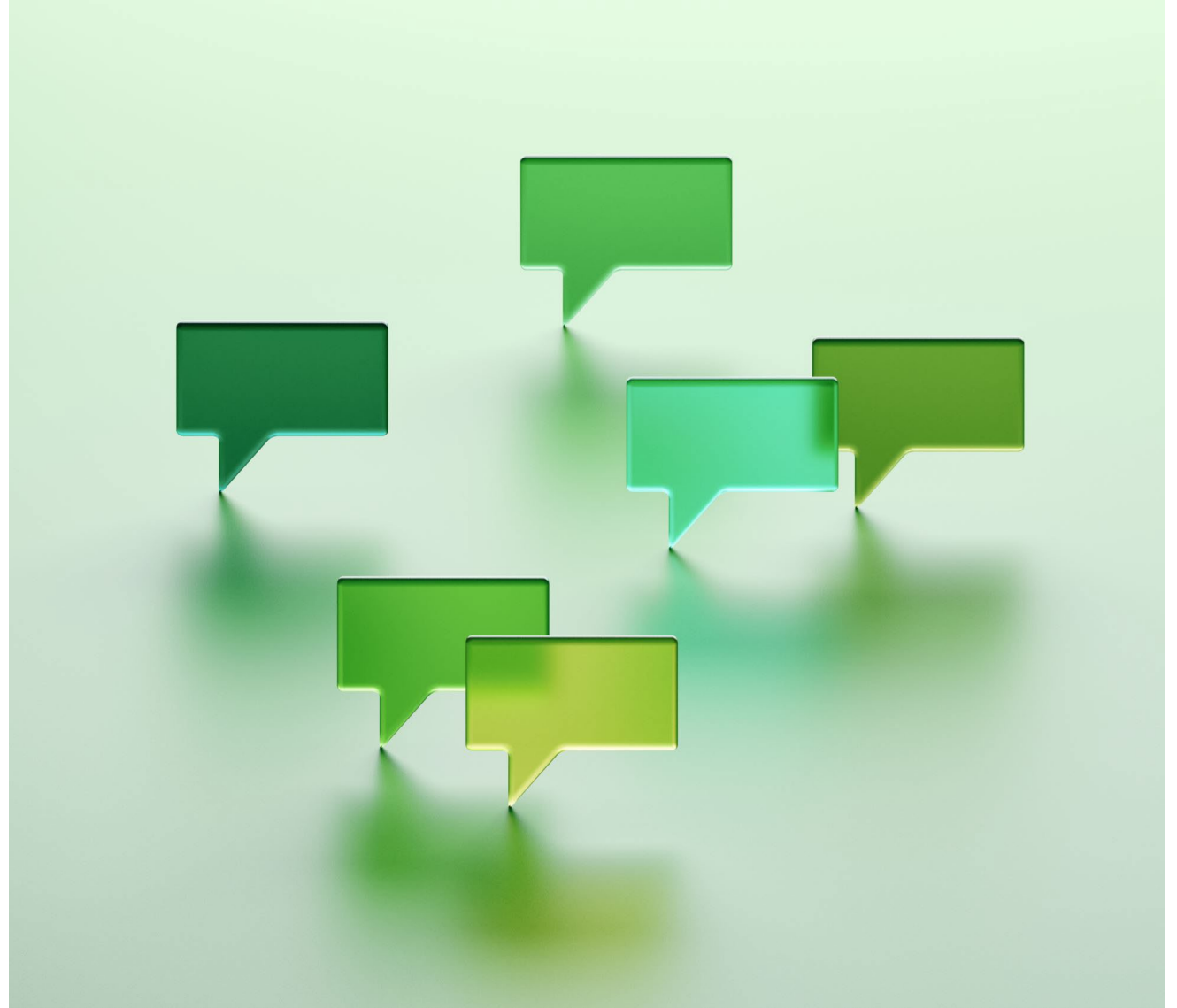
2025 Planned Activity - Commercial

- Continue PGE Test Bed support
 - Meridian Gardens SE Portland
- Scaling Up project support
- Explore Light Commercial
- Betterbricks.com updates
- ENERGY STAR test procedure



Closing

*Open Discussion
& Comments*



Q4 RETAC Survey



Thank You!



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