Hot Water Forum

Water Heating, Distribution, and Use Efficiency

Hilton Portland & Executive Tower • Portland, OR • February 21-23, 2016

CONFERENCE PROGRAM (subject to change)

Sunday, February 21

12:00 pm – 7:00 pm  REGISTRATION OPEN

5:00 pm – 7:00 pm  WELCOME RECEPTION

Monday, February 22

7:30 am – 7:30 pm  REGISTRATION OPEN

8:00 am – 9:00 am  CONTINENTAL BREAKFAST

9:00 am – 10:30 am  WELCOME, INTRODUCTIONS AND PLENARY SESSION

Welcome and Introductions: Rachel Cluett, American Council for an Energy-Efficient Economy

Plenary Session: Updates Since the 2015 Federal Water Heater Standards Took Effect

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

Speaker(s): Frank Stanonik, Air-Conditioning, Heating, and Refrigeration Institute  
George Chapman, Consortium for Energy Efficiency  
Ashley Armstrong, US Department of Energy

Description: The 2015 Water Heater Minimum Efficiency Standards took effect in April 2015, beginning mandatory adoption of higher efficiency levels for water heaters larger than 55 gallons. Simultaneously, DOE is adopting a new test procedure that extends coverage, divides water heaters into four capacity-based categories, and uses different but more realistic tests for each class. Our speakers represent perspectives from manufacturers, contractors, utilities, and regulators involved in this work and will present updates from their respective areas.

This session will cover:

- The collision of two regulatory changes: the new test method and new minimum efficiency standards
- News from equipment manufacturers on the effect of standard and test procedure changes on business
- What’s happening in the field – news from contractors
- How these changes are affecting utilities and energy efficiency programs
- Details on cross-walk for rating water heaters under the new test method
10:30 am – 11:00 am AM BREAK

11:00 am – 12:30 pm BREAKOUT SESSIONS

Session 1A

Grid-Enabled, Grid-Responsive, and Grid-Interactive Electric Thermal Storage (ETS) Water Heating (GIWH): How We Got Here and Where We’re Going!

Moderator: Steven Koep, Vaughn Thermal Corporation, Co-Chair – PLMA GIWH Interest Group
Speakers: Utility Industry Policy Update: How We Got Here!
Keith Dennis, National Rural Electric Cooperative Association
Efficiency Standards, Environmental Performance, and Water Heating Technology
Robin Roy, Natural Resources Defense Council
Grid-Interactive Loads: Pursuing Market Acceptance through Codes & Standards
Paul Steffes, Steffes Corporation
From Legacy Systems to GIWH & Community Storage!
Gary Connett, Great River Energy, Co-Chair - PLMA GIWH Interest Group
Emerging Opportunities in Electric Water Heating
Judy Chang, Brattle Group

Description: Grid-Interactive Water Heating (GIWH) is poised to move from lab tests and pilot projects to market introduction for electric utilities across the country. Simultaneously, increasing amounts of variable renewable energy are being integrated onto the grid, ancillary service markets are developing, and water heating efficiency standards are evolving. This changing landscape is leading to a variety of challenges and opportunities as stakeholders - ranging from policymakers, utilities, environmental advocates, and manufacturers - work to balance their interests while meeting the demands of consumers and the market. Join us for a discussion of how policies and technologies interact and continue to evolve as we move from grid-responsive to grid-interactive water heating.

Session 1B

CO₂ Heat Pump Water Heating Advancement in the US Market

Moderator: Omar Abdelaziz, Oak Ridge National Laboratory
Speakers: CO₂ for Larger Commercial Applications
John Bush, Electric Power Research Institute
EcoCute for the US Market
John Miles, Sanden
Affordable ENERGY STAR CO₂ HPWH for the US Market
Kyle Gluesenkamp, Oak Ridge National Laboratory
CO₂ Heat Pump Water Heater Field Tests: What We Know and What We Wish We Did
Ken Ecklund, Washington State University

Description: Heat pump water heaters using CO₂ have shown extremely high COPs and high service temperatures. Can they be successful on a large scale in US markets? Speakers from industry, utility and research laboratories will cover CO₂ HPWH for large commercial applications, split water heating systems; development of a low cost CO₂ HPWH for the US market that could meet ENERGY STAR® criteria; and results from field testing of CO₂ HPWHs.
Session 1C

Heat Pump Water Heater Marketing: How to Influence the Planners and the Procrastinators
Moderator: Becca Yates, Northwest Energy Efficiency Alliance
Speakers: Becca Yates, Northwest Energy Efficiency Alliance
Steve Ryan, US Environmental Protection Agency

Description: The water heater market is a double-edged sword. Some consumers plan ahead and replace their water heater proactively, while others wait until their water heater breaks, and they have to act quickly to get a replacement. The consumer mindset, needs, and demographic profiles are markedly different in these two scenarios and programs need to tailor their marketing strategies accordingly to influence both types of consumers. The Northwest Energy Efficiency Alliance and ENERGY STAR® will discuss the experience and research that has informed their unique approaches and results in transforming the market.

Session 1D

What Is the Future for Solar Thermal Water Heating?
Moderator: Bill Healy, National Institute of Standards and Technology
Speakers: Solar Thermal vs. Photovoltaic Water Heating
Bill Healy, National Institute of Standards and Technology
Residential Solar Water Heating Trends and Financial Incentives in Oregon
Rob Del Mar, Oregon Department of Energy
Solar Thermal in a Changing Utility Landscape: Lessons from Florida
Jeff Curry, Lakeland Electric [invited]
Understanding and Improving Solar Thermal Water Heating Effectiveness for California Households
Loren Lutzenhiser, Portland State University
Field Results from a New Solar Thermal System
Larry Weingarten

Description: This session will cover various developments in solar thermal water heating and explore the costs and benefits of relying on solar thermal versus photovoltaics.

12:30 pm – 1:30 pm LUNCH

1:30 pm – 3:00 pm BREAKOUT SESSIONS

Session 2A

Grid Interactive Water Heating (GIWH) Research
Moderator: Keith Dennis, National Rural Electric Cooperative Association
Speakers: System Level Value of GIWH
Mark Dyson, Rocky Mountain Institute (RMI)
GIWH for the Multi-family Residential Sector
Jim Lazar, Regulatory Assistance Project (RAP)
Demonstrating GIWH as Part of an Enhanced Load Control Strategy
Ken Glaser, Connexus Energy and Eric Lebow, Power Over Time

Description: This session includes a number of research efforts that explore the value of grid interactive water heating (GIWH) to utilities, customers, and businesses. The first presentation will detail RMI’s recent analysis of the total value creation potential of GIWH for utilities, customers, and third-party entrepreneurs yielded a current estimate of $3.7 billion/year across the US, with many stakeholders able to capture some of that value as either cost savings or new revenue. The presentation will outline this market sizing analysis and highlight the paths to market for innovative utilities and third parties to capture the value. The second presentation will
draw from a forthcoming RAP report to explore how the 45 million electric water heaters in the US can enable approximately 100,000 megawatts of additional variable renewable energy to be easily integrated into the US electric grid. The presentation will focus on the multi-family sector, where deployment is easier due to concentration of customers, access issues, communications network availability, and lack of applicability from other water heating technologies. The last presentation will cover results Connexus Energy’s deployment of a number of retrofitted grid-interactive water heater controls, installed to evaluate the potential for GIWH to function as the foundation of an enhanced load control strategy that will include electric vehicles and residential battery systems.

Session 2B
Field Testing of Combi-Systems

Moderator: Paul Glanville, Gas Technology Institute
Speakers:
- Integrated Forced-Air System: Field Research on Combis with Condensing Gas Water Heaters and Electric Heat Pumps
  Tim Kingston, Gas Technology Institute
- Findings from 3 Field Studies of Rheem’s H2AC Condenser Waste Heat Recover System at Full Service Restaurants
  Hillary Vadnal, Gas Technology Institute
- Development of the Mitsubishi Dual Purpose (Space Conditioning and Heating Water) Heat Pump
  Paul Doppel, Mitsubishi

Description: Packaging space and water heating in combination systems stands to offer a cost effective alternative to separate space conditioning and water heating systems. Experts have been conducting field tests of these combi systems under various application scenarios. In this session, they will present the latest findings and expected outcomes.

Session 2C
Heat Pump Water Heaters and the Northwest Market: Where Have We Been and Where Are We Going?

Moderator: Aaron Winer, CLEAResult
Speakers:
- Energy Efficiency Program Perspective
  Jill Reynolds, Northwest Energy Efficiency Alliance
- Manufacturer Perspective
  Francois LeBrasseur, General Electric
- Utility Perspective
  Christine Bunch, Seattle City Light

Description: The Northwest Energy Efficiency Alliance (NEEA) has worked for the past five years to transform the water heater market, encouraging consumers to adopt heat pump water heater technology while achieving large energy savings in Oregon, Washington, Idaho, and Montana. The market has come a long way and NEEA has learned some important lessons that will inform future strategies and success. This session will share perspectives from multiple layers of the water heater market to understand the unique barriers and successes each stakeholder has experienced. Based on understanding nuances of the market, we will piece together a cohesive approach for future success.

Session 2D
Modeling What We Know About Hot Water Use

Moderator: Jim Lutz, Lawrence Berkeley National Laboratory
Speakers:
- HOTHOUSE: Hot Water Provision in Homes - Consumption, Storage, and Lifestyle
  Richard Buswell, Loughborough University
- Modeling Hot Water Use in Single Family Buildings
  Sean Armstrong, Redwood Energy
- Revising Hot Water Calculations in Title 24 in California
  Bruce Wilcox

Description: How domestic hot water is dealt with in building energy simulation models is still a work in progress. This session will begin with a critical review of the current state of the art along with some preliminary findings from field research in the UK. Next will be a discussion of two efforts in California. One will be about using the Residential End Uses of Water databases to discover the per-
person, per fixture use of domestic hot and cold water to more accurately model higher density multi-family housing. The other is about ongoing efforts to revise water heating energy use calculations in California’s building energy efficiency code.

3:00 pm – 3:30 pm  PM BREAK

3:30 pm – 5:00 pm  BREAKOUT SESSIONS

Session 3A

Grid Interactive Water Heating Market Development: New Business Models for Scaling the GIWH Market

Moderator:  Mark Dyson, Rocky Mountain Institute
Speakers:  Scaling a GIWH Rental Business Model
   Dan Flohr, Sequentric
   Standardizing GIWH and Rolling Out at Scale
   Conrad Eustis, Portland General Electric
   Water Heater Leasing – The New/Old Business Model for GIWH
   Steven Koep, Vaughn Thermal Corporation

Description: This session is focused on examining new business models to capture the value generated by the proliferation of GIWH technologies. Hear from companies and utilities that are working to develop the potential for getting GIWH deployed into consumers' homes and explore their business case for doing so.

Session 3B

Gas-Fired Heat Pump Water Heaters

Moderator: Kyle Gluesenkamp, Oak Ridge National Laboratory
Speakers:  Commercial Heat Pump Water Heaters
   Mike Garrabrant, Stone Mountain Technologies, Inc.
   Patrick Geoghegan, Oak Ridge National Laboratory
   Membrane Based Heat Pump Water Heaters
   Devesh Chugh and Saeed Moghaddam, University of Florida
   Adsorption Heat Pump Water Heaters
   Moonis Ally, Oak Ridge National Laboratory
   Update of Field Study of Stone Mountain Technologies, Inc. Residential Heat Pump Water Heaters
   Paul Glanville, Gas Technology Institute

Description: This session will provide new laboratory and field research data on measuring the performance of advanced gas water heaters.

Session 3C

Plumbing Pathogens

Moderator: Jim Lutz, Lawrence Berkeley National Laboratory
Speakers:  Presentation Title TBA
   Marc Edwards, Virginia Tech
   Presentation Title TBA
   Carl Hiller, Applied Energy Technology
   Probiotic Approaches to Pathogen Control
   Marc Edwards, Virginia Tech

Description: Increasingly important pathogens are living in our drinking water. This session will present research on elevated water age and poor water quality in green buildings. What is in ASHRAE's newly released standard 188-2015 Legionellosis: Risk Management for Building Water Systems? What are they doing with Guideline 12 - Minimizing the Risk of Legionellosis Associated with Building Water Systems? Are other probiotic approaches to pathogen control in plumbing systems possible?
**Session 3D**

**Large Commercial Applications**

**Moderator:** Nehemiah Stone  
**Speakers:** To Be Announced  
**Description:** To Be Announced

**5:15 pm – 6:15 pm**  
**LIGHTNING SESSION**

**Shameless Commerce: Introducing New Products and Services**

**Description:** In this session, we’ll deviate from our usual norms, and offer anyone a few minutes to present new products or services, as well as their advantages, features, availability, etc. This session will be packed with short 5-minute presentations. Come hear about a variety of new products and services, and continue discussions directly following this session during the reception.

**5:30 pm – 7:30 pm**  
**RECEPTION**

**7:30 pm**  
**EVENING INFORMAL SESSIONS**

**Saving Water through Behavior Changing Technologies**

**Moderator:** Todd Levin, Argonne National Laboratory

**Description:** The United States is experiencing a number of key trends that have increased the imperative to develop and implement comprehensive water conservation efforts. Such conservation can be achieved through both technical change (e.g., low-flow showerheads) and behavioral change (e.g. shorter showers). With this in mind the US Department of Energy Building Technologies Office commissioned Argonne National Laboratory to conduct a scoping study of the market landscape for behavior-changing technologies in the water sector. We will discuss the findings and lessons learned that were developed through background research, stakeholder outreach, and stakeholder participation in a 2-day workshop that was hosted by Argonne in April 2015. These findings include: 1) technology characteristics that are favorable for motivating behavioral change, 2) barriers that have and prevented the development and market adoption of technologies with these characteristics in the water sector, and 3) concrete research and development pathways that could be undertaken to overcome these barriers, increase the penetration of technologies that influence water consumption behavior, and ultimately reduce domestic water consumption.

**A Market Transformation Initiative: Heat Pump Water Heaters as Grid-Scale Thermal Batteries**

**Moderator:** Joseph Hagerman, US Department of Energy

**Description:** The Department of Energy is considering launching a market transformation program that would challenge utilities and market actors to encourage widespread adoption of grid-interactive HPWH, and thus realize benefits including grid stability, economy, and reduced carbon emissions – without affecting consumer utility. Because the HWF uniquely brings together manufacturers and market channels, utilities, the research community, and government staff, we are offering an informal session at the event. DOE will briefly outline its “straw man”, to elicit response, support and critiques of all aspects – especially focused on better ways to achieve the objectives. All are invited.
Tuesday, February 23

7:30 am – 5:00 pm  REGISTRATION OPEN

8:00 am – 9:00 am  CONTINENTAL BREAKFAST

9:00 am – 10:30 am  BREAKOUT SESSIONS

Session 4A

From Grid Responsive to Grid Interactive – An Evolving Perspective

Moderator: Steven Koep, Vaughn Thermal Corp.

Discussion Panelists: Gary Connett, Great River Energy/PLMA
Paul Steffes, Steffes Corporation
Robert Warden, Comverge
Eric Lebow, Power Over Time
Dan Flohr, Sequentric
Joe Childs, Eaton
Steven Koep, Vaughn Thermal Corporation

Description: As we move toward the Internet of things, it’s important to recognize the trend from pre-programmed stand-alone timers and one-way radio-control devices (on-off/grid-responsive) to high-speed, two-way communication (element modulation/grid-interactive) and the variety of ancillary services (frequency control, etc.) that are enabled. From communication protocols to grid-interactive functionality, the panel participants will share their perspectives on the evolving market opportunity.

Session 4B

Heating Water with Integrated Heat Pumps

Moderator: Van Baxter, Oak Ridge National Laboratory

Speakers: Air Source Integrated Heat Pumps: Lab and Field Test Results
Jeff Munk, Moonis Ally and Van Baxter, Oak Ridge National Laboratory
Modeling Integrated Heat Pumps
Bo Shen, Oak Ridge National Laboratory
Water Heating with Gas Engine Driven Heat Pumps
Isaac Mahderekal, IntelligChoice
Ayyoub Momen and Ed Vineyard, Oak Ridge National Laboratory

Description: This session will include research on highly efficient combined space and water heating systems that rely on air source, ground source, and gas engine driven heat pumps.
Session 4C

Midstream and Upstream Utility Programs
Moderator: **Jennifer Parsons**, The United Illuminating Company
Speakers: Survey of Heat Pump Water Heater Programs  
- **George Chapman**, Consortium for Energy Efficiency  
Upstream Hot Water Program at the Connecticut Utilities  
- **Jennifer Parsons**, The United Illuminating Company  
Efforts to Shift from Traditional Rebate Programs to Upstream Approaches  
- **Marshall Johnson**, Energy Trust of Oregon

Description: Moving the rebate process from a downstream (i.e. mail-in) consumer submission to an upstream submission at the distributor level, has proven to be an effective means of capturing larger volumes of high efficiency equipment sales, while also creating a market shift from conventional, code equipment to high efficiency equipment. This session will highlight some of the successes programs have experienced by reaching beyond the customer to the distribution chain.

Session 4D

Pipe Sizing
Moderator: **Jim Lutz**, Lawrence Berkeley National Laboratory
Speakers: How Small Can We Go: Pressure Drop versus Flow Rate for ¼ and ½ inch Nominal Tubing  
- **Gary Klein**, Gary Klein and Associates  
Hotel Hot Water Use  
- **Carl Hiller**, Applied Energy Technology

Description: Pipe sizing techniques rely on knowledge of peak demand and pressure drops. Current codes and practices are based on research that is many decades old. At this panel we will hear about recent research that is updating our knowledge of peak demands in single-family homes and hotels. Also presented are initial findings of pressure drop across modern PEX plumbing fittings.

10:30 am – 11:00 am  AM BREAK

11:00 am – 12:30 pm  BREAKOUT SESSIONS

Session 5A

Grid-Responsive Water Heaters
Moderator: **Ed Vineyard**, Oak Ridge National Laboratory
Speakers: Field Test Results of Grid-Responsive HPWH  
- **Roderick Jackson**, Oak Ridge National Lab  
Development of Grid-Enabled Units  
- **Samuel DuPlessis** and **Venkat Venkatakrishnan**, General Electric  
HPWH for Demand Response  
- **Ron Domitrovic**, Electric Power Research Institute  
EERE Tech to Market: Grid Responsive HPWHs  
- **Joe Hagerman**, US Department of Energy

Description: The session is intended to present information on grid-enabled heat pump water heaters (HPWHs) regarding their development, field testing, and marketing. The goal is that this information will help to significantly increase the number of grid-enabled HPWHs in the market through a better understanding of this new technology.
**Session 5B**

**Showers: Recycling or Capturing Waste Heat – Which is the More Efficient Option?**

**Moderator:** Gary Klein, Gary Klein Associates  
**Speakers:** Kaity Tang, CLEAResult  
James Domanski, CLEAResult  
Rick Caruso, Swing Green

**Description:** This session will present information on recycling showers, drain water heat recovery and gray water source water heating. There are at least three companies trying to bring recycling showers to the US market; we will discuss their approaches to the technology and the potential challenges they face with codes and standards. The presentation on drain water heat recovery will present field data from one house that is currently being monitored. A different strategy is to collect all grey water at one location and use a heat pump to extract the energy and use it to heat the water in a storage tank; field data on two systems will be presented. Discussion will revolve around the system impacts of installing each one or all of these devices.

**Session 5C**

**Heat Pump Water Heaters and the Northern Climate Specification Update**

**Moderator:** Geoff Wickes, Northwest Energy Efficiency Alliance  
**Speakers:** Geoff Wickes, Northwest Energy Efficiency Alliance  
Ben Larson, Ecotope  
Arthur Smith, A.O. Smith

**Description:** Northwest Energy Efficiency Alliance’s Northern Climate Specification (NCS) was first release in 2009 to provide guidance to manufacturers interested in developing products that not only meet ENERGY STAR® criteria but are able to provide high levels of consumer satisfaction and energy performance in cooler, northern climates. Since the NCS was released, manufacturers have stepped up to the challenge and there are currently 55 products on the NCS Qualified Products List. The NCS is in the process of being updated with a variety of new features including:

- Additional Tiers for improved efficiency levels
- Clarify test procedure so manufacturers can better design products
- Open testing to other certified labs
- Clarify definitions of terms (unconditioned, semi-conditioned and conditioned space)
- Define performance challenge process
- Warranty requirement clarification

**Session 5D**

**Distribution in Large Buildings**

**Moderator:** Ben Schoenbauer, Minnesota Center for Energy and Environment  
**Speakers:** Demand Control Recirculation in Commercial and Hotel Properties  
Ben Schoenbauer, Minnesota Center for Energy and Environment  
Controls for Circulation Systems in Large Buildings  
Gary Klein, Gary Klein and Associates, Inc.  
Energy Research on Improving the Balancing and Mixing of Domestic Hot Water  
Gabriel Ayala, Enovative Group

**Description:** This session will explore solutions to distribution loses and waste in both energy and water in large buildings.

**12:30 pm – 1:30 pm**  
LUNCH
**Session 6A**

**DOE’s Working Group on Adopting a Standard Communications Port for Water Heaters**

Moderator: Brian Spak, Portland General Electric

Speakers: To Be Announced

**Description:** On September 14, 2015, Senators Cantwell and Wyden sent a letter to Secretary Moniz requesting that he establish such a working group via the Office of Electricity Delivery and Energy Reliability. Such a port would have significant benefits in facilitating and lowering the cost of residential demand response. The establishment of a common port on all electric water heaters would be a low incremental cost to water heater manufacturers while dramatically lowering the cost of water heater demand response programs and at the same time increasing functionality for customers, thus enabling their robust adoption around the country. The DOE-lead working group is an attempt to voluntarily help utilities, manufacturers, and other stakeholders agree to such a standard port. This panel focused on DOE’s working group, with the objective of informing the audience about the effort and the early positions of various stakeholders.

**Session 6B**

**Distribution in Residential Buildings**

Moderator: Gary Klein, Gary Klein and Associates, Inc.

Speakers: Troy Sherman, Evolve Technologies, LLC
Gary Klein, Gary Klein and Associates, Inc.

**Description:** How long do you want to wait for hot water to arrive after you turn on the tap? Even if the structural waste is small, will people change their behavior to take this into account? We will discuss what it means to have a “compact” plumbing design in dwellings that have one water heater whether single or multi-family or to multi family units with one branch off a central circulation. We will also discuss the importance of simultaneously addressing structural and behavioral waste.

**Session 6C**

**What’s Cooking? Using a Targeted Approach to Selling ENERGY STAR® Certified Commercial Water Heaters**

Moderator: Mark Michalski, Cadmus

Speakers: To Be Announced

**Description:** Everyone in our industry knows that ENERGY STAR® certified commercial water heaters offer substantial energy savings to a variety of commercial customers. What we don’t know we can learn from our panelists in how they are engaging commercial customers through their program sales and marketing channels to upsell them on certified units. Learn their strategies, what works and what doesn’t as we strive to identify pathways to increasing commercial water heater efficiency, one kitchen at a time.
3:30 pm – 5:00 pm  BREAKOUT SESSIONS

**Session 7A**

**Changes to Codes and Standards**

Speakers:  
- **Jim Lutz**, Lawrence Berkeley National Laboratory  

**Description:** What impact will changes to the DOE and ASHRAE test procedures have across other codes and standards? This change will likely impact solar rating (SRCC), home ratings (RESNET, ENERGY STAR®), utility programs and others.

**Session 7B**

**Field and Lab Monitoring in Commercial Kitchens**

Moderator: **Amin Delaghah**, Fisher-Nickel, Inc.

Speakers:  
- Results from 18 Field Monitoring Projects on Rack and Flight Conveyor Dishwashers  
- Updates from an In-Depth Hot Water System Replacement Project in a Full Service Restaurant  
- **Don Fisher**, Fisher Consultants  
- Recent Testing and Added Features of the 2nd Generation Hot Water System Testing Laboratory at PG&E  
- **Eddie Huestis**, PG&E Applied Technology Services

**Description:** Fisher-Nickel Inc. has recently taken on two extensive projects that seek to modernize hot water system design and operation. The first speaker will summarize the results from 18 monitoring projects on rack and flight conveyor dishwashers. These machines are the most water and energy intensive appliances in commercial kitchens using two to three times their anticipated hot water use. Observations relating to the maintenance and operation of existing machines and commissioning of new machines will be provided. The second speaker will discuss a study that monitored hot water use from generation to point of use in a full-service restaurant. Details will be provided on the original system’s energy and water use, delivery performance and overall system efficiency. Updates on the design, installation and monitoring of the replacement system will be covered. The third speaker will present on the recent testing completed and added features of the 2nd-generation hot water system laboratory at PG&E.

**Session 7C**

**Development of the CEA 2045 Standard**

Moderator: **Geoff Wickes**, Portland General Electric

Speakers:  
- To Be Announced

**Description:** BPA and PGE are working with EPRI in the development of the CEA 2045 standard for water heaters. This panel will discuss the benefits to the Grid and some of the details on how the next generation of Demand Response will be implemented by the adoption of the CEA 2045 Standard for water heaters.
Thank You Funders!

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