

Better Buildings Residential Network Peer Exchange Call Series: *Known Unknowns: Key Energy Efficiency Trends in the New Year* February 2, 2017 *Call Slides and Discussion Summary*



Agenda

- Agenda Review and Ground Rules
- Opening Poll
- Brief Residential Network Overview and Upcoming Call Schedule
- Featured Speakers
 - Steve Cowell, President, E4 The Future
 - Larry Zarker, CEO, Building Performance Institute, Inc. (Network Member)
 - Jennifer Amann, Buildings Program Director, ACEEE (Network Member)
- Discussion
 - Has your organization observed new trends or changes in the market for home energy upgrades heading into this year?
 - What do those changes imply for different market actors energy efficiency programs, contractors, financial industry, realtors, consumers, etc.?
 - How is your organization preparing for or adapting to new trends in the industry?
 - Other questions/issues related to emerging trends in the residential energy efficiency sector?
- 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 <u>bbresidentialnetwork@ee.doe.gov</u>, or go to <u>energy.gov/eere/bbrn</u> 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:

- March 16: <u>Sold! Engaging the Real Estate Industry in Home Performance</u>
- March 23: Effecting Behavior Change: Energy Report Data Usage

Send call topic ideas to <u>peerexchange@rossstrategic.com</u> See the Better Buildings Residential Network Program <u>website</u> to register





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March Energy Madness: Join the game!

Submit your most creative residential energy-related marketing messages to: <u>peerexchange@rossstrategic.com</u> *Due date: February 10, 2017*

Tournament Details:

- We will announce the **Sweet 16** entering the race on the March 2 Peer Exchange call.
- Call Participants will make their picks to determine what messages are best in the 8 head-to-head match ups.
- On each following Peer Exchange Calls in March, you'll find out who has made it on to the next round and vote on your favorites.
- The winning message will be selected on the March 23 call!



U.S. Department of Energy **See the <u>video</u>**



Utilitywise More information

Better Buildings Residential Network members may be given priority consideration.





Key Trends Outlook: E4 The Future





Key EE Trends

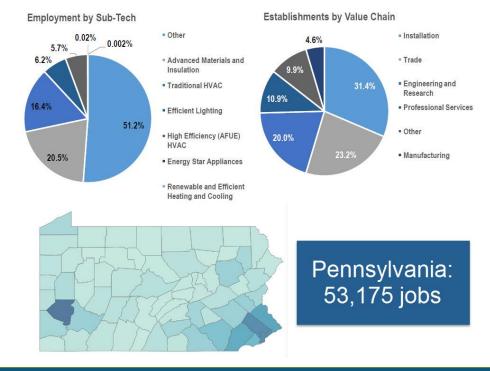
Better Buildings Peer Exchange

Feb. 2, 2017

Stephen Cowell, President, E4TheFuture

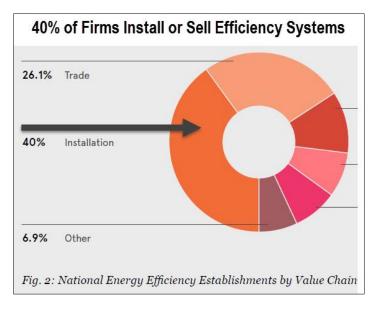
Jobs

- E4TheFuture and DOE both published EE jobs reports by state
- More jobs than any other energy sector!



Energy Efficiency Jobs in America

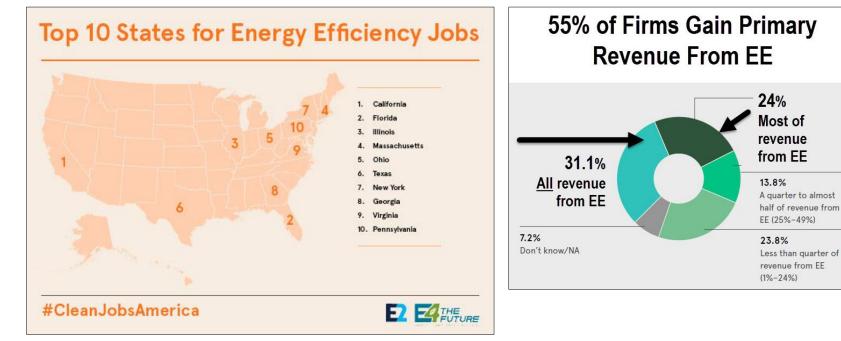




Jobs

- Find at <u>www.e4thefuture.org</u>
- Use it to educate allies and decision makers





National Standard Practice Manual

Guide to evaluating cost effectiveness of energy efficiency measures and programs

- Prepared by a team of experts with 40+ reviewers
- Become a member to receive the final document in April

Sign up:

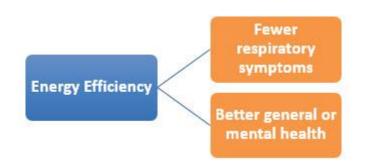


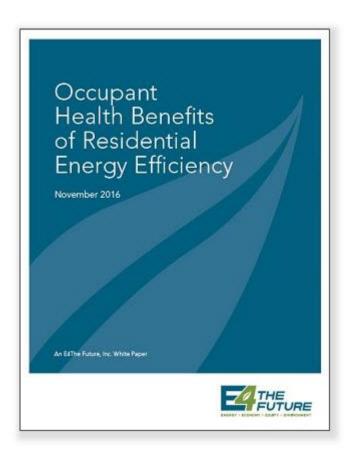
www.nationalefficiencyscreening.org



Health Impacts of EE

- E4 and DOE reports
- Extensive work on linking health impacts of residential EE
- BPI Health Evaluator Certification
- Low-Income Wx co-funding in WA

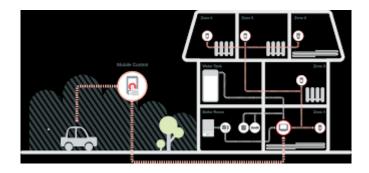






Technology

• New technology for in-home equipment creating new opportunities







Building Energy Modeling



Sensors & Controls





Renewables . . .

... are becoming part of the home energy package.

We need to align rules, regulations, programs and incentives.







Home Performance Coalition

Collaboration to expand industry - Natl Conference: March 19-23, 2017



Thank you!



Key Trends Outlook: Building Performance Institute, Inc.



Key EE Trends

Better Buildings Peer Exchange February 2, 2017



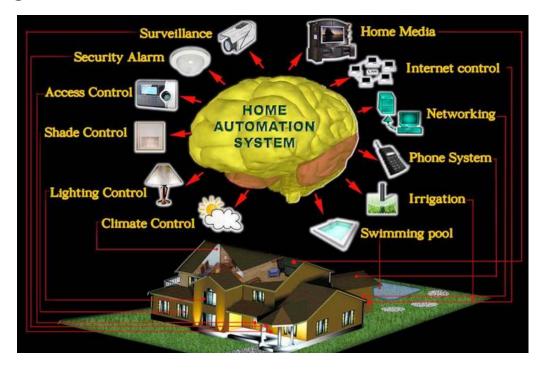
Building Performance Institute, Inc.







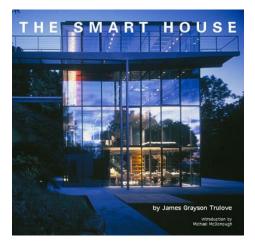
1. The Integrated Home



























electrocuted.

When a cloud passes, the panels tell it to pause. Your solar panels have checked the weather... They've told the dishwasher that the sun is shining so it can kick on.

Smart grid: Revolutionizing our energy future



Graphic courtesy of the Environmental Defense Fund



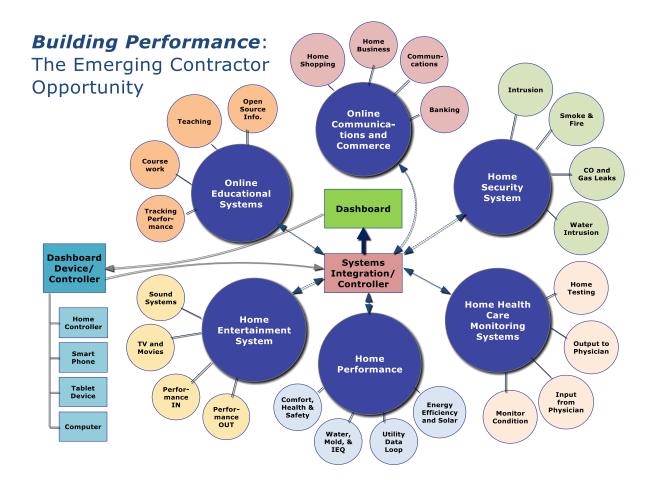


They pay it (and other freezers in town) to postpone defrosting. Meanwhile grid managers might cut a deal with your freezer.

Smart grid: Revolutionizing our energy future



Graphic courtesy of the Environmental Defense Fund



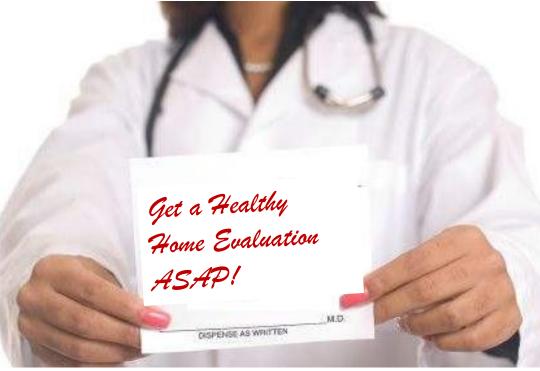
Why Can't We Get All of These?



With Just One of These.



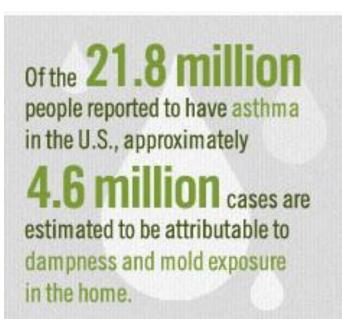
2. A Broadened Focu on HEALTHY Home Performance

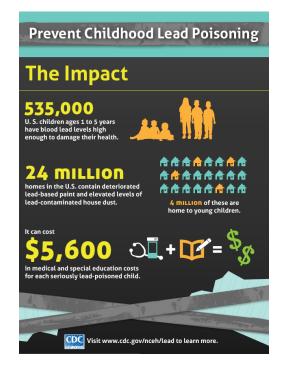






Emerging Trend Toward Healthy Housing

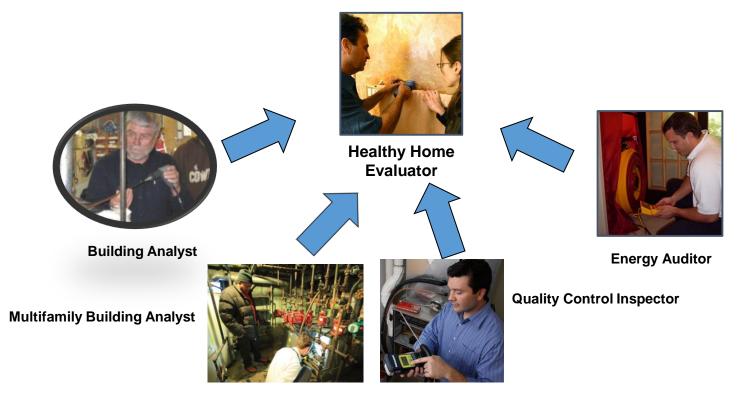








The Healthy Home Evaluator Credential







Scope of HHE Credential

- The Healthy Home Evaluator micro-credential builds upon the knowledge of the certified <u>BPI Building Analyst</u> professional, the <u>BPI Energy Auditor</u>, or the <u>BPI QC Inspector</u> by establishing the competencies required to conduct an indepth healthy home environmental risk assessment.
- The *Healthy Home Evaluator* assesses and characterizes home-based environmental health and safety hazards by integrating qualitative observations with quantitative diagnostics to determine and prioritize recommendations that address existing and potential hazards.
- The *Healthy Home Evaluator* communicates the identified risks and hazards to the occupant with the goal of improving health and quality of life.





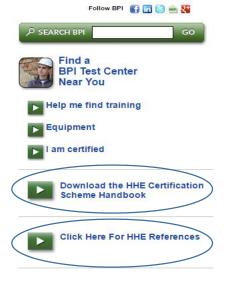
HHE Certification Scheme Handbook

Unhealthy Housing and Unhealthy Families: Earn the Healthy Home Evaluator (HHE) Credential

Help Break the Link Between



www.bpi.org/hhe







Good News for the WAP Community!

According to DOE's WPN 15-4, the *Healthy Home Evaluator* credential is an eligible Tier 2 training activity that can be paid for along with certification exam fees with DOE Training and Technical Assistance funds.





Curriculum Development and Train-the-Trainer

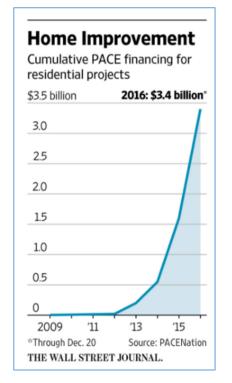
- Development of a model curriculum for trainers to use in preparation for the Healthy Home Evaluator exam
- Piloted in Kansas City through Children's Mercy Hospital
- A Master Trainer session with 4-6 individuals completed in December
- A Train-the-Trainer initiative is underway to bring the curriculum to the BPI Test Center network of over 135 training organizations
- First TtT session held with 17 Test Centers in Toledo, OH last week
- HHS and BPI investigating ways to better integrate their training networks
 Led by Healthy Housing Solutions with funding support from

the U.S. Department of Housing and Urban Development





3. Focus on Innovative Financing and PACE

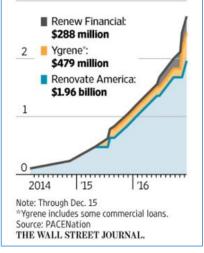


Hungry Investors

The growth of PACE loans has been fueled partly by investor appetite for bonds created from the loans.

Cumulative securitization of residential PACE loans* by dollars funded











Department of Energy Washington, DC 20585

Best Practice Guidelines for Residential PACE Financing Programs

November 18, 2016

Residential PACE Market

104,000

Number of Home Upgrades

Energy efficiency 59% Renewable Energy 36%

Mixed

\$2,237

million

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Jobs Created

*All estimated aggregate data is provided to PACE*Now* by PACE programs and not independently verified.





How the Building Performance Institute Helps State and Local Programs Meet DOE's New "Best Practices Guidelines for R-PACE Programs"

DOE Best Practices Guidelines

Health and Safety Measures

PACE programs can establish eligibility criteria for financing health and safety measures necessary to protect occupants The BPI Healthy Home Evaluator certification is built on a prerequisite requirement of the BPI Building Analyst, Energy Auditor or QC Inspector certifications to conduct environmental risk assessments in homes.

BPI Offerings to Support PACE





How the Building Performance Institute Helps State and Local Programs Meet DOE's New "Best Practices Guidelines for R-PACE Programs"

DOE Best Practices Guidelines

BPI Offerings to Support PACE

Energy Assessments

Energy assessments to identify comprehensive, cost-effective energy efficiency improvements

Qualified Energy Assessors

Only a qualified energy assessor or rater should perform assessments.

Health and Safety Measures

PACE programs can establish eligibility criteria for financing health and safety measures necessary to protect occupants

Consumer Disclosures on PACE

Participating contractors should provide homeowners with PACE assessment consumer disclosures in writing.

Customer Dispute Resolution

Homeowners should receive information about whom to contact if they have problems with their PACE contractor.

Quality Assurance/Anti-fraud

Quality assurance and anti-fraud measures are essential protections for property owners, mortgage holders, investors, and local governments.

Minimum Contractor Requirements

PACE programs should establish minimum contractor requirements, including training and technician certifications appropriate to the installed measures.

Clearly Defined Work Standards Program administrators should have

clearly defined work standards outlined for all projects eligible for program financing.

For energy assessments and recommended upgrades, EE Program Administrators point to ANSI/BPI-1100-T-2014 Home Energy Auditing Standard and ANSI/BPI-1200-S-2015 Standard Practice for Basic Analysis of Buildings.

The BPI Building Analyst (BA) and BPI Home Energy Professional Energy Auditor (EA) certifications require that individuals demonstrate competency through written and field practical exams to the BPI-1100 and BPI-1200 standards.

The BPI Healthy Home Evaluator certification is built on a prerequisite requirement of the BPI Building Analyst, Energy Auditor or QC Inspector certifications to conduct environmental risk assessments in homes.

BPI 1100 and BPI-1200 standards include disclosure requirements and other consumer protections that must be discussed by the BPI GoldStar Contractor (GSC) with potential customers.

The BPI GoldStar Contractor program requires companies to follow applicable standards in the work they perform, establish and follow consumer dispute resolution policies, and commit to an internal quality management program for the work they perform.

BPI implements a Quality Assurance program on GSCs. GSCs are required to comply with all state and local laws and codes. Failure to comply with these requirements and BPI standards results in suspension or termination of GoldStar status.

The BPI GSC program is a company level accreditation that requires companies to commit to an internal quality management improvement training program, and use certified professionals installing measures and completing work for their customers.

The suite of BPI technical standards cover the process of assessing and upgrading the performance of existing homes. They were developed through a consensus process by the existing homes industry, align with their goals, and are available at no cost. **The BPI Test Center** network is prepared to provide training and technical assistance to contracting companies and PACE Program staff across the US. With over 130 centers covering all regions, relevant training and technical assistance is easily in reach and can be located quickly on the BPI Test Center locator tool.



BPI provides a full suite

of services to ensure

consumers with high

efficiency projects by a

trained and certified

that local PACE

quality energy

workforce.

programs provide



Questions or Comments?







Key Trends Outlook: American Council for an Energy-Efficiency Economy (ACEEE)



Key EE Trends: Driving the Next Wave of Energy Efficiency Gains

Jennifer Amann Buildings Program Director, ACEEE BBRN Peer Exchange Call February 2, 2017



Residential Measures by Savings Potential

incil for an Energy-Efficient Economy

Large reductions in miscellaneous plug loads	3.4%
New construction programs 🖁	1.9%
High efficiency air conditioners and heat pumps	1.5%
High-eff heat pumps replacing electric resistance furnaces	1.2%
LEDS in current incandescent applications	
Comprehensive retrofits 🖁	1.0%
Real-time energy use feedback and behavioral response 🔒	0.8%
Appliances 👌 (refrigerators, clothes washers & dryers)	
Heat pump water heaters and other advanced systems	0.6%
Smart thermostats 8	0.5%

Savings as a percentage of total electricity demand in 2030



Trends: Technological Innovation

Residential LEDs

Very dynamic market, prices dropping Rapid growth: 84% market share by 2030



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Heat pump technologies

Cold-climate and ductless systems Clothes dryers Water heaters

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Smart products/buildings/manufacturing



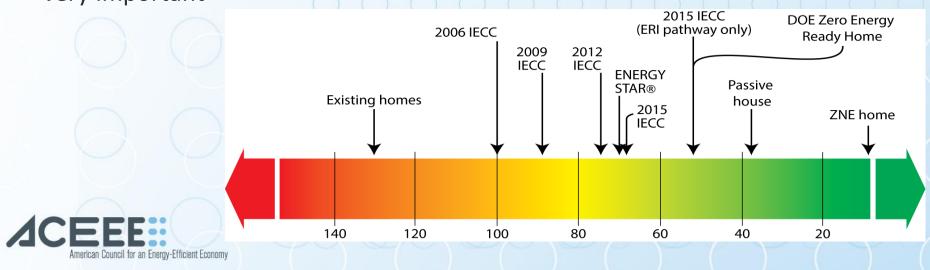
Trends: Systems Solutions

Comprehensive retrofits

- HPWES averages savings of 23-32%
 whole house, depending on region
- Leading programs reaching 0.5-2% of households each year – much room for scaling up
- Other benefits (comfort, health, safety, reduced maintenance costs) very important

New Construction

- Promote beyond-code levels of
 efficiency and take other steps to lay
 foundation for code upgrades to
 these levels of performance
- Residential DOE ZER home



Trends: Behavior Change

Real-Time Energy Use Feedback & Behavioral Response

- Opower averaging about 2% electric savings
- In-home displays saving from 0-19%, with average so far of 4%
 - Much of the savings comes from a limited number of "cybersensitive" customers
 - Amount of savings correlates to intensity of feedback
 - Savings persist with some decline
 - Dynamic pricing can boost results



Intelligent Efficiency INTEGRATED, RELIABLE, and SMART.

People-Centered Efficiency

Providing real-time information and management tools that enable users to lower energy consumption in response to changing information

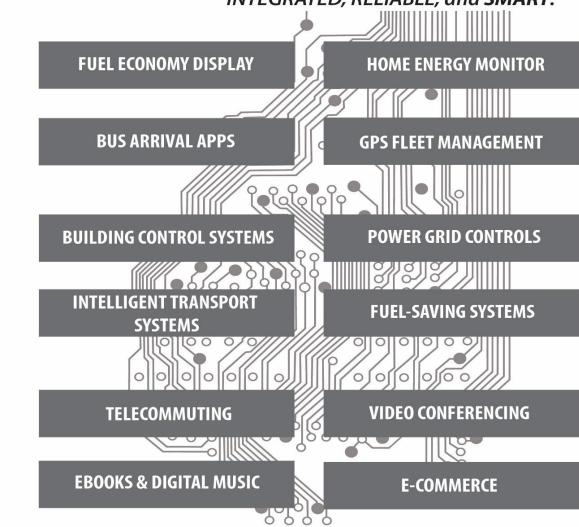
Technology-Centered Efficiency

Using sensors, controls, and software to automate and optimize energy use

Service-Oriented Efficiency

Shifting behavior and organizational structures to reduce energy-intensive activities

merican Council for an Energy-Efficient Economy



Takeaways

- A diverse set of efficiency measures can reduce
 U.S. electricity use 20% by 2030 and cut energy
 use in half by 2050!
- Savings will come from a mix of opportunities in the residential, commercial and industrial sectors—no silver bullet
- Utility and other customer programs will deliver the savings, but important policy supports are crucial for success



Next Steps

- Research and demonstrate these emerging technologies and practices
- Research and catalyze markets
- Expand options within existing programs to include new technologies and measures
- Launch pilot programs to test new program models and to improve cost-effectiveness
- Integrate and target behavioral change
- Target systems approaches



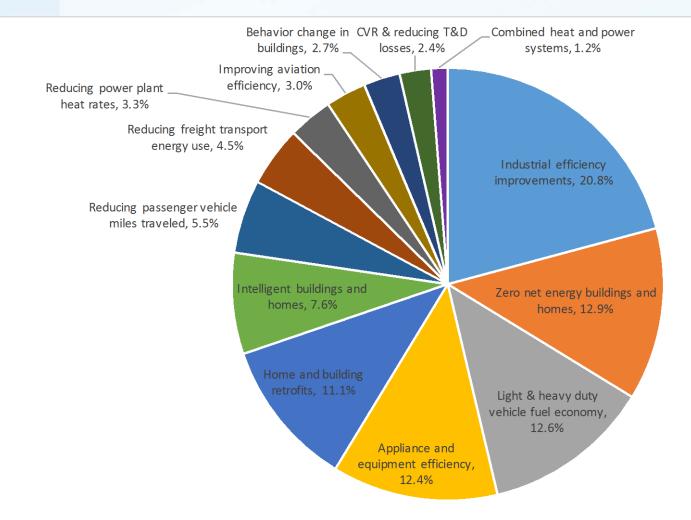
Cutting U.S. Energy Use in Half

- 1. Appliance and equipment efficiency
- 2. Zero net energy new buildings and homes
- 3. Smart buildings and homes
- 4. Home and building retrofits
- 5. Behavior change in buildings
- 6. Industrial efficiency improvements
- 7. Combined heat and power systems
- 8. Light and heavy duty vehicle fuel economy improvements
- 9. Reducing passenger vehicle miles traveled
- 10. Reducing freight transport energy use
- 11.Improving aviation efficiency
- 12. Conservation voltage reduction & reducing T&D losses
- 13. Reducing power plant heat rates



Source: ACEEE, Cutting Energy Use in Half, 2016.

2050 Energy Savings by Measure

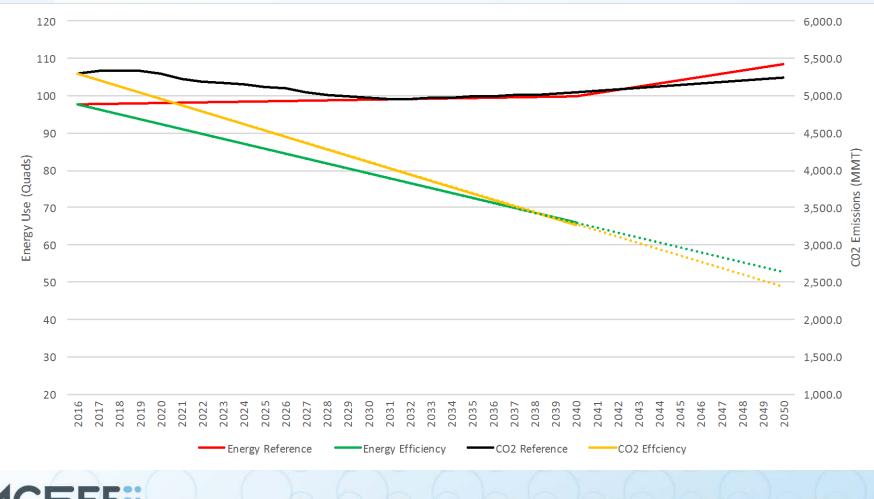




Source: ACEEE, Cutting Energy Use in Half, 2016.

Energy & GHG Savings from 13 Measures

American Council for an Energy-Efficient Economy



Source: ACEEE, Cutting Energy Use in Half, 2016.



jamann@aceee.org

Upcoming ACEEE Conferences

Hot Water Forum	February 26-28	Portland, OR
National Symposium on Market Transformation	April 2-4	Arlington, VA
Energy Efficiency Finance Forum	May 21-23	Chicago

The top convener in energy efficiency. aceee.org/conferences



Key Trend: Broader Messaging

- Joining Forces: The energy-efficiency industry is moving from being siloed by technology (e.g., HVAC, insulation, etc.) to a more integrated energy efficiency community. This shift will make the far-reaching scope of the industry more visible and will help influence future energy legislation.
 - Messaging: Messaging in the industry is reaching decision makers by connecting energy efficiency to job and economic growth.
 - Coalitions: E4 The Future is collaborating with other organizations, such as the Home Performance Coalition, to put out a national manual that provides a roadmap for how regulators can evaluate how energy efficiency benefits the energy system.





Key Trend: Health and Home Performance

- Research: The U.S. has a national asthma epidemic with roughly 5 million cases attributed to factors in the home.
 - Building scientists are working to conduct a comprehensive assessment that will support the medical community assess their patients.
- Certification and Standardization: BPI worked with partners to create the Healthy Home Evaluator certification program, which builds contractor knowledge to conduct a healthy home assessment.
 - The Evaluator uses quantitative diagnostics and qualitative observations to train contractors to identify existing and potential hazards.
 - BPI is also creating a curriculum for trainers to ensure training is standardized around the country and builds off
- of the existing contractor knowledge base.





Key Trends: Technology Integration

- From Smart Home to the Connected Home: The ideas from the 80s remain, though we have transitioned from a hardwired structure to a wireless connected home.
 - Smart Devices: The devices being manufactured today have chips and will be used to communicate with other appliances in the home. This will lay the foundation for integrated demand response, resiliency to outages, and communication with electric vehicles.
 - "Smart Phone Model for the Contractor": At present, up to 20 different trades service the home (e.g., security, geek squad, etc.). In the future, these silos and multiple contractors will be integrated into a comprehensive contracting company that manages the connected home for the homeowner.

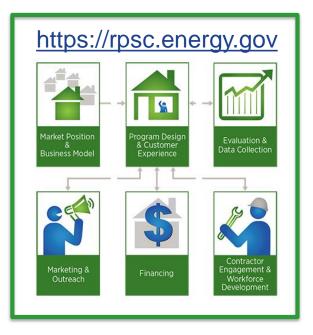




Related Resources in the Residential Program Solution Center

Explore resources related to key trends in energy efficiency:

- Explore the updated best practice <u>guidelines</u> for residential PACE financing programs from DOE.
- Learn how <u>emerging technologies</u>, including advanced data collection (e.g. AMI, smart meters) and data analytics tools, are changing the EM&V landscape.
- Gain marketing & outreach insight from successful programs across the country, starting with these Residential Program Solution Center <u>lessons learned</u> highlights.



- Check out the latest <u>Proven Practices</u> post on <u>Speaking About Financing in Ways</u> <u>That Resonate with Homeowners.</u>
- The Solution Center is continually updated to support residential energy efficiency programs—<u>member ideas are wanted</u>!





2017 Better Buildings Summit Registration is now open!



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**





GET SOCIAL WITH US



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 LinkedIn

We can't wait to hear from you!

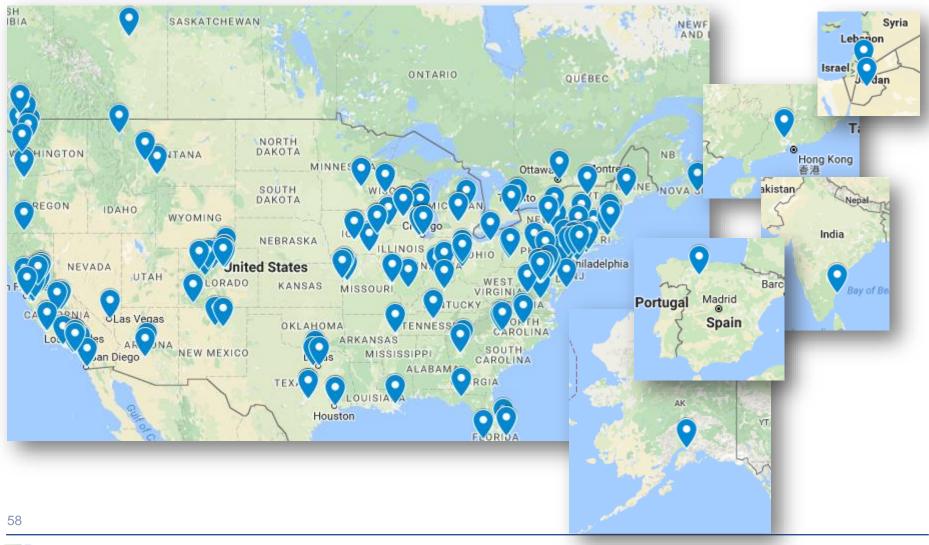




Addenda: Attendee Information and Poll Results



Call Attendee Locations







Call Attendees: Network Members (1 of 3)

- Alaska Housing Finance Corporation
- American Council for an Energy-Efficient Economy (ACEEE)
- AppleBlossom Energy Inc.
- Arlington County Government
- Austin Energy
- BELCO
- CalCERTS, Inc.
- Center for Energy and Environment (CEE)
- Center for Sustainable Energy
- City of Bloomfield

- City of Kansas City
- Civic Works
- CLEAResult
- Cleveland Public Power
- Davis Energy Group
- District of Columbia
 - Sustainable Energy Utility (DC SEU)
- Efficiency Maine
- Efficiency Nova Scotia
- EnergySavvy
- FMC Facility Management
 - Consultores
- Fujitsu General America Inc.





Call Attendees: Network Members (2 of 3)

- High Country Conservation Center
- Home Energy Magazine
- Honeywell International, Inc.
- Institute for Market Transformation (IMT)
- International Center for Appropriate and Sustainable Technology (ICAST)
- Michigan Saves
- Midwest Energy Efficiency Alliance (MEEA)
- Mitsubishi Electric Cooling and •
- •• Heating

- Modular Lifestyles
- National Grid
- National Housing Trust/Enterprise
- New Jersey Board of Public Utilities
- New York State Energy Research and Development Authority (NYSERDA)
- OmStout Consulting
- Optimal Energy, Inc.
- Resynergy Systems
 - Richmond Region Energy Alliance





Call Attendees: Network Members (3 of 3)

- Rocky Mountain Institute
- Rural Ulster Preservation Company (RUPCO)
- Seventhwave
- Solar and Energy Loan Fund (SELF)
- South Burlington Energy
 Committee
- Southeast Energy Efficiency Alliance (SEEA)
- The Insulation Man, LLC

- TRC Energy Services
- U.S. Department of Energy (DOE)
- WattzOn
- Wisconsin Energy Conservation Corporation (WECC)





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Call Attendees: Non-Members (1 of 4)

- 1200AE
- 2rw Consultants
- Alliant Energy
- AnnDyl Policy Group
- Apogee Interactive
- Association for Energy Affordability
- AtSite
- AYNI Project
- Bank of Montreal
- Bay City Electric Light & Power - Service Building
- BKi
- BlocPower

- Boston Tax Help Coalition
- Brooklyn Green Home Solutions Inc
- Budova Engineering, Inc.
- C.G.I Technology
- California Housing Partnership
- Carley Consulting
- Centennial Contractors
- City of Bloomington
- City of Dallas
- City of Houston
- City of Milwaukee
- City of Mt. Vernon
- City of West Hollywood





Call Attendees: Non-Members (1 of 4)

- civicspark
- Conservation Connection
 Consulting
- Cook County Department of Environmental Control
- County of San Diego
- Craft3
- CSRA
- CT Green Bank
- Downtown DC Business Improvement District
- Dr. Energy Saver Houston
- Duke University
- E4TheFuture

- Earth Advantage
- Eko Smart Solutions
- Electric & Gas Industries
 Association
- Emerson Climate Tech
- Enbridge Gas Distribution
- Energy Management Services (EMS)
- Energy Resources Group
- Energy Smart Colorado
- Eversource Energy
- Ferguson Township Supervisors
- Flathead Electric Cooperative
- Fox Energy Specialists





Call Attendees: Non-Members (2 of 4)

- Franklin Energy Services, LLC
- GoodCents
- Green & Healthy Homes Initiative
- Green Compass Sustainability
- Green Home Advisers, LLC
- Groundswell
- Hawaii Energy
- Holy Cross Energy
- Home Office Training & Technology
- Home Performance Coalition Inc.
- **ICF** International

- Katerra
 - Knauf Insulation
 - L&L Insulation
 - LGC
 - LINC Housing •
 - Local Government Commission
 - Local Initiatives Support Corporation
 - Massachusetts Department of **Energy Resources**
 - Menlo Spark
 - Mercy Housing Management Group
 - Michaels Energy





Call Attendees: Non-Members (3 of 4)

- MN Pollution Control Agency
- Montana DEQ
- NANA
- Natural Resources Canada
- Nexant
- Off The Grid Renovations, LLC.
- Opportunity Council/ Community Energy Challenge
- PA Public Utilities Commission
- Pacific Northwest National Laboratory
- People's Self Help Housing
- PG&E Energy Training Center

- Poch
- PosiGen Solar
- Preservation of Affordable Housing
- Salcido Solutions LLC
- Schreiner Design
- Seattle City Light
- SGS Guangzhou
- Smaart House
- Snohomish County PUD
- Southwest Energy Efficiency Project





Call Attendees: Non-Members (4 of 4)

- SPEER (South-central Partnership for Energy Efficiency as a Resource)
- Stone Energy Associates
- Sunowner Inc
- Sustainable South Bronx
- The Energy Network
- Thermostat Recycling Corporation
- University of North Texas
- US Dept of HUD

- V3 Smart Energy
- VCREA
- Woods Bagot
- Ygrene





Opening Poll

- Which of the following best describes your organization's familiarity with trends affecting the residential energy efficiency sector?
 - Some familiarity 47%
 - Very familiar 41%
 - Limited familiarity 10%
 - No familiarity 2%
 - Not applicable 0%





Closing Poll

- After today's call, what will you do?
 - Seek out additional information on one or more of the ideas 79%
 - Consider implementing one or more of the ideas discussed 12%
 - Make no changes to your current approach 6%
 - Other (please explain) 3%





Thank you!

Please send any follow-up questions or future call topic ideas to: peerexchange@rossstrategic.com

Find summaries from previous peer exchange calls online.





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