

Hot Water and Hot Air Forums

Hot Water Forum, March 4–5 | Hot Air Forum, March 5–6



Monday, March 3

12:00 – 5:00 pm UA 290 Tour and Heat Pump Water Heater Equipment Demonstration

Optional event off-site at United Association (UA) Local 290 training facility in Tualatin, OR.

**Available to add to your registration for \$25; limited to 56 participants.*

3:00 – 5:00 pm Splash Apartments Commercial Water Heater and Building Tour

Come see a former Pepsi bottling plant come back to life as mixed-use (commercial/residential) building conversion. Of particular interest is the Nyle central heat pump water heater. Made in Maine, it is the first one of its kind installed in the US, and an example of a central HPWH system that could be a key to scale through simpler installations. Kick off your ACEEE Hot Water Forum in style with a tour of an important central HPWH!

**Optional event off-site. Free to attend. Register [here](#).*

Tuesday, March 4 – Hot Water Forum

7:00 am – 7:00 pm	Registration	Regency Foyer
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7:30 – 8:20 am	Breakfast	Regency Ballroom CD
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8:20 – 8:50 am	Welcome and Introductions	Regency Ballroom AB
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9:00 – 10:30 am	Concurrent Sessions
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1A. How to Get the Heat for Heat Pump Water Heaters Regency Ballroom A

Many buildings are not designed, modified, and utilized for optimum service with air-source heat pump water heaters (HPWH). This session addresses how to assure optimum performance in the face of installation faults, especially inadequate air supplies for heat exchange, and handling cold discharge air.

Moderator: **Harvey Sachs**, ACEEE

Air-Source HPWH: Where Does the Warm Intake Air Come From? Where Does the Cold Exhaust Air Go?

Gary Klein, Gary Klein Associates

Ensuring HPWH Efficiency in Less-than-Ideal Spaces

Sam Larson, Larson Energy Research

Central Horizontal Drain Water Heat Recovery in 80 Buildings and Growing: Design and Measured Performance

Gerald Van Decker, RenewABILITY Energy Inc.

1B. Commercial Food Service

Willamette 1

Heat pump water heaters are a proven technology in residential applications but have only been applied in limited cases in commercial food service. This creates a challenge for operators and designers who are unfamiliar with HPWH design principals, specification, and performance as well as Environment Health (EH) professionals who hold the responsibility for approving HPWHs. This session shares the latest lab and field research info HPWH performance as well as practical design advice and current HPWH policy.

Moderator: **Richard Young**, Frontier Energy

Starting System Design, Sizing, and Policy Research to Decarbonize Water Heating in Commercial Kitchens

Amin Delagah, TRC Companies

Foodservice Water Heater Decarbonization: Field Data Research

Maya Gantley, 2050 Partners

Evaluating Unitary Heat Pump Water Heaters: Laboratory Insights for Diverse Foodservice Applications

Mehdi Zeyghami, PG&E

1C. Demand Flexibility

Deschutes A

Join us for an engaging panel discussion on the importance of demand flexibility in commercial heat pump water heaters, highlighting their benefits for consumers and their role in promoting grid stability. Experts from leading organizations will share insights into the latest advancements in grid-integrated systems, including load-shifting optimization and cost-minimization strategies, highlighting how these technologies can be leveraged to improve energy management and operational efficiency.

Moderator: **Vidhisha Moopnar**, New Buildings Institute

Pure MAGIC - Made in America Grid Integrated Commercial Heat Pump Water Heaters

Tim O'Neill, Ecotope, Inc.

Standardization, Optimization, and Quantification of Load Shift in Commercial HPWH Systems

Scott Spielman, Ecotope, Inc.

Central Heat Pump Water Heater Load Shift Testing at Multifamily Buildings

M M Valmiki, ASK Energy

Demonstrating Simple Price-Responsive Controls for Central HPWHs to Minimize Cost Under Time-Varying Electricity Prices

Brian Woo-Shem, LBNL

1D. Showers: Cleaning Away the Waste of Water and Energy

Deschutes B

A fifth, and in some cases much more, of household and lodging hot water use is for showers. And much of that water, and thus the energy to heat it, is wasted. The presentations in this session look into different ways to reduce the water and energy waste of showers. One looks at how timing of showers and type of water heaters affect both peak and total energy demand for showers. Another presents a new technology to address the wasting of water before it warms up at the shower. The final presentation focuses on best practices for on-demand hot water recirculation systems in single-family and small multifamily homes.

Moderator: **Jim Lutz**, Hot Water Research

Trade-offs Between Quantity and Timing of Shower Energy Consumption in Households

Rebecca Hall, University of Queensland

Beyond the Faucet: Impact of Excessive Hot Water Use in Commercial Properties

Priya Thomas, Shower Stream

On-Demand Hot Water Recirculation Systems and Best Practices

Alex Boetzel, Earth Advantage

10:30 – 11:00 am

Networking Break

Regency Foyer

11:00 – 12:30 pm

Concurrent Sessions

2A. Affordable Multifamily I: Solving the Challenges of Heat Pump Water Heaters

Regency Ballroom A

The electrification of hot water with heat pumps in multifamily and affordable housing faces challenging economics and technical constraints but is nevertheless essential for low-income and energy-burdened communities. This session will explore potential solutions to current challenges. Panelists will discuss an innovative pilot program in New York City that addressed technical and cost hurdles of commercial HPWHs with displacement strategies, analyze key takeaways from affordable housing organizations that have successfully installed and operated them, and provide updates on NEEA's Hot Water Innovation prize that seeks to develop new equipment options for in-unit HPWH replacements for multifamily buildings.

Moderator: **Joseph Wachunas**, New Buildings Institute

Scalable Affordable Financeable Electrification: Displacement DHW in NYC

Nicole Ceci, Steven Winter Associates

Enhancing Affordable Housing Through Efficient Hot Water Solutions

Vidhisha Moopnar, New Buildings Institute

What the 2029 Water Heater Standards Mean and the Next Big Splash for Utility Efficiency Programs

Suzanne Foster Porter, Kannah Consulting

Dana Bradshaw, Northwest Energy Efficiency Alliance

2B. Simulating Hot Water for Better Programs, Designs and Tests

Willamette 1

Water heater lab and field testing yield valuable data but are costly, with field testing posing challenges in managing consistent variables. This session will examine how simulations can evaluate water heater performance across multiple variables.

Moderator: **Debra Brunk**, 2050 Partners

National Simulation Analysis of 120V Heat Pump Water Heaters

Jeff Maguire, NREL

Right-Sizing Heat Pump Water Heaters Using Simulation-Based Approach

Robbie Svidron, Intellihot Inc

How Well Does Laboratory Performance of Heat Pump Water Heaters Represent Field Performance?

Jim McMahon, Better Climate Research and Policy Analysis

2C. Designing Distribution Systems

Deschutes A

When it comes to hot water systems, we often forget one of the most critical components to making the whole system work: the supply and return of hot water, also known as the hot water recirculation system. The proper design and installation of these systems is vital to making any hot water system efficient, let alone work. In this session, we will explore a number of the strategies to control, update, and optimize hot water recirculation systems to promote sustainability while maintaining safety.

Moderator: **Christoph Lohr**, IAPMO

Single Zone Hot Water Recirculation Systems: Control Strategies and Water Heater Performance

John Lansing, PAE Consulting Engineers

Remix! - Updating Outdated Hot Water Distribution Systems with Digital Master Mixing Valves

Daniel Hacking, TRC Companies

Product Ratio Method - Optimizing Flow for Domestic Hot Water Circulation Systems

John Lansing, PAE Consulting Engineers

2D. Basics of Commercial Heat Pump Water Heaters

Deschutes B

Everything you need to know about central heat pump water systems (CHPWHs), in multifamily settings in one session. Leave with an understanding of all the available tools and support for ensuring reliable and efficient systems.

Moderator: **Neil Grigsby**, Northwest Energy Efficiency Alliance

CHPWHs Ready for Prime Time: Presenting the Available Body of Tools to Support Market Transformation

Jonathan Heller, Ecotope, Inc.

Commercial Heat Pump Water Heater Market Research: Programs, Training, and Product Landscape

Helen Townsend, D&R International

Noah Gabriel, New Buildings Institute

Small Commercial HPWHs: State of the Shelf, Known Issues, Current Research, and Path Forward

Alexi Miller, New Buildings Institute

12:30 – 1:30 pm

Networking Lunch

Regency Ballroom BCD

3A. Water Heater Cost Drivers and Opportunities**Regency Ballroom A**

Heat pump water heaters are a silver bullet technology, but installation costs remain stubbornly high and the economics of transitioning from fossil gas to electricity can be challenging. This panel will discuss regional and national HPWH up-front and operating cost drivers and will present the key barriers along with success stories key solutions to driving down those costs.

Moderator: **Alexi Miller**, New Buildings Institute

HPWH: Cost Barrier Breakthroughs

Nathaniel Jutras, ENERGY STAR

Electrifying Fossil Fuel Customers...Strategies to Improve the Economics of Heat Pump Adoption

David Lis, NEEP

The Cost of Heat Pump Water Heater Installations is Too Damn High

Noah Gabriel, New Buildings Institute

3B. Market Transformation – Driving the Residential Water Heater Market to DOE's New Energy Efficiency Standard**Willamette 1**

DOE projects that its 2024 standards update for residential water heaters will cause 35 million electric resistance water heaters to be replaced with electric heat pump water heaters by the early 2040s. Achieving this transition, and realizing the associated savings, will require market building activities to complement the new regulations. In this session we will review the challenge of transforming residential water heating, look at HPWH promotions that are already in the field, and brainstorm new promotions for the future.

Moderator: **Chris Granda**, Energy Solutions

Driving the Tide: Realizing the Potential of DOE's Landmark Residential Water Heater Standard

Chris Granda, Energy Solutions

Using Wholesale Distribution Partnerships as a Catalyst to Accelerate Transformation of the Heat Pump Water Heater Market

Emily Rosenbloom, Northwest Energy Efficiency Alliance

Making Water Heaters Fun - Costumes, Road Trips and National Holidays

Joseph Wachunas, New Buildings Institute

3C. Commercial Recirculation Monitoring Studies

Deschutes A

This session will focus on best practices and lab and field research on distribution systems with recirculation loops and discussion on key components such as demand pump controls, mixing and balancing valves. Field testing results from pre and post HP retrofit projects will be shared with focus on troubleshooting to uncover systemic distribution system issues and show the impact of extensive pipe heat losses and methods to mitigate it.

Moderator: **Amin Delagah**, TRC Companies

Optimizing Central Heat Pump Water Heating Performance: The Essential Role of Pre- and Post-Retrofit Monitoring in Multifamily Buildings

Ashley Davis, Association for Energy Affordability, Inc.

Are Automatic Balancing Valves Effective in Improving Recirculation System Balancing and Reducing Recirculation Heat Loss?

David Chapman, ZYD Energy

Laboratory Assessment of Master Mixing Valve Performance and the Impact of Recirculation Controls

Michael Slater, PG&E

3D. Commercial Design

Deschutes B

Size Matters: Explore sizing HPWH in multifamily buildings for optimal comfort and efficiency.

Moderator: **Michael Corbett**, Bradford White

Water Heater Right-Sizing: Comparing Retrospective Demand Sizing Using Building Hot Water Data and ASHRAE Sizing Methods

Debra Brunk, 2050 Partners

Introduction to the New ASHRAE Guideline: Central Heat Pump Service Water Heating Systems in Multifamily Buildings

Cristalle Mauleon, Lincus, Inc.

Reducing Cost and Carbon Emissions at Dairies with Heat Pump Water Heaters

Scott Spielman, Ecotope, Inc.

3:00 – 3:30 pm

Networking Break

Regency Foyer

3:30 – 5:00 pm

PAE Living Building Tour

As part of ACEEE's Hot Water Forum, Tour Portland's first Living Building to learn about sustainable engineering. The five-story, mixed-use building demonstrates replicable and cost-effective solutions for sustainable design removing barriers to entry for highly sustainable projects while revitalizing the community. The tour will cover all petals of the International Living Future Institute's Living Building Challenge, which includes placement of the building health and happiness of the tenants; beauty; equitability of the company; water, energy, and building material efficiency. This tour of the PAE Living Building will focus heavily on the mechanical systems and innovative water systems.

**Optional event off-site. Free to attend. Register [here](#).*

4A. 120 V Heat Pump Water Heaters**Regency Ballroom A**

This session will address issues important to 120 V HPWHs, including experiences in the field with 120 V products, and leveraging heat pumps and energy storage to unleash the delivery capacity of next-generation systems. Field data gathered on commercially available products in the field will be presented, with the Midwest, South, and West all represented. Since delivery capacity is an important question relevant to customer satisfaction, draw profiles that can be useful for development and laboratory evaluation of prototype systems are presented. In addition, the theoretical and practical limits of water delivery capacity are presented, to inform future research and development.

Moderator: **Noah Gabriel**, New Buildings Institute

Plugging In for Hot Water in Cold Climates: 120V Heat Pump Water Heaters in the Midwest

Maass, Illume Advising

Field Data Driven Draw Profiles to Support HPWH Development

Melanie Moses-DeBusk, Oak Ridge National Lab

4B. Residential Program Design: Bridging the Gap from Supply Chain to End Use**Willamette 1**

This session will explore innovative programs, strategies, and partnerships that have uncovered lessons learned from real-world implementation. Gain actionable insights to overcome challenges and build on proven success for energy-efficient water heating solutions.

Moderator: **Emily Rosenbloom**, Northwest Energy Efficiency Alliance

Lessons Learned from Research with Distributors

Josh Butzbaugh, Pacific Northwest National Laboratory

Empowering Access and Affordability with Homeowner DIY HPWH Installations

Meghan Harwood, VEIC

Time to Level Up: Bringing Water Heater Installers Onboard with HPWHs

Troy Zdzieblowski, Evergreen Energy Partners

4C. Commercial Field Demonstrations: Data Dispatch from California

Deschutes A

This session will focus on design, operation, and optimization of high-performance HPWHs, recirculation systems, and controls. Emerging code-readiness research projects will address 1) real-world operation of light commercial hybrid HP/ER heaters, issues encountered and retrofit optimization strategies to deal with poor ventilation, low system COP, and water runouts, 2) CO2 HP operation in return to primary configuration at various recirculation return temperatures, and 3) energy savings and operation of advanced pumps with integrated and standalone pump controls. Lastly, results will be shared from a HPWH field demonstration with a full DHW system control solution for small centralized HPWH applications.

Moderator: **Amin Delagah**, TRC Companies

Code Readiness Project Overview and Results from Integrated hybrid HPWH and Recirculation Pump Controls Retrofit Projects in Non-Residential Buildings

Jeff Staller, 2050 Partners

Common Mistakes in Central Heat Pump Water Heating Systems & How to Avoid Them

Scott Adler, Association for Energy Affordability

Field Demonstration of High-Performance Design and Control Solutions for Small Central Heat Pump Water Heater Systems

Yanda Zhang, ZYD Energy

4D. Commercial Measurement & Verification

Deschutes B

Come learn from specific field deployed multifamily HPWH installations. The speakers will cover 1) operational data visualization, 2) proper commissioning, and 3) new construction applications.

Moderator: **Geoff Wickes**, Bonneville Power Administration

Empowering Meaningful Measurement & Verification with EcoDash: A Standardized Tool for Commercial HPWH M&V

Madison Johnson, Ecotope

Measuring the Bumpy Road to a Properly Commissioned Multi-SanCO2 Array in New Markets

Charlie Simek, New Ecology

Utility Funding for Large Heat Pump Water Heater Systems in Multifamily New Construction – Lessons Learned

Phoebe Warren, Seattle City Light

5:30 – 7:00 pm

Reception

Regency Foyer

Wednesday, March 5 – Hot Water and Hot Air Forum

7:30 am – 7:00 pm	Registration	Regency Foyer
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8:00 – 9:00 am	Breakfast	Regency Ballroom CD
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9:00 – 10:30 am	Welcome, Introductions, and Plenary Panel	Regency Ballroom AB
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2025: Uncertainty on Federal Policy but State and Air Quality Management District Efforts Will Shine

Panelists will discuss potential changes in federal policy under the Trump administration and new Congress and growing efforts in California, the Northeast, and several other leading states. Topics covered will include equipment emissions standards, utility programs and regulations addressing the energy transition, federal grants and tax credits, clean heat standards, electric rate reforms and the New England Heat Pump Accelerator.

Moderator: **Karen Myers**, Vice President, Government Affairs; Rheem

Panelists:

- **Panama Bartholomy**, Executive Director; Building Decarbonization Coalition
- **Erin Cosgrove**, Director, Policy and Programs; Northeast Energy Efficiency Partnership
- **Steven Nadel**, Executive Director; American Council for an Energy-Efficient Economy

10:30 – 11:00 am	Networking Break	Regency Foyer
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11:00 – 12:30 pm	Concurrent Sessions	
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5A. Financing	Regency Ballroom A
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Increasing energy efficiency performance and electrifying/decarbonizing buildings always involves one thing: financial support. This panel will discuss a variety of funding sources, innovative financing strategies, and customer preferences for electrifying hot air and hot water systems in buildings across commercial and residential (multifamily and single-family) buildings.

Moderator: **Daniel Farrell**, American Council for an Energy-Efficient Economy

Financing Preferences Among Residents in Low-Income and Disadvantaged Communities

JahAsia Jacobs, Rewiring America

Tackling the Electrification Cost Gap Through Municipal Funding & Financing

Paul Picciano, E3

Assessing a Utility Model for Widespread Ground Source Heat Pump Adoption

William Harvey, Dunsky Energy Consulting

5B. Energy from Wastewater and the Sun

Willamette 1

Paths less commonly taken include photovoltaics for water heating in cold climates or green CHP for both hot water and power; improving any water heating system's efficiency with solar thermal; solar pool heating technologies today; and central horizontal drain water heat recovery in larger buildings.

Moderator: **Harvey Sachs**, American Council for an Energy-Efficient Economy

Get Over the Hump: Utilizing Solar Thermal Technology to Dramatically Improve the Efficiency of Any Water Heating System

Adam Chrisman, SunEarth Inc.

Green CHP - Hot Water AND Power from the Sun

Terry Bickham, Green CHP

Solar Pool Heating Technologies

Jill Murphy, Magen Eco-Energy US

5C. Appliance NOx Emission Rules – A Bay Area (California) Perspective

Deschutes A

The first of two sessions dedicated to updates and perspectives on the development of zero-emissions equipment standards for residential HVAC and water heating. These standards, establishing zero NOx and/or zero GHG emissions for equipment, represent one of the largest greenhouse gas reduction policies that states or regions can pursue. However, these standards also have considerable consumer, market and system impacts that must be well understood and addressed to ensure successful implementation. This session will examine this potential, and impacts, through the Bay Area Air District rulemaking process. Presenters will provide updates on this process and considerations, while representatives from environmental justice communities and community choice aggregators will share the perspective of consumers and utility systems as they participate in this process and navigate the promise, and challenge, of this policy.

Moderator: **Jim Lutz**, Hot Water Research

Bay Area Air District Zero NOx Building Appliance Rules: Overview of Rules 9-4 and 9-6 and the Implementation Working Group

Richard Chien, Bay Area Air District

Wait - Who Installs water heaters? State of the California Water Heater Market

Jayden Wilson, Opinion Dynamics

Understanding Community Perspectives and Driving Meaningful Equity: Lessons Learned from the San Francisco Bay Area's Zero-Emission Appliance Standards

Megan Leary, Emerald Cities Collaborative Northern California

Silicon Valley Electrifies Residential Water Heating

Zoe Elizabeth, Silicon Valley Clean Energy

5D. Hot Water and Hydronic Heat Combination Units

Deschutes B

This session includes presentations on multifunctional heat pumps (combi heat pumps) capable of delivering space cooling, space heating, domestic water heating, and energy storage. It will also examine dual-fuel heat pumps that integrate electricity and natural gas. The session will delve into new technologies, market trends, and findings from initial field investigations.

Moderator: **Bo Shen**, Oak Ridge National Laboratory

Combi Systems for North America

Amir Refaat, P.Eng., MBA, Systemair

Development and Assessment of a Multi-Functional Heat Pump with Wall-Embedded Thermal Storage

Yifeng Hu, PhD., P.E., Oak Ridge National Laboratory

Triple Threat: Characterization of a Residential Tri-Mode Heat Pump for Multiple Climates

Pradeep Vitta, GTI Energy

Early Findings from a Dual-Fuel Combi-System Demonstration

Meg Waltner, PE, Energy 350

12:30 – 1:30 pm

Networking Lunch

Regency Ballroom BCD

1:30 – 3:00 pm

Concurrent Sessions

6A. Correctly Installing Technologies to Keep Operation Costs Low

Regency Ballroom A

This session focuses on research related to contractor installation of high-performance HVAC and Water Heating equipment, and improving quality installations through technical assistance.

Moderator: **Neil Grigsby**, Northwest Energy Efficiency Alliance

Results from Field Research with Contractors

Kieren McCord, Pacific Northwest National Laboratory

Literature and Resource Review Results

Fredericka Brown, Pacific Northwest National Laboratory

Preparing Contractors for High-Quality Installations

Eduardo Rodriguez-Feo Bermudez, Pacific Northwest National Laboratory

6B. Driving Adoption with Rates, Incentives, and Regulations

Willamette 1

The affordability of heat pump retrofits can be impacted by electric rates, building codes, and installation incentives. This session will highlight the current state of heat pump bill impacts and prevalence of heat pump rates, and examine alternative rate designs, incentives, and other policy levers to reduce costs.

Moderator: **Jon Koler**, Slipstream Inc.

Speeding Up Clean Heating: Global Insights on Policies and Pathways to Electrification

Cory Luker, Resource Innovations

Electric Rate Reform: The Prevalence and Bill Impacts of Heat Pump Rates Across the US

Ryan Shea, RMI

Rate Roadmap for Electrification and Energy Affordability in Massachusetts

Vivan Malkani, E3

6C. Appliance Emission Standards – Northeast Perspective

Deschutes A

The second of two sessions dedicated to updates and perspectives on the development of zero-emissions equipment standards for residential HVAC and water heating. These standards, establishing zero NOx and/or zero GHG emissions for equipment, represent one of the largest greenhouse gas reduction policies that states or regions can pursue. However, these standards also have considerable consumer, market and system impacts that must be well understood and addressed to ensure successful implementation. This session will examine emissions-based standards activities in the Northeast, with an emphasis on the climate, building stock, utility infrastructure and costs and policy factors that reflect considerable differences with ongoing California rulemakings. Presenters will provide an update on Model Rule development for potential adoption by various states, as well as a market analysis indicating consumer impacts and opportunities for policy interventions. How best to implement a successful standard will be discussed, including the support structures necessary. Maryland's rulemaking process and the unique considerations of the state will be reviewed as a case study, more information on Maryland's program is available [here](#).

Moderator: **Helen Davis**, Energy Solutions

Presenters:

Riena Harker, NESCAUM

George M. Chapman, Energy Solutions

6D. Thermal Energy Storage

Deschutes B

Integration of thermal energy storage systems with building heating and cooling systems can reduce peak thermal loads and improve energy efficiency. This session showcases different integration strategies and solutions.

Moderator: **Kaushik Biswas**, GTI Energy

Strategies for Combining Air Source Heat Pumps and Thermal Energy Storage in Cold Climates

Samantha Hill, Center for Energy and Environment

Novel Modular Residential Cold-Climate Heat Pump for Space Conditioning and Water Heating

Juan Catano, NREL

Thermal Energy Storage: Market Barriers and Opportunities for Adoption in Buildings

Liz Traynor, American Council for an Energy-Efficient Economy

3:00 – 3:30 pm

Networking Break

Regency Foyer

7A. Affordable Multifamily II**Regency Ballroom A**

Income-qualified multifamily buildings represent a largely untapped market for energy savings and present a particularly challenging landscape of split incentives that make capital expenses complicated to justify without a more holistic understanding of the potential for savings and improved comfort. In this session, we will hear about current efforts aimed at this market segment and discuss unique challenges faced when engaging them, with a focus on comprehensive strategies that address these market realities.

Moderator: **Ryan Hamilton**, Consortium for Energy Efficiency

Electrifying Evanston – Lessons from the Green Homes Pilot Program

Bill Lyons, Elevate

Decarbonizing Public Housing: Sustainable Futures for Low-Income Multifamily Communities

Joel Wool, Boston Housing Authority

Affordable Multifamily Electrification Retrofits in the Midwest: Monitoring and Verification Results

Justin Sharer, Slipstream

7B. Designing the Future: Innovative Utility Programs for Decarbonization**Willamette 1**

This session plans to explore the steps that utility programs are taking as their focus shifts to decarbonization and what these innovative programs look like today.

Moderator: **Kim Rose**, C+C

Updating TRMs to Align with Decarbonization Goals

Deepti Dutt, Northeast Energy Efficiency Partnerships

Innovative Residential Electrification Programs

Nupur Hiremath, Silicon Valley Clean Energy

An Industry Consortium for Power Efficiency

Brendan McEwen, Dunskey Energy + Climate Advisors

Adding it All Up: Innovative Residential Program Approaches in an Evolving Landscape

Evelyn Lane, Consortium for Energy Efficiency

7C. Performance Metrics

Deschutes A

How can utilities continue to pay incentives on heat pumps when the savings are so difficult to measure accurately? Presenters will share some of the latest research on new metrics for measuring and differentiating heat pump performance and efficiency.

Moderator: **Suzi Asmus**, Northwest Energy Efficiency Alliance

Exploring Representativeness of Heat Pump Performance Ratings

Dave Lis, Northeast Energy Efficiency Partnerships

The Case for COPpeak

Jeff Stewart, Trane Technologies

Low-Load Efficient Heat Pumps – Lab and Field Data Analysis

JJ Sawicki, TRC Companies

7D. Gas Heat Pumps

Deschutes B

Heat pumps aren't all electric—some are powered by fuels such as natural gas and hydrogen. This session covers these systems that can be more efficient than condensing combustion technology, including field studies of commercially available gas heat pump products, laboratory evaluation of pre-commercial systems, hydrogen-readiness of fuel-fired heat pumps, and sizing approaches tailored toward the unique characteristics of gas-fired heat pumps.

Moderator: **Navin Kumar**, Oak Ridge National Laboratory

GAHP Field Results in DHW Systems

Cristalle Mauleon, Lincus Inc.

Heat Pump Performance in California: Hydrogen-Natural Gas Blend Fired Water Heating Applications

Madeline Talebi, ICF

Comparing Current DHW Sizing Methods with Reality

Alyza Khan, Lincus Inc.

Laboratory Evaluation of Thermally-Driven Adsorption Heat Pump for Domestic Hot Water

Magnus Ekblad, HeatAmp

5:30 – 7:00 pm

Reception

Regency Foyer

Thursday, March 6 – Hot Air Forum

7:00 am – 4:00 pm Registration Regency Foyer

8:00 – 8:50 am Breakfast Regency Ballroom BCD

9:00 – 10:30 am Concurrent Sessions

8A. Affordability: Lessons from TECH Clean California Regency Ballroom A

The TECH Clean California program has incentivized over 40,000 residential heat pump systems for space and water heating. This session will share perspectives on the customer and contractor experience, energy and cost impacts, and how this data can inform future electrification programs throughout the country.

Moderator: **Peter Grant**, Lawrence Berkeley National Laboratory

What can data from heat pump installs tell you about customer satisfaction, customer bills, and grid impacts?: Insights from participant surveys, meter-based energy impacts, and machine learning analysis of TECH Clean California heat pump data.

Presenters:

Teddy Kisch, Energy Solutions

Jen Loomis, Opinion Dynamics

Adam Scheer, Recurve

Dylan Sarkisian, Energy Solutions

8B. Heat Pumps and HVAC Business Structure Willamette 1

Residential contractors are at the frontlines of home upgrades, but in today's market, most offer fragmented services and are unequipped to guide residents in their home electrification journey. This session will highlight on-the-ground insights from state and utility sponsored programs that reach energy auditors, weatherization, solar, HVAC and plumbing contractors on how they have expanded their business to bring electrification solutions to market rate and income eligible programs. We'll also discuss the unfortunate trends of anti-competitive behaviors and model examples to watch out for, while providing recommendations to track and mitigate these outcomes for your customers and programs. Lastly, this session will highlight a prime example of government collaboration with small, local businesses that help them achieve their sustainability goals and offer funding to work with energy efficiency vendors to achieve them. Other governments and non-profits looking to learn about the benefits of a green business program, or vendors looking to connect with local green business programs in their area, will find value in this story.

Moderator: **Matt Malinowski**, American Council for an Energy-Efficient Economy

Leveraging Federal and Local Green Business Programs to Recommend Pollution Prevention Technologies

Max Ciarlone, Cook County (IL) Department of Environment and Sustainability

Collateral Damage: Trends that Heat Pump Policies and Programs May Be Driving Up Heat Pump Costs Due to Attracting Anti-Competitive and Monopolistic Behavior

Matthew Horwitz, Southern California Edison

Optimizing Hybrid Heat Pump Swapover Temperature for Cost and Carbon Savings

Ethan Goldman, Resilient Edge

8C. Installation Tools

Deschutes A

The success of high-performance HVAC technologies will depend on contractors being empowered to install them effectively. Come learn about the latest tools available for installers to find and manage jobs, select equipment, and validate performance.

Moderator: **Sam Larson**, Larson Energy Research

Responsibly Scaling ASHPs in Cold Climates: Upskilling HVAC Contractors to Guess Less and Measure More

Zak Paine, Slipstream

Digitizing Contractor Workflows: What Works, Why It Matters, and How to Build the Future Software Stack

Jason Trager, Plentiful.ai

Tools for Your Quality Installation Toolbox

Christian Valoria, Pacific Northwest National Laboratory

8D. Decarbonization Using Dual-Fuel Technologies

Deschutes B

This session will examine the potential of dual-fuel space conditioning and water heating systems in building decarbonization. Presenters will discuss findings from modeling studies and field demonstrations that investigated energy and emission savings of various configurations of dual-fuel equipment. Presenters will also share insights and best practices from demonstrating residential ground source heat pump systems in the field.

Moderator: **Ramanathan Dharmarajan**, GTI Energy

Navigating the Dual-Fuel Landscape: Insights and Strategies for Market Adoption

Aaron Winer, Northwest Energy Efficiency Alliance

Dual Fuel and All-Electric Heat Pumps: Ratings are only Half the Story; Installation Matters

Matt Haffner, Illume Advising

The New Dual Fuel: Exploring Ground Source Heat Pumps with Gas Backup to Decarbonize Residential Heating

Kristen Dong, Illume Advising

10:30 – 11:00 am

Networking Break

Regency Foyer

11:00 – 12:30 pm

Concurrent Sessions

9A. Lowering Energy Bills for Multifamily and Manufactured Homes

Regency Ballroom A

This session explores case studies in energy-efficient manufactured and multifamily housing, pilot projects for grid-interactive multifamily retrofits, and research on retrofit barriers in manufactured housing.

Moderator: **Dr. Tyler Pilet**, Pacific Northwest National Laboratory

Leave No Home Behind: Enhancing Access to Decarbonized Heating in Manufactured Homes

Hannah MacDonald, Dunsy Energy + Climate Advisors

Grid-Connected Multifamily Building Retrofit Program

Jason LaFleur, GTI Energy

Advancing Cost Effective Energy Efficient Manufactured Homes in Georgia

Don Shirey, EPRI

9B. Refrigerants

Willamette 1

This session presents the latest research on next generation refrigerants. It covers performance evaluations and technology updates for A2L and A3 refrigerants in both new installations and retrofit HVAC&R designs, and in various applications.

Moderator: **Kaushik Biswas**, GTI Energy

Central Space Heating: Performance of VRF and AWHF Systems and Alignment with A2L Requirements
John Arent, NORESKO

Experimental Evaluation of Ultra-Low GWP R290 Residential Heat Pump Across Multiple Operating Conditions
Sarath Kannan, GTI Energy

Technology Update on Next Generation Refrigerants for Air Conditioning and Heat Pumping Applications
Samuel F. Yana Motta, Oak Ridge National Laboratory

9C. Impact of Controls on Dual Fuel Heat Pump Performance

Deschutes A

Maximizing the potential of dual-fuel heat pumps in an evolving electric grid depends on the optimization of their control strategies. Presenters will highlight the impact of different control schemes for dual-fuel heat pumps on performance and utility cost to the homeowner. The session will also explore the cost-effectiveness of adopting dual-fuel systems in gas-connected homes in cold climates.

Moderator: **Ramanathan Dharmarajan**, GTI Energy

Hybrid Heat Pumps: Optimizing Backup Fuels for Decarbonization
Micah Sweeney, EPRI

Affordability Benefits of Grid-Responsive Dual Fuel Heat Pump in 2025, 2035 and 2050 Scenarios
Zhenning Li, Oak Ridge National Laboratory

Hybrid Heat Pumps Avoid Extreme Marginal Abatement Costs of Electrifying Peak Heating Loads in Cold Regions
Sean Smillie, E3

9D. Advancing Heat Pump RTUs: Potential and Real Impacts

Deschutes B

Rooftop units (RTUs) are the most common commercial HVAC equipment, yet heat pump RTUs are uncommon. Hear about efforts to deploy heat pump RTUs more broadly through a national campaign, a cold-climate heat pump RTU specification, state market transformation, and pairing RTUs with energy recovery.

Moderator: **Courtney Moriarta**, NYSERDA

Heat Pump RTUs – Accelerating Awareness, Availability, and Adoption (Part 1 Campaign)
Jim Young, Guidehouse
Michael Blunsch, U.S. Department of Energy

Heat Pump RTUs – Accelerating Awareness, Availability, and Adoption (Part 2 Challenge)
Michael Deru, National Renewable Energy Laboratory

Next Gen Rooftop Units: Modeling Performance and Influencing the Market
Leah Guenter, Center for Energy and Environment

12:30 – 1:30 pm

Networking Lunch

Regency Ballroom BCD

10A. Assessing Workforce Needs**Regency Ballroom A**

Growing a workforce with the skills to perform building decarbonization jobs is necessary for improving the energy efficiency and resiliency of our building stock. This session will provide insights into what actions and market approaches have been successful in supporting the development of a clean energy workforce.

Moderator: **Rohini Srivastava**, American Council for an Energy-Efficient Economy

Taking the Guesswork Out of Workforce Investment

Erin Kempster, Opinion Dynamics

Achieving Electrification and Decarbonization Goals Through the Contractor Network

Steven Jaslowich, National Grid

Ensuring Excellence in Ground Source Heat Pump Installations: Quality Assurance is a Pillar of Success

Carina Paton, VoltaMetrics

10B. Utility Programs: incentives, TRMs, and Automation**Willamette 1**

How do we optimize utility programs to focus on cost reduction for homeowners and building owners. Please join our panel for an in-depth discussion of opportunities, challenges, emerging trends, and lessons learned in this space.

Moderator: **Daniel Farrell**, American Council for an Energy-Efficient Economy

Energy Efficiency Opportunities

Andrew Wiegand, Michaels Energy

Evolving Business Models: The Opportunity to Equitably Support Development of Residential Electrification Service Provider Businesses that Specify and Install Heat Pumps

Zak Paine, Slipstream

Partnering with Utilities for Energy Efficiency and Building Optimization

David Burchfield, Burch Energy Services

10C. Rooftops, PTACs, Window Units and More**Deschutes A**

Developing efficient and high-performing heat pumps in a variety of form factors will be key to decarbonizing commercial buildings. Presenters will summarize efforts to bring more efficient rooftop units to the market and how better cold-climate or dual-fuel models can provide the needed warmth in the harshest climates.

Moderator: **Jason Jones**, Northwest Energy Efficiency Alliance

Building Demand for Heat Pump Rooftop Units

Bjorn Jensen, Consortium for Energy Efficiency

Dual Fuel RTUs for Drop-In Decarbonization

Jason LaFleur, GTI Energy

Assessment and Evaluation of Heat Pumps Designed for Use in Cold Climate Multifamily and Hospitality Buildings

Ben Schoenbauer, Center for Energy and Environment

10D. Heat Pump Commissioning and Controls for Cold Climates

Deschutes B

This session explores innovative strategies to enhance the performance, efficiency, and grid integration of heat pumps for building decarbonization. Topics include optimizing dual fuel heating systems with predictive controls, addressing cold-weather performance limitations to reduce grid strain, and advancing connected commissioning solutions for streamlined installation and operation.

Moderator: **Subhrajit Chakraborty**, UC Davis

Connected Commissioning Heat Pumps – 4 Birds, 1 Stone

Christopher Dymond, Northwest Energy Efficiency Alliance

Decarbonization of Heat Pump Dual Fuel Systems Using Advanced Control: Field Demonstration in a Small Commercial Building

Jingjuan Dove Feng, TRC Companies

Bad Heat Pump System Setback Recovery – An Electrification Barrier

Ben Larson, Larson Energy Research

3:00 – 3:30 pm

Networking Break

Regency Foyer

3:30 – 5:00 pm

Concurrent Sessions

11A. Space Heating Up-front and Operational Costs

Regency Ballroom A

This session focuses on the costs associated with heat pumps and electrification. Presenters will share data behind heat pump upgrade costs, solutions to address cost barriers, and program designs to address affordability.

Moderator: **Justin Margolies**, Slipstream Inc.

The Answer is Finally Here: How Much Does a Heat Pump Upgrade Versus a Gas Like-for-Like Replacement Actually Cost?

Malena Hernandez, Opinion Dynamics

AC Replacements as a Decarbonization Strategy: Updates on Potential, Strategies, and Progress

Meg Waltner, Energy 350

U.S. Heat Pump Affordability: Top Strategies to Address Upfront and Operating Costs

Russell Unger, RMI

Window heat pumps are an emerging packaged air source heat pump implementation promising portability, simplicity, and rapid deployment to market segments that can be difficult to serve, such as multifamily buildings and rented single family homes. These products can perform as efficiently as a conventional mini-split system, yet be installed without any tools or training, and new cold climate models are expanding the potential reach of the market rapidly. Leading window heat pump manufacturer Gradient's Sam Lamos will present to discuss their market strategy, major partnerships, and other research currently being conducted on window heat pumps. Hear VEIC's Jake Marin experiences bringing renters through the "DIY" process of installing a window heat pump in Vermont. Tom Bougher, from 2050 Partners, will present an analysis on the opportunity for window heat pumps in more moderate climates and CalMTA's Elaine Miller will discuss strategies for in delivering these products to the California market as part of a new California-wide market transformation initiative.

Moderator: **Matt Booth**, Washington State University

Heat Pumps Without the Hassle: How Window Units Are Changing the Game

Samantha Lamos, Gradient

Window Heat Pumps for Renters - A DIY Electrification Solution for an Underserved Population?

Jake Marin, VEIC

Window heat pumps in California and More Moderate Climates – Large Opportunity, but new Barriers

Tom Bougher, CalMTA/2050 Partners

Transforming the Market for Room Heat Pumps: How Strategic Partnerships Can Accelerate Technology Adoption and Accessibility

Elaine Miller, CalMTA/Resource Innovations

11C. Cold Climate Heat Pumps and Peak Impact**Deschutes A**

The session presents field and modeled data from investigation of both VRF and residential split system cold climate heat pumps. The results provide insight into challenges and potential solutions for addressing peak power consumption during periods of very cold weather.

Moderator: **Christopher Dymond**, Northwest Energy Efficiency Alliance

The Challenge of Decarbonizing Peak Heat

Sean Smillie, E3

Annual Energy Savings and Peak Power Reduction Simulated for Cold Climate Heat Pumps

Bo Shen, Oak Ridge National Laboratory

Cold-Climate VRF: Is VRF an Electrification Option in the Future?

Kevin Frost, Slipstream

Fact vs. Fiction: What is really happening with ASHP performance in cold climate conditions? Join us in this session to hear results from several field studies on real-world heat pump performance in cold climates.

Moderator: **Suzi Asmus**, Northwest Energy Efficiency Alliance

Characterizing Real-World Performance of Air Source Heat Pumps: Insights from Several Midwest Studies
Dani Ball, Slipstream

Advancing RTU Performance with Heat Pumps and Energy Recovery
Daniel Raherimanjato, Center for Energy and Environment

Thank you for attending!

