

Hot Air and Hot Water Forums

Hot Air Forum, March 24–25 | Hot Water Forum, March 25–26
Renaissance Phoenix Downtown Hotel. Phoenix, Arizona.



Monday, March 23 | Pre-Forum Events

2:00–4:00pm Offsite Tour: Visit the Southwest Building Science Training Center

The [SWBSTC](#) has provided specialized technical training in weatherization and energy efficiency since 2004, with a focus on hands-on laboratory learning. The visit will include:

- Tour of the specialized Building Science lab
- Demonstrations of test procedures, including pressure diagnostics
- Discussion and Q&A with SWBSTC Training Manager

Sign up for the tour when you register. Cost: \$50. Capacity: 15 attendees.

5:30–7:00pm First-timers' orientation and group dinners

More information coming soon.

Tuesday, March 24 | Hot Air Forum

7:00 am – 7:00 pm Registration

7:30–8:15am Breakfast

8:20 – 8:50 am Welcome and Introductions

9:00 – 10:30 am Concurrent Sessions

1A. Fitting the Space: Advances and Challenges in Room and Micro Heat Pump Deployment

Moderator: Max Reichlin, Clean Power Research

Addressing Window Barriers to Room Heat Pumps
Alex Wurzel, CalMTA

Insights on Micro Heat Pumps Performance Metrics Via Laboratory Tests
Aniruddh Roy, Energy Solutions

Installed Performance of New Form Factor Heat Pumps in Cold Climate Multifamily Buildings
Ben Schoenbauer, Center for Energy and Environment

1B. Reporting from the field: Residential Dual-Fuel Heating Part I

Moderator: Jason LaFleur, GTI Energy

Evaluating Advanced Dual-Fuel Heating Systems: Field Demonstration Results from Residential Applications
Ram Dharmarajan, GTI Energy

My Buddy the Backup Boiler: Dual Fuel and All-Electric Air-to-Water Heat Pump Installations in Wisconsin
Jon Koliner, Slipstream

Renewable Liquid Fuels as a Low Cost Option for Heating
Thomas Butcher, NORA

1C. Advancing Heat Pump Technology: New Horizons in Cold Climate Applications - Part I

Moderator: Bo Shen, Oak Ridge National Laboratory

Leveraging Cold Climate Capabilities and Minimizing Supplemental Heat
JJ Sawicki, TRC Companies

Field Demonstration of an Affordable Thermoelectric Heat Pump for Residential Space Heating
Sreenidhi Krishnamoorthy, Electric Power Research Institute

Advancing Cold-Climate Heat Pump Performance through Tandem Vapor-Injection Compressor Technology
Yifeng Hu, ORNL

1D. New Insights into Rooftop Unit Performance and Efficiency Opportunities

Moderator: Bjorn Jensen, Consortium for Energy Efficiency, Inc.

Advancing Efficient Rooftop Units in the Northwest: From Concept to Market Adoption
Rebecca Hovey, Energy 350

National Efficient Rooftop Unit Energy Modeling and Field Studies
Colleen Collins, Resource Innovations

10:30 – 11:00 am **Networking Break**

11:00 – 12:30 pm **Concurrent Sessions**

2A. New Approaches to Tackling Heat Pump Barriers

Moderator: Matt Malinowski, ACEEE

How Geothermal Leasing Helps Utilities Build Resilient Energy Grids Cost-Effectively & Future-Proof Energy Infrastructure
Brian Ferrarese, Dandelion Energy

Practical Applications of Power Efficient Design to Accelerate Building Electrification
Brendan McEwen, Dunskey Energy + Climate Advisors

2B. Reporting from the field: Residential Dual-Fuel Heating Part II

Moderator: TBD

Are New Metrics for Dual Fuel Heat Pumps Picking Winners and Losers?

Meghan Sylvia, Frontier Energy

Developing an Emulator Control Platform for Dual Fuel HVAC Systems

Navin Kumar, ORNL

One-Way to Two-Way ACs in the Northeast

Danice Ball, Slipstream

2C. Advancing Heat Pump Technology: New Horizons in Cold Climate Applications - Part II

Moderator: TBD

Cold-Climate ASHP Sizing – Estimating Loads and Matching Duct Capacity

Justin Margolies, Center for Energy and Environment

Someone Actually Measured All That? High Performance High-Capacity Heat Pumps in the Field

Ben Larson, Larson Energy Research

Electrification Meets Reality: Achieving Net Zero with Hybrid Boiler-Heat Pump Systems

Simon Mandeville, Enervex

2D. Connected Commissioning: From Rooftops to Residences

Moderator: Rick Olson-Huddle, Resource Innovations/CalMTA

Presenters:

Rick Olson-Huddle, Resource Innovations/CalMTA

Christopher Dymond, Northwest Energy Efficiency Alliance

12:30 – 1:30 pm Networking Lunch

1:30 – 3:00 pm Concurrent Sessions

3A. Data-Driven Strategies for Sizing and Installing High-Efficiency HVAC Systems

Moderator: Ashley Armstrong, Daikin

Optimizing Variable-Speed Heat Pump Sizing: Rethinking Standards for Performance and Efficiency

Hannah Hargrove, EPRI

I Can See Clearly Now, Using 3-D Scanning, Manual J, and Metering to Redesign Heat Pump Installations

Jake Jaskwich, Ridgeline Energy Analytics

First Things First: Validating Assessor Knowledge for Fuel Switching and Dual-Fuel ccASHP Projects

Amanda Hatherly, Building Performance Institute

3B. Peak Performance: Flexing Loads and Pumping Up Comfort in an Electrified Future

Moderator: Matt Christie, TRC Companies

Residential HVAC Demand Flexibility Opportunities in Cold Climates
Rabi Vandergon, Center for Energy and Environment (CEE)

Comparing Available Demand Response Strategies for Residential Variable-Speed and Single-Speed Heat Pumps
Ashley Armstrong, Daikin

Unlocking Efficiency and DR Potential of Residential Dual Fuel Systems: Lessons from a Northwest Pilot
Barend Dronkers, Energy 350

3C. Affordability through Innovation in Financing and Program Design

Moderator: TBD

Inclusive Utility Investment: A Win-Win
Serena Campas, Rewiring America

Pulling the Levers to Reduce Residential Heat Pump Costs
Matthew Malinowski, ACEEE

Aligning Grid and Customer Benefits of Ground-Source Heat Pumps in Cold Climates
Iain Kerr, Dunsy Energy + Climate Advisors

3D. Refrigerant Landscape Overview: Low-GWP Market Readiness, Rollbacks?, and State of the Alternatives

Moderator: Ben Larson, Larson Energy Research

Aligning Markets and Mandates: Low-GWP Readiness in Heat Pump Technologies
Ellen Steiner, Opinion Dynamics

Rolling Back the Low-GWP Refrigerants Tide
Rachel Murray, DNV Energy Insights USA, Inc

Hot Water, Cool Air, Cleaner Future: Demystifying Next Generation Refrigerants for HVAC and Water Heating
William Goetzler, Guidehouse

3:00 – 3:30 pm **Networking Break**

3:30 – 5:00 pm **Workshops** (*Open to Hot Air and Hot Water Participants*)

4A. Targeting the Midstream

Moderator: Paul Campbell, ICF International, Inc.

4B. The Ideal Controller: Functionalities Needed for Efficient System Operation

Moderator: Suzi Asmus, Northwest Energy Efficiency Alliance

4C. Shifting Landscapes---Regulatory Uncertainty Across Jurisdictions

Moderator: Chris Granda, Energy Solutions

From Policy to Payback: The Evolving Landscape of Federal Energy Tax Credits and Incentives
Josh Irving, NORESO

4D. Commercial Building Electrification and Peak Load

Moderator: Elizabeth Traynor, ACEEE

Electrifying Small Businesses in Sacramento
Nic Dunfee, TRC

Open, Grid-Interactive Commercial Loads for Affordable Peak Demand Management
Tristan de Frondeville, SkyCentrics

Code Switch: Energizing Efficient Buildings for a Renewable Future
FANGXING LIU, Energy and Environmental Economics

5:00 – 6:30 pm

Reception

Wednesday, March 25 | Hot Air & Hot Water Forum (Combo Day)

7:30 am – 7:00 pm Registration

8:00 – 9:00 am Breakfast

9:00 – 10:30 am Welcome, Introductions, and Plenary Panel: Load Growth, Affordability and impacts of Space and Water Heating

10:30 – 11:00 am Networking Break

11:00 – 12:30 pm Concurrent Sessions

5A. Low-Income Multifamily: Practical HPWH Retrofits for Cold Climates and Combined Space and Water Heating Loads

Moderator: Vidhisha Moopnar, New Buildings Institute

Practical Decarb Approaches for Electrifying Low-Income Housing
Emily Nesting, Ecotope

Affordable Multifamily Electrification: A Case Study of Heat Pump Retrofit in Cold Climate Multifamily
Pierre Delforge, Harvest Thermal

Heat Pump Water Heaters for Combined Space and Water Heating in Multifamily Buildings
Jeff Maguire, National Lab of the Rockies (NLR)

5B. Market Drivers and Shifts: Getting HPWHs into Houses

Moderator: Roch Naleway, A.O. Smith Corporation

Michigan's Residential Buildings: A Policy Roadmap to Decarbonization
Grace Michienzi, Institute for Energy Innovation/Michigan Energy Innovation Business Council

Bay Area CCA Coalition: Regional Collaboration for Water Heater Market Transformation
Jennifer Green, MCE

The Water Heater Market Shift Led by Home Builders
Susan Harris, New Buildings Institute

5C. Post-Installation Performance

Moderator: TBD

When Energy Models Meet Reality: Closing the Gap Through Post-Installation Evaluation
Vivek Komarina, DNV

Insights from HPWH Market Transformation Progress in the Northwest: Supporting Installers and Educating Customers
Melissa Meek, NMR Group

Heat Pump Water Heater Performance and Extended Warranties
Joseph Wachunas, New Buildings Institute

5D. Hydronic Heat Pumps: Bye-Bye Boiler or Boiler as Backup?

Moderator: David Korn, Ridgeline Analytics

Design for Off with Air-to-Water Heat Pumps

Scott Spielman, Ecotope Inc.

Measured Field Performance of a CO₂ Air to Water Heat Pump Water Heater in a Commercial Building

Sarath Kannan, GTI Energy

Hot Enough for You? What Water Temperature Does Baseboard Really Need to Heat Your Home?

Chris Zimbelman, Ridgeline Energy Analytics

12:30 – 1:30 pm **Networking Lunch**

1:30 – 3:00 pm **Concurrent Sessions**

6A. Design and Financial Strategies for Affordability

Moderator: TBD

Financing Programs are Energy Solutions – How can Affordable Financing Accelerate Program Success and Reduce Barriers to Entry for Homeowners?

Aaron Edge, Slipstream

Scalable Affordable Financeable Electrification Part 2

Nicole Ceci, Steven Winter Associates

Advancing HPWH Deployment in Affordable Housing: Central HPWHs and Manufactured Home Retrofits

Vidhisha Moopnar, New Buildings Institute (NBI)

6B. New Strategies for Homeowner and Installer Engagement

Moderator: Susan Grant Harris, New Buildings Institute

From Supply Chain Gaps to Gains: A Unified Approach to Heat Pump Adoption

Lauren Eagan, Evergreen Energy Partners

Beyond the Audit: Emerging Customer Engagement Models in Heating and Hot Water Efficiency

Josh Irving, NORESO

Removing The Complexity Tax to Reduce Cost

Sonia Moin, Groundswell

6C. Refrigerants: From Lifecycle Management to the Next Generation

Moderator: Kyle Bergeron, A.O. Smith Corporation

Lifecycle Refrigerant Management: A Climate & Affordability Imperative for the Heat Pump Market
Rose Wall, VEIC

Clearing the Air on Reclaimed Refrigerants
Dennis Nasuta, OTS R&D

Next Generation Refrigerants for Commercial Heat Pump Water Heaters
Bo Shen, ORNL

6D. Combination HVAC/DHW Systems

Moderator: Ryan Hamilton, Consortium for Energy Efficiency, Inc.

Building Grid and Climate Resiliency with Ground Source Renewable Heating and Cooling
Willem Lange, WaterFurnace International

Seeing Double: Cooling with Commercial Split Heat Pump Water Heaters
David Korn, Ridgeline Energy Analytics

Integrated Heat Pumps for Heat Recovery from Space Conditioning and Water Heating
Micah Sweeney, EPRI

3:00 – 3:30 pm	Networking Break
----------------	------------------

3:30 – 5:00 pm	Concurrent Sessions
----------------	---------------------

7A. Eliminating Barriers to Residential Electrification Retrofits

Moderator: Harvey Sachs, ACEEE

Customer Journeys and Journeymen: Electrical Work for Heat Pumps and the Project Timeline
Jen Loomis, Opinion Dynamics

How To Avoid Upsizing Electrical Panels While Installing Heat Pumps
Diane Bailey, City of Palo Alto Utilities

Installing for Impact: Electrifying Older and Hard-to-Reach Homes Safely and Effectively
Jim Plantico, Community Energy Project

7B. Rate Design Strategies for Affordable Electrification

Moderator: Jennifer Kane, Trane Technologies

Heating Homes and Cooling Costs: Rate Designs to Support Decarbonization and Customers Affordability
Hannah Platter, Energy and Environmental Economics (E3)

Deploying Heat Pump Rates for Cold Climates
Erin Cosgrove, Northeast Energy Efficiency Partnerships

Building Consumer Confidence to go Electric with Monthly Electrification Bill Credits
Timothy Minezaki, SFPUC

7C. Credentials, Licensing Pathways, and Contractor Business Models that Work

Moderator: Joe Wachunas, New Buildings Institute

Expanding Business Opportunities for Heat Pump Water Heaters through Specialty Licensure Pathways
Emily Rosenbloom, Northwest Energy Efficiency Alliance

Stay Tuned: Contractor Business Models that Enable Commissioning
Alison Shereda, PNNL

HVAC Career Advancement: Certifications for the Clean Energy Economy (BPI, EPA 608, and NORA Bronze)
Robert O'Brien, National Oilheat Research Alliance (NORA)

7D. Thermal Energy Storage

Moderator: Peter Grant, Lawrence Berkeley National Laboratory

Field Demonstration of a Thermal Energy Storage-Heat Pump for Building Space-Heating Load Shifting
Navin Kumar, Oak Ridge National Laboratory

Coupled Thermal Energy Storage-Heat Pump for Building Load Shifting: Prototype Validation and National Assessment
Zhenning Li, Oak Ridge National Laboratory

Optimizing HVAC Defrost with Thermal Energy Storage for Better Comfort and Grid Load Management
Navin Kumar, Oak Ridge National Laboratory

5:30 – 7:00 pm

Shameless Commerce & Reception

Thursday, March 26 | Hot Water Forum

7:00 am – 4:00 pm Registration

8:00 – 9:00 am Breakfast

9:00 – 10:30 am Concurrent Sessions

8A. Measured Performance of Consumer HPWHs

Moderator: Adam Gage, Northwest Energy Efficiency Alliance

Looking High and Looking Low, Combining AMI Analysis and Meter Data for New Insights in HPWH Evaluation
David Korn, Ridgeline Energy Analytics

Comparison of HPWHs Ducted to the Outdoors and Unducted HPWH in Small Space
Ryan Allen, Frontier Energy Inc.

Real Performance: Measured Energy Use of 60 HPWHs and 200 ERWHs
Ben Larson, Larson Energy Research

8B. Accelerating HPWH Adoption: Innovation, Advanced Metrics and HVAC Integration for Multifamily Housing

Moderator: Adam Darlington, A.O. Smith Corporation

HPWHs in Apartments: HVAC Interactions
Robb Aldrich, Steven Winter Associates

The Heat is On for the Hot Water Innovation Prize: Affordable Multifamily Water Heating Products for All
Suzanne Foster Porter, Kannah Consulting

Advancing Metrics and Operational Insights for Centralized Heat Pump Water Heating in Multifamily Affordable Housing (MFAH)
Yiyang Dong, EPRI

8C. The Evolution of Distribution: Part I - Pumps

Moderator: Becky Henderson, Grundfos Pumps Corporation

Controlling the Flow or How Circulator Pump Controls Can Save Energy and Reduce Heat Losses
Fawn Brooks, 2050 Partners

Comparative Evaluation of Hot Water Recirculation Pump Demand Controllers (RPDCs)
Ryan Kerr, GTI Energy

To Swing or Not To Swing: Optimizing Recirculation in Central Heat Pump Water Heating Systems for Greater Efficiency and Market Adoption
Andrew Brooks, AEA

8D. Taking Load Shifting to the Next Level — Advanced Load Up, Conformance, and Scaling from Pilots to Programs

Moderator: Noah Gabriel, New Buildings Institute

Domestic Hot Water and Grid Flexibility: A Field Study of Real-Time Price Optimization at Three Affordable Housing Multifamily Sites in California

Greg Pfothenhauer, Artemisia Energy

Laboratory Testing of Residential Electric Water Heaters for Conformance with Demand Flexibility Communications Protocols

Daniela Urigwe, Energy Solutions

Customer acquisition and connectivity lessons from Southern California Edison's SmartShift Rewards program

Emily Kehmeier, Energy Solutions

10:30 – 11:00 am Networking Break

11:00 – 12:30 pm Concurrent Sessions

9A. 120 V Water Heaters

Moderator: Jon Koliner, Slipstream Inc.

"Max-Tech" 120V Heat Pump Water Heater: Development of a Higher Capacity Hot Water Heater

Melanie Moses-DeBusk, ORNL

Plugging into Transformation: Unlocking Small Business Adoption of 120V Heat Pump Water Heaters

Evan Gutierrez, TRC

Real Life 120V Heat Pump Water Heater Installation in Single-Family & Multifamily Retrofit Applications

Roch Naleway, AO Smith

9B. CHPWHs Part I: The Future of Commercial Heat Pump Water Heaters: Water Use, System Metrics, and Design Guides

Moderator: Ben Schoenbauer, Center for Energy and Environment

Multifamily Hot Water Draw Profiles – the When and How Much?

Jeff Staller, 2050 Partners Inc

Progress Update on ASHRAE Guideline 47 for Central Commercial Heat Pump Water Heaters in New Multifamily Buildings

Cristalle Mauleon, Lincus Inc

Unlocking the Future of Commercial Heat Pump Water Heaters: A Unified Approach to Performance Metrics

Ryan Hamilton, Consortium for Energy Efficiency

9C. It's All About the Volume!

Moderator: Gary Klein, Gary Klein Associates

A New Perspective on Managing OPPPS

Tim Bartrand,

The Benefits of Tiny Pipes

Larry Weingarten, Just Me

Highlights from a Research Project in Minnesota on Right-Sizing Distribution Pipes and Water Heating Systems to Save Energy and Reduce Building Costs

Steffi Becking, 2050 Partners

9D. Optimized Controls for Consumer HPWHs

Moderator: Sam Larson, Larson Energy Research

Maximizing Hot Water Output for Small Volume Heat Pump Water Heaters

Janelle Domantay, Colorado School of Mines

Stop Overpaying 4x! Predictive Controls to Minimize Heat Pump Water Heater Use of Resistance Elements

Peter Grant, Lawrence Berkeley National Laboratory

Quantifying the Impacts of Shifting Residential Electric Water Heating Loads

Tim Larsen, Demand Side Analytics

12:30 – 1:30 pm	Networking Lunch
-----------------	------------------

1:30 – 3:00 pm	Concurrent Sessions
----------------	---------------------

10A. Gas HPs - Applications and Results

Moderator: Ramy Abdelhady, GTI Energy

GAHP Commercial Water Heating Field Performance and Comparison with Electric Heat Pumps

Hardik Shah, GTI Energy

Gas Heat Pumps: Applications & Results

Melissa Mejia, NEEA

10B. CHPWHs Part II: Field Performance of Central Heat Pump Water Heaters for Multi-Family

Moderator: Skye Gruen, ACEEE

Field Insights: Evaluating Central HPWH System Performance
Maya Gantley, 2050 Partners

On-site Performance of Central Heat Pump Water Heater Systems in a Small Multifamily Complex
Catherine Chappell, TRC

Performance monitoring feedback to ensure persistence of CHPWH Systems
Scott Spielman, Ecotope Inc.

10C. Food service - HP Performance Testing in the Laboratory to Support Sizing, COP, and Load Shifting Research

Moderator: Amin Delagah, TRC Companies

Heat Pump Water Heaters for Commercial Foodservice: Lessons Learned from the Lab
Mehdi Zeyghami, PG&E
Michael Slater, PG&E

Hot Water Load Shifting for Foodservice Decarbonization
Matt Stevens, TRC

10D. Emerging Paradigm or just a Phase? Phase Change Materials for Hot Water

Moderator: Jim Lutz, Hot Water Research

Integrating TES PCM for Simultaneous, On-Demand Hot Water and Space Heating/Cooling with Solar PVT
Jason LaFleur, GTI Energy

Getting 50 Gallons out of 40 Gallons: Phase Change Material Heat Exchangers to Eliminate Up-Sizing of 120V Heat Pump Water Heaters
Erin Blackley, Colorado School of Mines

Reimagining Multifamily Central DHW Designs with Distributed PCM Storage
Emma Casavant, VEIC - Vermont Energy Investment Corporation

3:00 – 3:30 pm

Networking Break

11A. Dual Fuel Systems

Moderator: Kyle Guesenkamp, Oak Ridge National Laboratory

Advancing Hybrid Water Heating Systems for Space and Domestic Applications
Ross Brawner, Lochinvar

Grid-Responsive Dual-Fuel Heat Pump Water Heater for Operating Cost Reduction
Zhenning Li, Oak Ridge National Laboratory

Dual-Fuel 120V Heat Pump Water Heaters as a Swiss Army Knife
Jason Lafleur, GTI Energy

11B. CHPWHs Part III: Balancing standardization and design innovation to advance the Commercial HPWH market

Moderator: Scott Spielman, Ecotope Inc.

Presenters:

Andy McNamara, Carbon Zero Buildings
Adam Gage, Northwest Energy Efficiency Alliance

11C. Food Service – HP Field Demonstration and Sizing

Moderator: Maya Gantley, 2050 Partners

Field Demonstration: HPWH Assist Retrofit in Foodservices
Daniel Hacking, TRC

Revision of Health Department Sizing Guidelines to Remove Regulatory Barriers to Heat Pump Water Heaters and to “Right Size” Heaters in Foodservice Facilities.
Amin Delagah, TRC

H.O.T.T.O.G.O: Heat Pump Water Heaters in Quick-Service Restaurants (and other commercial applications)
Noah Gabriel, NBI

11D. Workshop---Meeting Customers Where They Are: Retail and DIY

Moderator: Kim Rose