

**PANEL 1: RESIDENTIAL BUILDINGS: TECHNOLOGIES, DESIGN, OPERATIONS, and INDUSTRY TRENDS**

**(Meeting Room: Fred Farr Forum)**

**Panel Leaders: Ryan Kerr and Vladimir Kochkin**

<b>MONDAY, AUGUST 22</b>	<b>SESSION 1 (8:30 am - 10:00 am)</b>	<b>TUESDAY, AUGUST 23</b>	<b>SESSION 1 (8:30 am - 10:00 am)</b>
	<b>Cold Climate Decarbonization: Strategies, Costs, and Performance</b>		<b>Demand Response: How Emerging Technologies Can Lead The Way</b>
	<i>Winter is Coming: is the Northeast Ready for Residential Electrification?</i> Christie Amero, Cadmus		<i>Variable Speed Heat Pumps can Provide Effective Demand Response with a Soft Touch</i> Andrea Mammoli, Electric Power Research Institute
	<i>The Economics of Cold Climate Electrification</i> Scott Robinson, Guidehouse		<i>Detailed Laboratory Evaluation of Electric Demand Load Shifting Potential of Heat Pump Water Heaters</i> Karen Fenaughty, FSEC Energy Research Center
	<i>The Unintended Consequences of Electrification and What to do About It</i> Rachel Murray, DNV		<i>Timing is Everything: Optimizing Heat Pump Load Flexibility for Cost, Comfort, and Carbon Emissions</i> Caton Mande, UC Davis Western Cooling Efficiency Center
	<b>SESSION 2 (10:30 am - 12:00 pm)</b>		<b>SESSION 2 (10:30 am - 12:00 pm)</b>
	<b>Envelope Solutions: Windows and Phase Change Materials</b>		<b>Heat Pump Water Heaters: Differing Approaches</b>
	<i>Methods to Analyze the Energy Performance of Window Attachments</i> Rowan McCarthy, D+R International		<i>Heat Pump Water Heaters in the Midwest: Cost, Comfort, and Climate Impacts</i> Kevin Gries, Slipstream
<i>Results from Laboratory and Field Studies of Thin Triple-Pane Windows</i> Katherine Cort, Pacific Northwest National Laboratory	<i>Split HPWHs as an Efficient Solution for Multifamily Buildings with In-unit Water Heaters</i> Bethany Sparr, National Renewable Energy Laboratory		
<i>Energy Savings and Durability of Phase Change Materials in Residential Attics</i> Presented by: Stephen Chally, Frontier Energy (Lead Author: Robert Hendron, Frontier Energy)	<i>In Hot Water! The Challenges and Barriers of Decarbonizing Water Heating in the Multifamily Buildings</i> Sammy Houssainy, National Renewable Energy Laboratory		

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WEDNESDAY, AUGUST 24	SESSION 1 (8:30 am - 10:00 am)	THURSDAY, AUGUST 25	SESSION 1 (8:30 am - 10:00 am)
	Using Big Data to Understand and Influence Energy Usage Behaviors		Energy Retrofits for Decarbonization: ccASHPs, Air Sealing and Insulation
	<i>The Elusive Missing Link: Correlating Billing Analysis and Thermostat Data in the Northwest</i>		<i>The Climate Impact of Retrofits: Embodied and Operational Emissions in Weatherization</i>
	Jon Koliner, Apex Analytics		Presented by: Chris Gordon, VEIC (Lead Author: Megan Nedzinski, Vermont Integrated Architecture)
	<i>Predicting Impact of Temperature Setpoint Adjustment Under Time-based Electricity Rate Plans</i>		<i>Aerosol Sealing of Existing Homes</i>
	Mahesh Naidu, Lawrence Berkeley National Laboratory		Curtis Harrington, UC Davis Western Cooling Efficiency Center
	<i>End-Use Level Impacts of the COVID-19 Pandemic on Residential Energy Usage</i>		<i>Field Test Results from Cold Climate Air Source Heat Pump Installations in New York State: Performance, Savings and More</i>
Hans Lehndorff, Evergreen Economics	Presented by: Richard Faesy, Energy Futures Group (Lead Author: Gabrielle Stebbins, Energy Futures Group)		
SESSION 2 (10:30 am - 12:00 pm) - <b>SESSION TO BE BROADCASTED</b>	SESSION 2 (10:30 am - 12:00 pm)		
Decarbonization Takes a Village: Dual Fuel Solutions	Innovative Technologies and Approaches: What's Next?		
<i>Electric and Gas Decarbonization Options for Homes: The Best Option Could Vary by Home and Region</i>	<i>Radiant Ceilings As A Residential Retrofit: Examining the Myths and Realities</i>		
Lyla Fadali, ACEEE	Simon Pallin, Frontier Energy		
<i>Why We Should Never Install Another Air Conditioner!</i>	<i>Experimental Evaluation of a Multi-function Compact Heat Pump for All-electric Residential Buildings</i>		
Ben Schoenbauer, Center for Energy and Environment	Subhrajit Chakraborty, Western Cooling Efficiency Center		
<i>Accounting for the Multiple Dimensions of Inequality in Utility Programs</i> <i>(no paper)</i>	<i>Hydronic vs. Hydronic: Comparing Performance of Air-to-Water Heat Pumps Coupled with Radiant Ceilings and Fan Coils</i>		
Karen Ehrhardt-Martinez, ICF	James Haile, Frontier Energy		

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FRIDAY, AUGUST 26	<b>SESSION 1 (8:30 am - 10:00 am)</b>
	<b>Home Energy System Controls: More Important than Ever</b>
	<i>Help! I Can't Figure out How to Set the Clock on my Microwave Oven and Now I Need to Program the Controls for my Heat Pumps, Batteries, Solar Panels, and Electric Vehicle Charging?</i>
	<i>Dave Intner, Southern California Edison</i>
	<i>Validation of HVAC Hardware-In-the-Loop Simulation for Advanced Control Strategies in Smart Homes</i>
	<i>Sugirdhalakshmi Ramaraj, National Renewable Energy Laboratory</i>
	<i>Evaluation of Condensation Risk Mitigation Methods for Residential Ceiling Cooling Systems</i>
	<i>Stephen Chally, Frontier Energy</i>
	<b>SESSION 2 (10:30 am - 12:00 pm)</b>
	<b>OPEN SESSION</b>