

# 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

### 2:00–4:00 pm 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.

### 5:30–7:00 pm Group dinners and first-timers' orientation

*More information coming soon.*

## Tuesday, March 24 | Hot Air Forum

7:00 am–7:00 pm Registration

7:30–8:15 am 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, Oak Ridge National Laboratory

## 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

Minnesota Efficient RTU Field Study Results  
Tobias Barth, Minnesota Center for Energy and Environment

Efficient RTU Modeling Energy Savings: National Modeling Research Results  
Marcus Dimeo, Resource Innovations

RTU Performance Metrics Are Leaving Savings on the Table  
Jason Jones, Northwest Energy Efficiency Alliance

10:30–11:00 am

Networking Break

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

**2A. 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 Jaskwhich, Ridgeline Energy Analytics

First Things First: Validating Assessor Knowledge for Fuel Switching and Dual-Fuel ccASHP Projects  
Amanda Hatherly, Building Performance Institute

**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, Oak Ridge National Laboratory

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. 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

William Harvey, Dunsy Energy + Climate Advisors

### 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

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

Pulling the Levers to Reduce Residential Heat Pump Costs

Matt 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: State of the Alternatives, Low-GWP Market Readiness, and Rollbacks?

Moderator: Ben Larson, Larson Energy Research

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

William Goetzler, Guidehouse

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

3:00–3:30 pm

Networking Break

**3:30–5:00 pm**      **Concurrent Workshops & Breakout Session**

Workshops are open to Hot Air and Hot Water Participants.

**4A. Midstream in Motion: A Supply-Chain Problem-Solving Workshop**

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, NORESKO

**4D. Commercial Building Electrification—New Approaches to Load and Flex**

Moderator: Elizabeth Traynor, ACEEE

Code Switch: Energizing Efficient Buildings for a Renewable Future  
Fangxing Liu, Energy and Environmental Economics

Electrifying Small Businesses in Sacramento  
Nic Dunfee, TRC

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

**5:00–6:00 pm**      **Fireside Discussion**

**6:00–7:00 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 am – 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: Emily Rosenbloom, Northwest Energy Efficiency Alliance

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 CO<sub>2</sub> 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

## 6B. Winning Strategies to Engage Homeowners, Building Owners, and Installers

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

Lindsey Dorman, Carrier Corporation

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, Oak Ridge National Laboratory

## 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

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

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

Building Consumer Confidence to Go Electric with Monthly Electrification Bill Credits  
Timothy Minezaki, San Francisco Public Utilities Commission

## 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, Pacific Northwest National Laboratory

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  
Kyle Gluesenkamp, 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

5:00–7:00 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  
Steve Morris, Demand Side 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  
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  
Srushti Koli, TRC Companies

Comparative Evaluation of Hot Water Recirculation Pump Demand Controllers  
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, Association for Energy Affordability

## 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  
Helen Davis, Energy Solutions  
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 am – 12:30 pm**      **Concurrent Sessions**

## 9A. 120 V Water Heaters

Moderator: Jon Koliner, Slipstream Inc.

“Max-Tech” 120 V Water Heater: Development of a Higher Delivery Capacity Water Heater  
Kyle Gluesenkamp, Oak Ridge National Laboratory

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, West Monroe

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  
Christoph Lohr, IAPMO

The Benefits of Tiny Pipes  
Larry Weingarten

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, West Monroe

## 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. Laboratory, Field, and Modeling Results for Gas Absorption and Electric Heat Pump Water Heaters

Moderator: Ramy Abdelhady, GTI Energy

Heat Pump Performance in California: A Comparison Laboratory Study for Fuel-Fired Water Heating Applications  
Madeline Talebi, ICF

Field Results of Gas Absorption Heat Pumps (GAHPs) In Domestic Hot Water (DHW) Systems  
Cristalle Mauleon, Lincus

GAHP Commercial Water Heating Field Performance and Comparison with Electric Heat Pumps  
Hardik Shah, GTI Energy

Commercial Building Modeling Results for Gas Heat Pumps  
Noe Contreras, Northwest Energy Efficiency Alliance

## **10B. Central Heat Pump Water Heaters 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, West Monroe

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 and Optimizing COP in Cafes, Fast Food and Sit-Down Restaurants**

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

Heat Pump Water Heaters for Commercial Foodservice: Integrated HPWH System Results and Findings  
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 Gluesenkamp, Oak Ridge National Laboratory

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

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

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

### 11B. Central Heat Pump Water Heaters 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, West Monroe

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

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

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

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

Moderator: Kim Rose