



Better Buildings Residential Network Peer Exchange Call Series: *Home Improvement Catalyst: Engaging Trades in Optimizing HVAC System Performance*

January 12, 2017

Call Slides and Discussion Summary

Agenda

- Agenda Review and Ground Rules
- Opening Polls
- Brief Residential Network Overview and Upcoming Call Schedule
- Featured Speakers
 - **Steve Dunn**, Program Manager for Home Improvement Catalyst (HI-Cat) Initiative, U.S. Department of Energy, Building Technologies Office
 - **Marshall Johnson**, Residential Sector Manager, Energy Trust of Oregon (*Network Member*)
- Discussion
 - What are key challenges and opportunities for programs working with HVAC contractors to shift towards high-impact energy efficient HVAC solutions?
 - How can programs engage/incentivize more trades into better HVAC installation?
 - What are keys to ensuring cost effectiveness of high-impact HVAC systems?
 - Other questions, lessons, or issues to optimization of HVAC systems?
- Closing Poll

Better Buildings Residential Network

Better Buildings Residential Network: Connects energy efficiency programs and partners to share best practices and learn from one another to increase the number of homes that are energy efficient.

Membership: Open to organizations committed to accelerating the pace of home energy upgrades.

Benefits:

- Peer Exchange Calls 4x/month
- Tools, templates, & resources
- Recognition in media, materials
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- Residential Program Solution Center guided tours

Commitment: Provide DOE with annual number of residential upgrades, and information about associated benefits.

For more information or to join, email bbresidentialnetwork@ee.doe.gov, or go to energy.gov/eere/bbrn and click Join

Peer Exchange Call Series

***We hold one Peer Exchange call the first four Thursdays of each month
from 1:00-2:30 pm ET***

Calls cover a range of topics, including financing & revenue, data & evaluation, business partners, multifamily housing, and marketing & outreach for all stages of program development and implementation

Upcoming calls:

- January 19: State of the Union: Best Practices from “Most Improved” Energy Efficient States in 2016
- January 26: 0 to 60: Best Practices for Accelerating Program Performance
- February 2: Known Unknowns: Key Trends in Energy Efficiency the New Year
- February 9: Comfort and Safety: Family-Oriented Marketing

Send call topic ideas to peerexchange@rossstrategic.com

See the Better Buildings Residential Network Program [website](#) to register

Home Improvement Catalyst (HI-Cat) Initiative Update

U.S. DOE, Building Technologies Office

Home Improvement Catalyst: Engaging Trades in Optimizing HVAC System Performance



HI Cat Progress Update

Established our framework

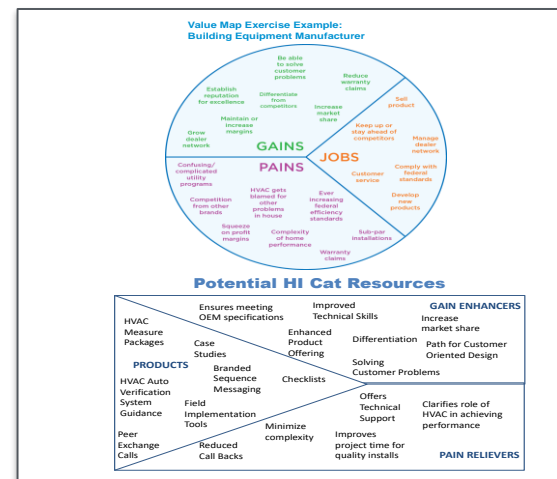
- HI Cat Plan developed with stakeholder feedback
 - Prioritizes home improvement technologies and trade practices/transactions; identifies barriers and strategies

Continuing to engage home improvement stakeholders

- Value Proposition Design (VPD) process
 - Publish HVAC supply chain profiles
 - Conduct session on value proposition for trades at HPC National (Nashville, TN Mar 19-22)

Developing tools and resources

- Cold climate air-source heat pumps (NEEP)
 - design, installation guidance and resources
- National Housing Stock Analysis (NREL)
 - Analysis of technical and economic potential of 50+ residential energy efficiency upgrades and packages by state



Optimizing HVAC System Performance



3 million HVAC replacements annually



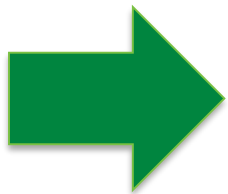
\$14 billion HVAC service/repair expenditures annually



Improper installations can increase energy use for heating and cooling by 30%



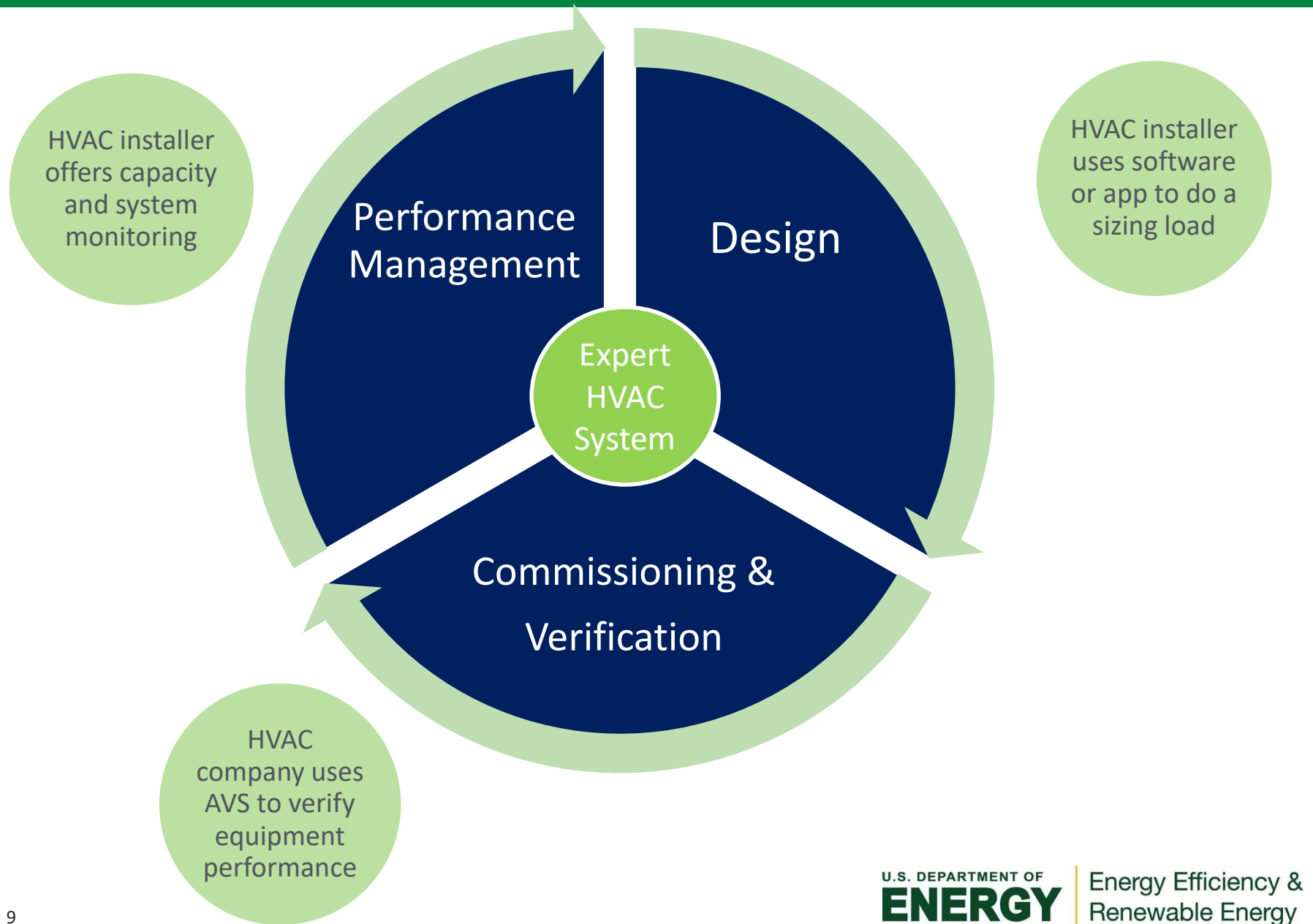
Proper installations improve comfort, system performance and save energy



HI Cat Focus: Advanced HVAC system design and installation

- Categorize and streamline software tools and resources
- Field implementation support: savings potential, customer messaging, field guidance

Defining Expert Systems for HVAC: Core Functions



AVS Tools: State of the Market

Performance Monitoring

24/7 : Hardware & Sensors



24/7: SAAS



Smart T-Stats



Wifi T-Stats



Multiple-In-One Tool



Multiple-In-One Repository



Refrigeration: Digital Gauges & Manifolds



Airflow



System Analysis



ACCA Approved Manual J Software/Apps



Man J Apps



Design

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

HVAC Quality Installation (in development)

- Analyses
 - Conduct meta-analysis of benefits and savings potential of QI programs.
 - Summarize key findings from existing research to quantify the benefits and potential energy savings associated with QI.
 - Develop taxonomy and provide guidance for selecting AVS tools and identify key performance indicators (KPIs) that are critical to evaluate HVAC system performance
 - Develop criteria for identifying and evaluating capabilities of AVS tools
- Tools and Resources for Programs and Trades
 - Case Study: HVAC SAVE QI Program
 - Document utility implementation model, including lessons learned and approach to scaling a utility-administered HVAC QI program
 - HVAC Contractor ‘playbook’
 - focused on overcoming business challenges associated with incorporating more EE/QI services into HVAC repair / replacement transactions
 - Sequencing tool for home improvement trades
 - Provides tools and resources to improve upon home improvement transactions in any given scenario, without disrupting it by providing relevant sales tools and tips; selection, specification, and field installation guidance
 - Develop use case for HVAC trades

Collaboration Opportunities

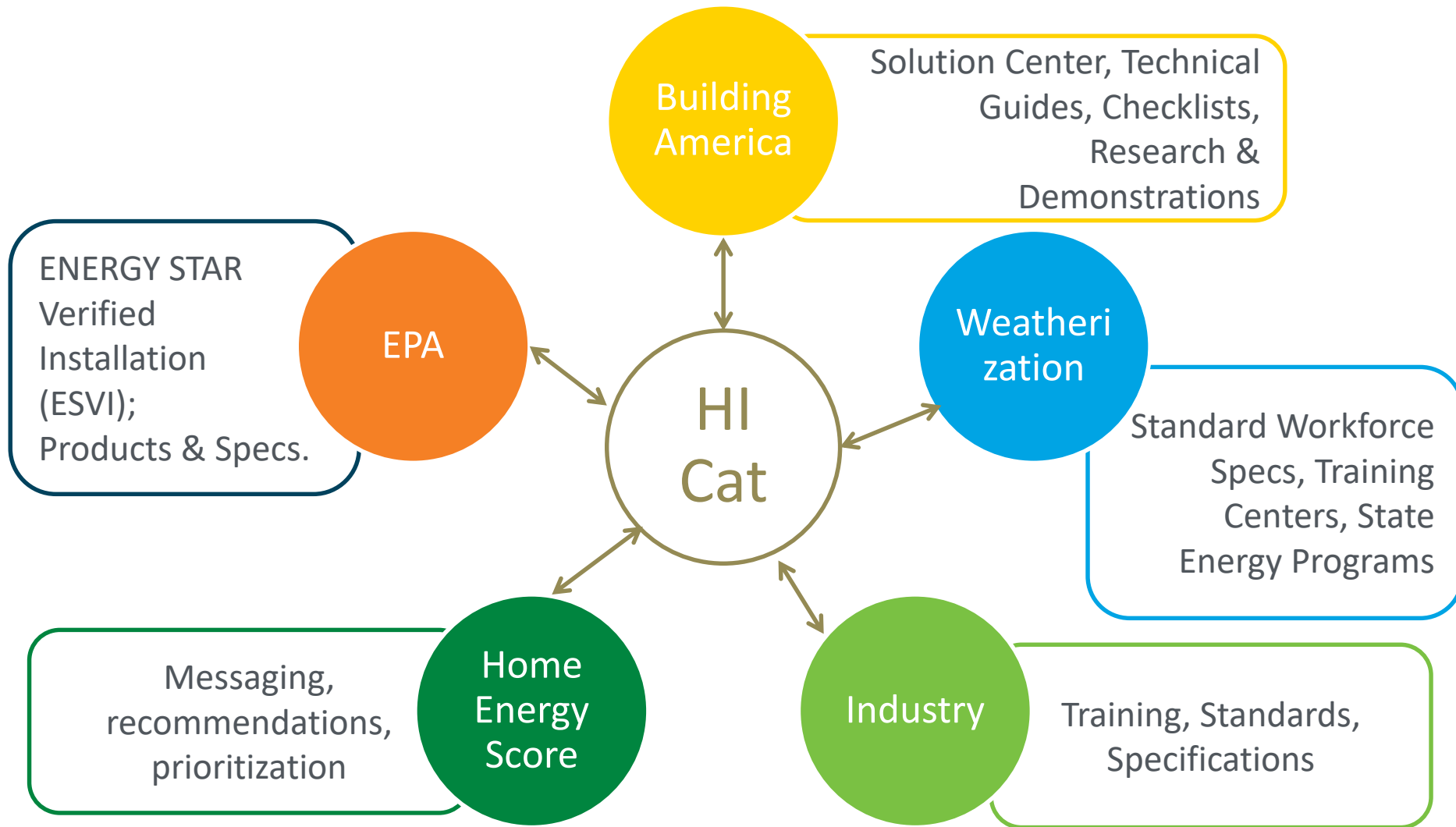
DOE seeks input and feedback from residential EE programs, trades, manufacturers and stakeholders on development of HVAC QI tools and resources

Opportunities for feedback / collaboration include:

- Contributing data and reports for meta-analysis effort
- Developing and demonstrating programs and sharing results to validate QI practices with trades
- Conduct demonstration activities that assist in categorizing AVS tools by function (e.g., design, installation, monitoring)
- Collaborate on implementation of industry adoption campaigns and dissemination of AVS tools



Coordinating and Leveraging DOE & Industry Resources



For More Information

Contact the HI Cat Team:

Steve Dunn, Project Manager

DOE Building Technologies Office

Courtney Moriarta, CSRA International

Presentation Highlights: U.S. DOE, Building Technologies Office (1 of 2)

- **U.S. DOE's Home Improvement Catalyst (HI-Cat) Initiative** aims to achieve improvements in both technologies and trade practices within existing home improvement transactions.
 - HI-Cat leverages the large home improvement market, with more than 3 million HVAC systems replaced annually.
 - The [HI-Cat Strategic Plan](#) is designed to achieve the DOE goals for reducing the energy use intensity in existing buildings, including the related 35% reduction target by 2025.
- **Studies show that proper HVAC installation can decrease energy use by ~30%**, while also improving performance.
- Proper **refrigerant charge, airflow, and fixes to the duct distribution system** are some of the opportunities to increase the quality of the HVAC installations, as identified by the **HVAC System Adjustment & Verified Efficiency (SAVE) Program** in Iowa.

Presentation Highlights: U.S. DOE, Building Technologies Office (2 of 2)

- Key factors to consider to effectively engage the HVAC market are:
 - The HVAC value chain is not a homogenous group. The **HI-Cat's Value Proposition Design Process** revealed that there are some differences among the supply chain actors in terms of drivers to perform jobs, avoid different “pains,” and seek different gains.
 - HVAC market engagement strategies have to be compatible with the existing business models and not disrupt trades’ transactions.
 - **For example, time is one of the key pressures for trades**, and requiring them to spend additional time in the field might be a disincentive to improve their processes.
- To create better value for customers and increase HVAC performance, programs should consider the following strategies:
 - Offer contractors access to **tools, resources, and field training**
 - Promote further **HVAC certification** offered through the **Air Conditioning Contractors of America Association's (ACCA) programs**

Program Experience: Energy Trust of Oregon



HVAC Market Engagement

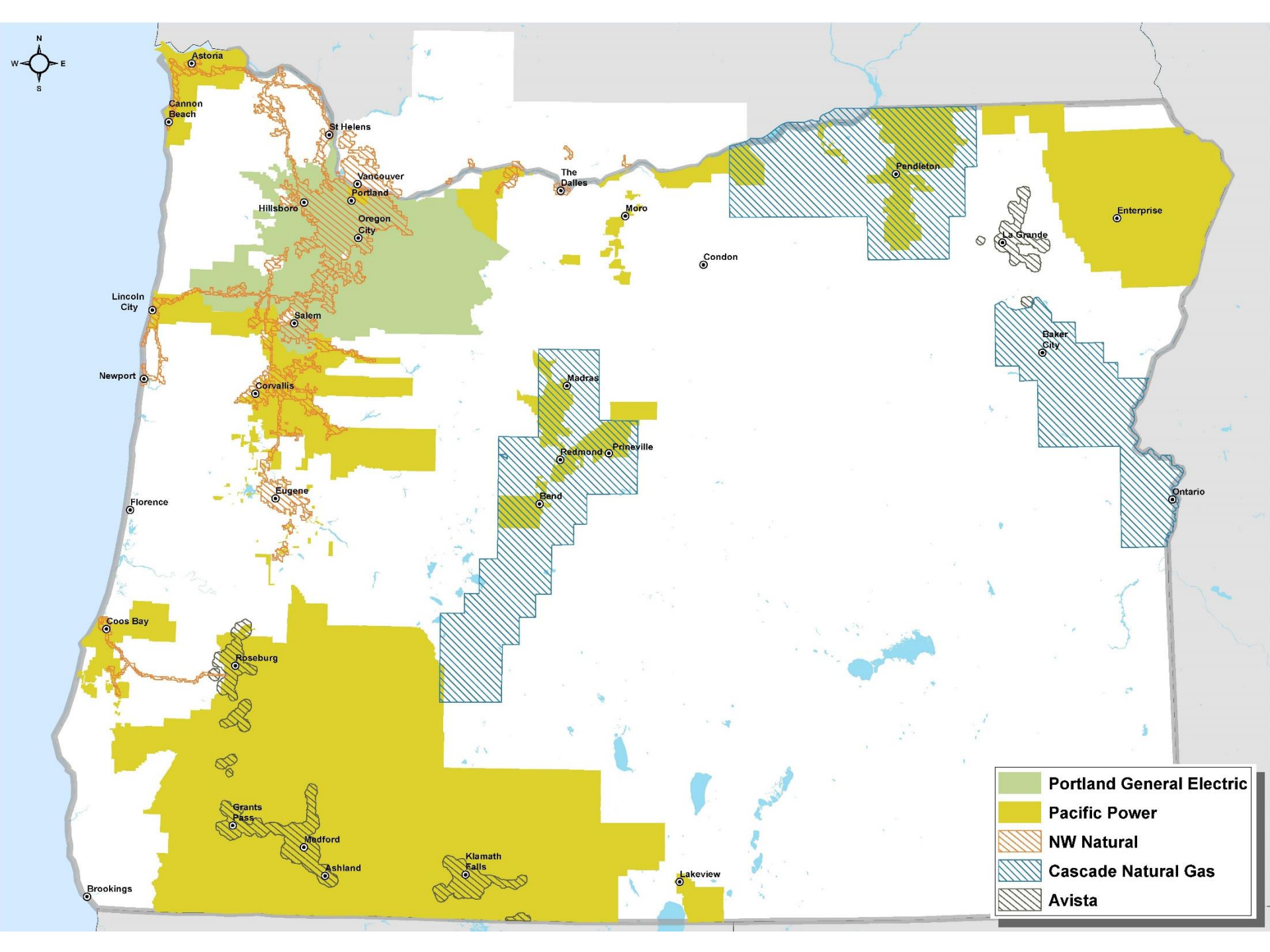
Better Buildings Residential Peer Exchange

January 12, 2017



About

- Independent nonprofit
- Serving 1.5 million customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista
- Providing access to affordable energy
- Generating homegrown, renewable power
- Building a stronger Oregon and SW Washington



Residential HVAC Offerings

Gas Furnaces

- Income-qualified track
- Rental properties

Heat Pumps

- Unitary systems
- Ductless systems

Gas Fireplaces

- Thermal efficiency
- Electronic ignition



Current Areas of Focus

Heat pump controls

- Smart thermostats
- PTCS/New equipment commissioning

Heat pump sizing

Duct distribution

Manufactured homes



Market Engagement

Understanding the supply chain

- Contractors, distributors, verifiers

Influence equipment purchase and stocking through programs

Engaging trade allies

- Account management model
- Program and technical trainings
- Soliciting feedback

Cost-effectiveness Strategies

Incremental cost and savings

Retrofit activity

New construction

Mid-stream fireplaces



Successes

- Upward influence on efficiency
- DHP market expansion
- New construction duct system improvements
- Increasing installations in rental and moderate income homes



Opportunities

- Training to configure lockout controls
- Heat pump cost effectiveness
- Duct sealing
- Broaden influence on HVAC in new construction
- Manufactured home market





Thank You

Marshall Johnson, Sr. Program Manager

Presentation Highlights: Energy Trust of Oregon

- Understanding and engaging the HVAC market is essential for collaboration and alignment of **supply chain actors with program objectives**.
 - The HVAC supply chain is very well established, and it differs by region. Being aware of the common practices in your regional supply chain helps identify the opportunities for collaboration.
- Successful approaches in collaborating with the HVAC supply chain and incentivizing the market towards more energy efficient practices include:
 - **Engaging contractors through technical trainings and other communication channels** like monthly newsletters, blogs, and conferences.
 - **Using an account management model**, where every trade ally has a dedicated account manager as their point of contact, who provides consistent communication and helps build relationships.
 - **Leveraging distributors' interest in being positioned as a technical resource** to provide training for contractors and to increase visibility in the market.
 - **Using sales performance incentive funds** as a financial incentive to encourage distributors to provide energy efficient equipment to contractors.

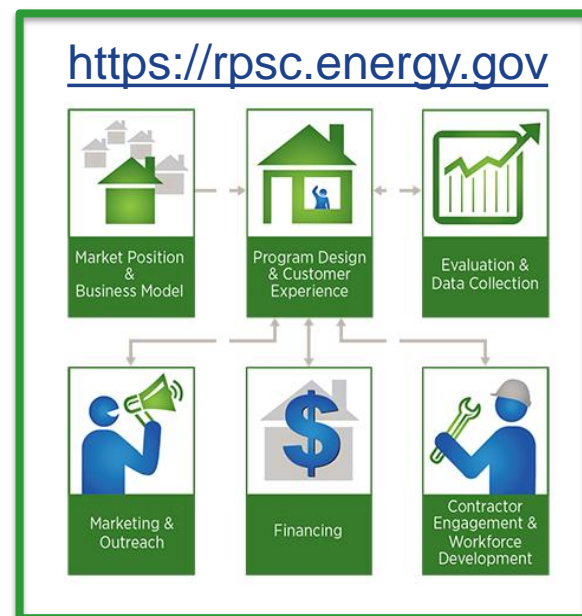
Discussion highlights

- Key lessons learned and best practices to incentivize trades in optimizing the performance of HVAC systems include:
 - **Maintaining an HVAC trade ally list associated with a quality rating system** is a powerful motivator for contractors to offer higher quality installations and gain more visibility among prospective customers.
 - **Providing HVAC contractors with technical specifications manuals** that are updated frequently can increase awareness and working knowledge of the HVAC system concepts.
 - **Collaborating with manufacturers on new product introductions** to provide brief presentations of available resources and incentives for contractors at these events.
 - **Investing in and retaining qualified HVAC trade allies through specialized trainings** is essential to increasing overall performance.
 - **Incentivizing well-established businesses to further invest in optimizing their processes** by highlighting the return on investment (ROI) and the profit potential that can come from **less call-backs, greater referrals, and more sales.**

Related Resources in the Residential Program Solution Center

Explore resources related to engaging trades in optimizing HVAC system performance:

- Read this [article](#) describing HVAC contractors' experiences incorporating home performance into their business and barriers for that expansion.
- See this [guide](#) on how HVAC contractors can enter the home performance market.
- Review strategies for engaging and developing contractor partners with the [Contractor Engagement & Workforce Development – Identify Partners](#) handbook.



- Check out the latest [Proven Practices](#) post on [Engaging Media to Garner Credibility](#).
- [Send us your ideas!](#) The Solution Center is continually updated to support residential energy efficiency programs.

Additional Resources and Examples (1 of 2)

- **NEW!** The National Renewable Energy Laboratory's (NREL) report on [Electric End-Use Energy Efficiency Potential in the U.S. Single-Family Housing Stock](#)
 - The report identifies priorities for residential electric energy efficiency initiatives at national, regional, state, and local levels.
 - This analysis was used to support the [Quadrennial Energy Review Second Installment: Transforming The Nation's Electricity System](#).
- The Department of Energy's (DOE) [Home Improvement Catalyst: Strategy and Framework](#).
- The U.S. DOE's [ENERGY STAR Verified HVAC Installation \(ESVI\) Program](#) promoting the proper design and installation of HVAC systems by relying upon a competent workforce of HVAC technicians, 3rd-party verifiers, and other skilled workers whose installations are successfully verified to ensure maximum system performance.
- Midwest Energy Efficiency Alliance's (MEEA) White Paper on [“HVAC SAVE - A Case Study in the Next Evolution of Residential Quality Installation Programs”](#).

Additional Resources and Examples (2 of 2)

Upcoming resources:

- **DOE** will publish a **guidance on cold climate air-source heat pumps**, in collaboration with the **Northeast Energy Efficiency Partnerships (NEEP)**, by the end of January 2017.

Related Better Buildings Residential Network Peer Exchange Call Summaries:

- [Home Improvement Catalyst - Maximizing HVAC Performance Through Contractor Partnerships](#)
- [Staged Upgrades as a Strategy for Residential Energy Efficiency](#)
- [Staged Upgrades—Homeowner-focused Strategies for Encouraging Energy Upgrades Over Time](#)
- [Home Upgrades: Leveraging HVAC Upgrades for Greater Impact](#)

2017 Better Buildings Summit

Registration is now open!

SUMMIT

WASHINGTON, D.C.
MAY 15-17, 2017

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U.S. DEPARTMENT OF
ENERGY

Be sure to [register today](#) for the 2017 [Better Buildings Summit!](#)



Spread the word:

[#BBSummit17](#) registration is right around the corner. Get ready to learn about expert [#EnergyEfficiency](#) enhancements <http://bit.ly/2iZCMsB>

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Stay engaged and connected with the Better Buildings Residential Network and our partners from the residential and multifamily sectors!

Follow us to plug into the latest Better Buildings news and updates!

Share with us your top stories on how your organization is accelerating energy savings through efficiency upgrades, strategies, and investment!



[Better Buildings Twitter](#) with [#BBResNet](#)



[Better Buildings LinkedIn](#)

We can't wait to hear from you!

Addenda: Attendee Information and Poll Results

The map shows the following locations marked with blue pins:

- Canada:** One pin in the western part of the country.
- Alaska:** One pin in the central part of the state.
- United States:**
 - West Coast:** Multiple pins in Washington, Oregon, California, and Nevada.
 - Mountain West:** Pins in Idaho, Montana, Wyoming, Colorado, and New Mexico.
 - Central:** Pins in North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, and Louisiana.
 - Midwest:** Pins in Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, and Missouri.
 - South:** Pins in Arkansas, Mississippi, Alabama, Georgia, and Florida.
 - East Coast:** Pins in New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, North Carolina, and South Carolina.
- Middle East:** One pin in Israel.

Call Attendees: Network Members

- AppleBlossom Energy Inc.
- City of Cambridge (MA)
- City of Somerville (MA)
- CLEAResult
- Davis Energy Group
- Efficiency Maine
- Energy Efficiency Specialists
- Energy Trust of Oregon
- Horizon Residential Energy Services NH, LLC
- Michigan Saves
- Midwest Energy Efficiency Alliance (MEEA)
- Northeast Energy Efficiency Partnerships (NEEP)
- New York State Energy Research and Development Authority (NYSERDA)
- Richmond Region Energy Alliance
- Southface
- Wisconsin Energy Conservation Corporation (WECC)

Call Attendees: Non-Members (1 of 3)

- AjO
- Association for Energy Affordability
- BKi
- Blue Ridge Electric Membership Corporation
- Brooks Kushman
- Carolina Smart Homes
- The Cold Climate Housing Research Center (CCHRC)
- ComEd
- California Public Utilities Commission
- Delaware Department of Natural Resources and Environmental Control
- Massachusetts Department of Energy Resources
- Electric & Gas Industries Association
- Emerson
- Energetics Incorporated
- Energy Management Services (EMS)
- Energy Smart Colorado
- EnergyWize LLC

Call Attendees: Non-Members (2 of 3)

- U.S. Environmental Protection Agency
- Eric Kjelshus Energy Heating and Cooling
- Flathead Electric Cooperative
- Greenergy Chicago, Inc
- Home Office Training & Technology
- Home Ventilating Institute (HVI)
- Johnson Home Performance
- Local Government Commission (LGC) (CA)
- Lockheed Martin
- Massachusetts Department of Public Utilities
- Montana Department of Environmental Quality
- Navigant Consulting
- New Jersey Natural Gas
- Nexant
- U.S. National Park Service
- Parab Associates
- PECO An Exelon Company
- Pacific Gas and Electric Company (PG&E)
- Proctor Engineering

Call Attendees: Non-Members (3 of 3)

- Public Service Enterprise Group (PSEG)
- PUSH Green
- PV Blue
- The Renaissance Collaborative, Inc.
- Sarasota County
- Snohomish Public Utility District
- South-central Partnership for Energy Efficiency as a Resource (SPEER)
- StopWaste
- Sustainable South Bronx
- Southwest Energy Efficiency Project (SWEET)
- ThermalStar Training Center
- Therma-Stor LLC
- Three LB Development
- University of North Texas
- Will County (IL)

Opening Poll #1

- Which of the following best describes your organization's experience with engaging trades on HVAC optimization?
 - Some experience/familiarity – **47%**
 - Limited experience/familiarity – **25%**
 - Very experienced/familiar – **19%**
 - No experience/familiarity – **7%**
 - Not applicable – **2%**

Closing Poll

- After today's call, what will you do?
 - Seek out additional information on one or more of the ideas – **76%**
 - Make no changes to your current approach – **14%**
 - Consider implementing one or more of the ideas discussed – **7%**
 - Other (please explain) – **3%**