Better Buildings Residential Network Peer Exchange Call Series: *Home Improvement Catalyst: HVAC Installations That Deliver*

June 15, 2017

Call Slides and Discussion Summary

Agenda

- Agenda Review and Ground Rules
- Opening Poll
- Brief Residential Network Overview
- Updates from the Home Improvement Catalyst Initiative—Steve Dunn, Project Manager, Building Technologies Office, U.S. Department of Energy
- Featured Speakers
  - **Jonathan Passe**, Chief, ENERGY STAR Residential Branch, U.S. Environmental Protection Agency
  - **Brad Turner**, Director Education and Technical Assistance, Southface Energy Institute *(Network Member)*
  - **John Taylor**, Deputy Director, Residential and Strategic Programs, Consortium for Energy Efficiency
- Discussion
  - What is your program's experience working with HVAC contractors?
  - What are effective strategies and incentives to ensure high-quality installation of HVAC systems?
  - What challenges have you experienced with HVAC installations and performance over time? What approaches have you taken to address those challenges?
  - Other questions/issues/lessons learned related to optimization of HVAC systems?
- Announcements and 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: Members only need to provide their organization's number of residential energy upgrades per year.

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

The Home Improvement Catalyst Initiative

Building Technologies Office, U.S. DOE

U.S. DEPARTMENT OF ENERGY

Home Improvement Catalyst:
HVAC Installations that Deliver

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Steve V. Dunn
US DOE, June 15, 2017

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

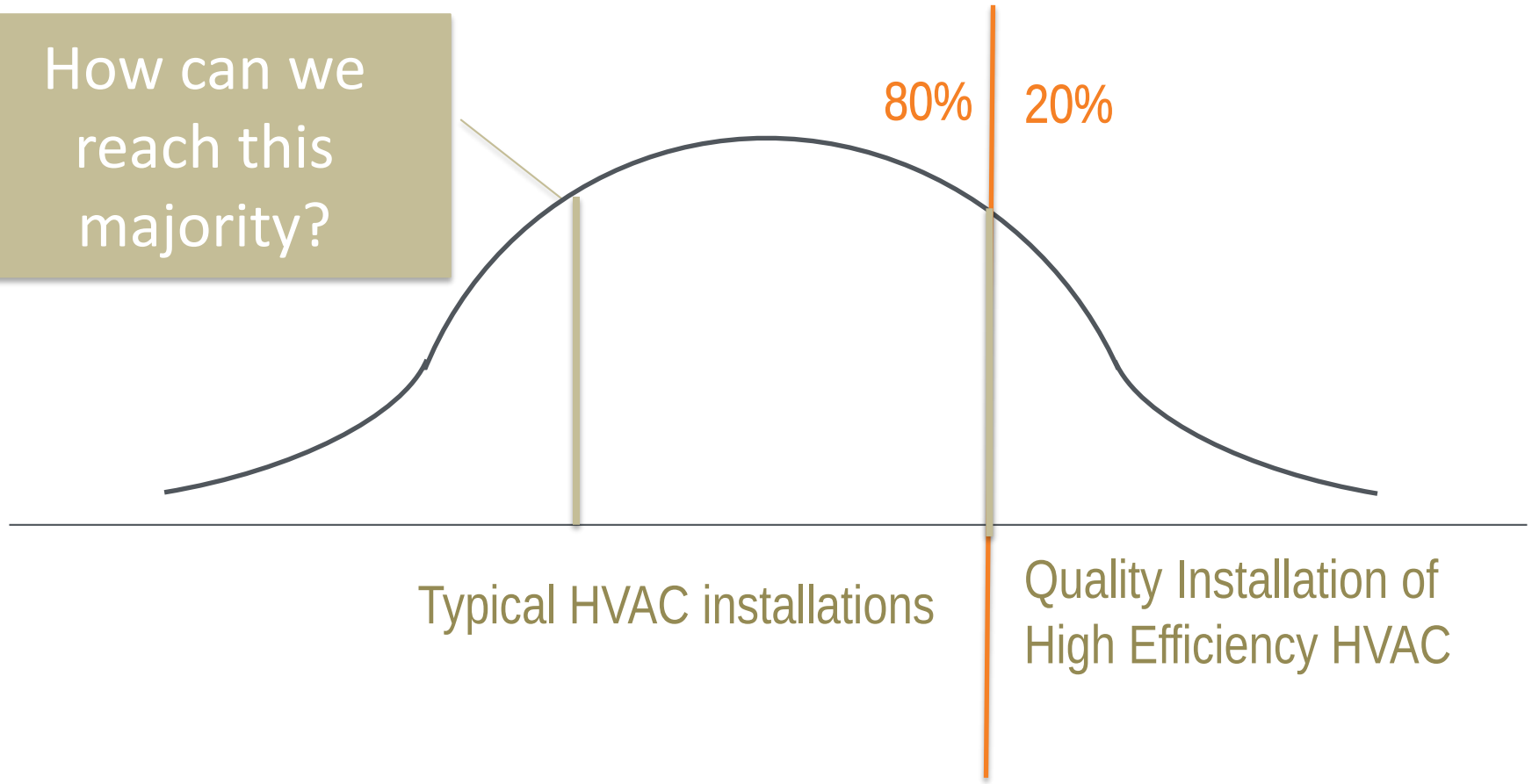
HI Cat Focus: Improving field performance of HVAC system installation

- **Selection guidance for verification tools**
- **Field implementation support: application/scenario based approaches; prioritizing installation elements**

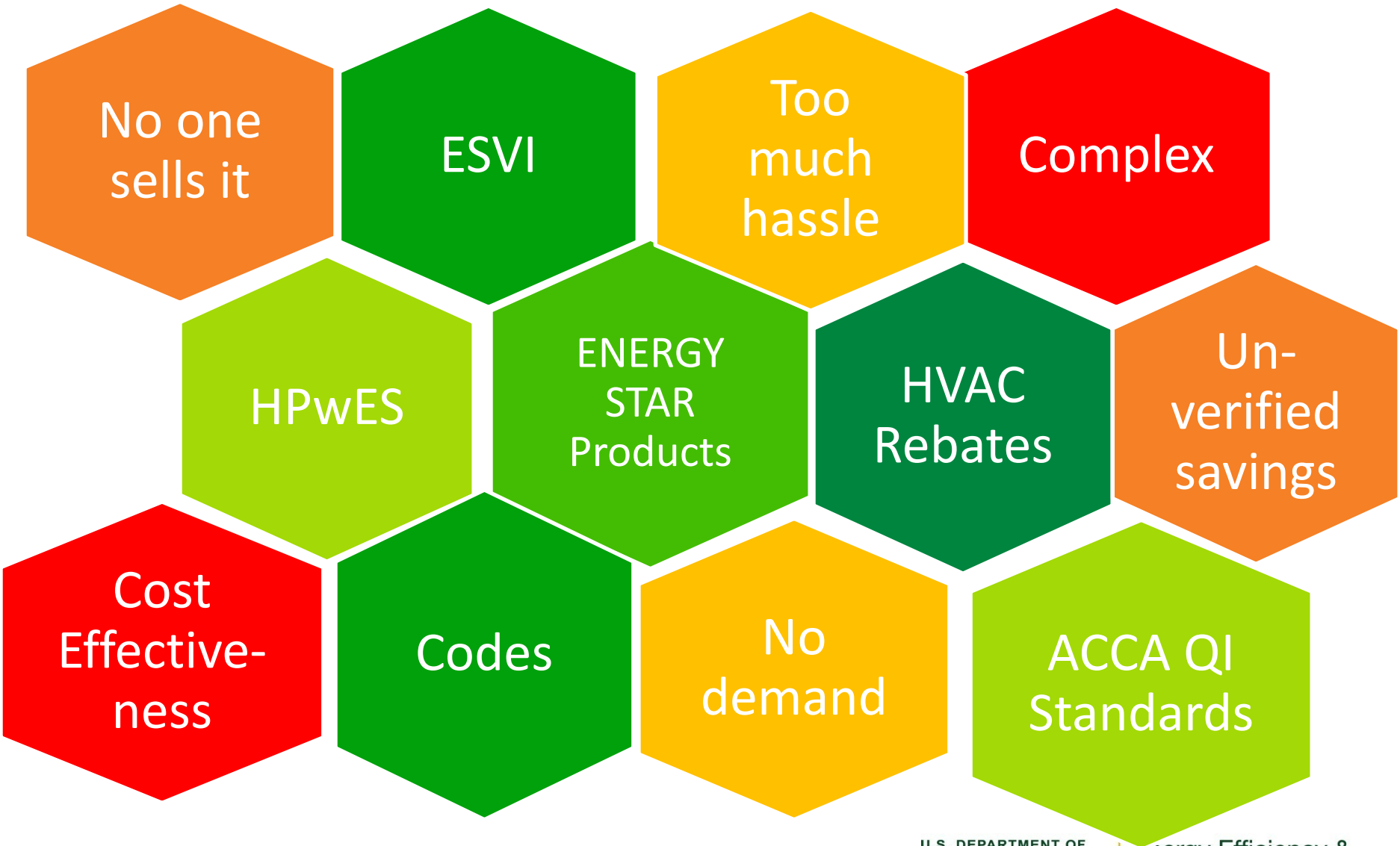
Focusing on Retrofit (Existing Homes) Market

HVAC Contractor Landscape/ Market Share for High Efficiency HVAC

How can we reach this majority?



Challenges and Opportunities

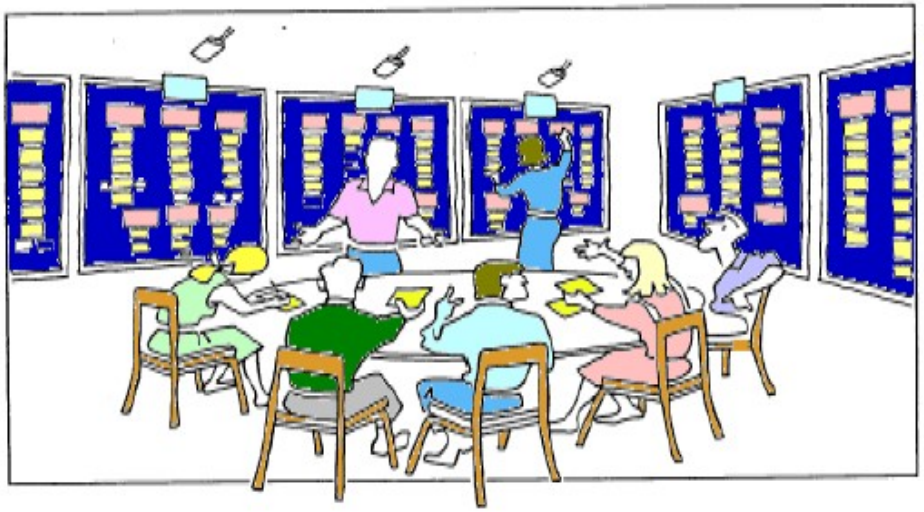


Gathering Industry Feedback

DOE Hosted Workshops in May 2016 and March 2017

Key action areas identified:

- ✓ Conduct research on the measured benefits of HVAC QI
- ✓ Develop/promote better tools for field measurement and verification
- ✓ Develop programs/tools to encourage ductless systems and duct sealing/repairs in existing systems

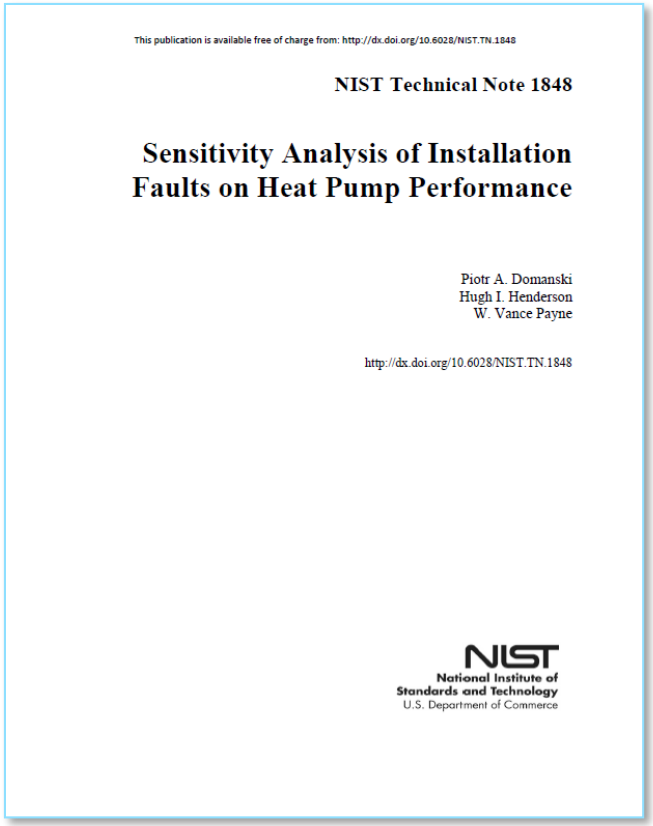


March 2017 Workshop Summary

- Forthcoming -

To review outcomes and stakeholder recommendations from May 2016 HVAC QI Stakeholder Meeting, visit:
https://energy.gov/eere/buildings/downloads/residential-central-air-conditioning-and-heat-pump-installation-workshop

Documenting the Benefits and Energy Savings of QI



- Documents potential energy impacts of improper heat pump installations
- Computer simulations and lab tests quantifying the impact of common faults

Great Report! But Questions Remain:

- How would field data, with imperfect conditions, change the results?
- Do we understand the prevalence of installation faults?
- What are the impacts of the studied faults on other types of systems and other aspects of HVAC system performance (e.g. occupant comfort, indoor air quality, and equipment durability)?

Conducting a Systematic Review of Available Literature

HI Cat Team Question:

What information has been published since September 2014 (or prior to) that would be helpful as it relates to the industry's thinking around QI?

- **Annotated Bibliography**
  - 35+ reports documenting the impacts of improper HVAC installation on energy performance
- **Actions to Address Key Findings**
  - Examining opportunities for "expert" systems and automated verification tools
  - Researching the prevalence of faults (and possible regionality issues)
  - Coordinating with ENERGY STAR products and ESVI
  - Disseminate findings to key industry stakeholders

Preliminary Findings of Systematic Review

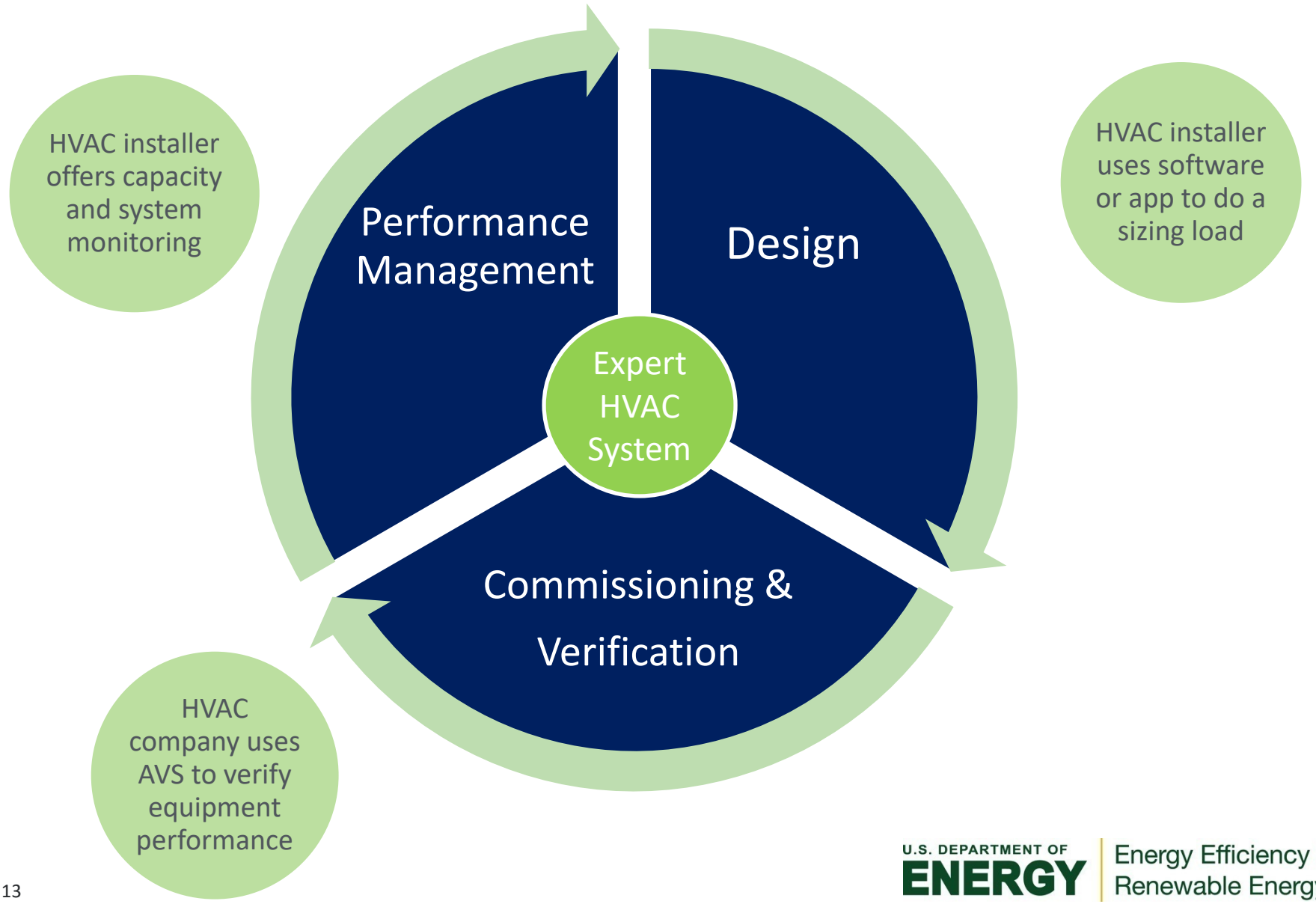
In addressing HVAC installations for existing homes, performance is most impacted by

- Proper airflow
- Proper refrigerant charge
- Sealed ducts (and overall duct design)

The importance of sizing is relative to the scenario/application

- More important for low load homes
- Accurate sizing is difficult in many retrofit applications
- Duct performance is an important limiting factor

Understanding Field Measurement Tools for HVAC



Ideas for Collaboration Opportunities

- Consider upstream efforts
  - High efficiency systems / components, diagnostic capabilities
- Collaborate with OEMs
  - to better align diagnostics with premium equipment controls
  - Improve sensors and data exchange
- Leverage incentives to promote duct system repairs and system tune-ups (help with content development/review of “contractor playbook”)
- Gather field data on impacts of common installation faults
- Support incremental actions for proper air flow and refrigerant charge
- Provide input on draft KPI’s

HI Cat Resources and Partnership Opportunities

Resources for Trades

- (HVAC) Trades oriented guidance, focused on delivering greater value and performance per the current transaction
- Handbook (recorded webinar) on installation
- "Quick Start" guide with a narrower list of specific services that trades/programs could use for HVAC technicians with more limited skills (or homeowners with limited budgets)

Case Studies

- Approaches to Scaling HVAC QI (Iowa HVAC SAVES case study)
- Customer Engagement to Up-serve EE (approaches to staged upgrades – TVA, NJNG, others)

HVAC QI Work Products

- Literature review and annotated bibliography on the impacts of improper HVAC installation
- Classification of Automated Verification System (AVS) Tools

Partnering on Incremental Approaches

- "Sequencing Tool" – Identify 1 or 2 partners to conduct a proof of concept
- HPWH Campaign – online resource with technical content and program strategies

Questions?

For more information, contact:

Steve Dunn, Project Manager
DOE Building Technologies Office

Caroline Hazard, CSRA International

Courtney Moriarta, CSRA International

Presentation Highlights: Building Technologies Office, U.S. DOE

- **Breaking down silos and adopting an integrated approach could increase the overall performance of the HVAC market.**
  - Currently the industry is structured around three functions: design, commissioning and verification, and performance management.
- **Almost 80% of HVAC systems are incorrectly installed.**
  - Many HVACs are installed in “panic mode” when home systems fail and homeowners search for a quick replacement.
- **Stakeholder collaboration and industry engagement is key in addressing current market barriers.**
  - Manufacturers could produce better connectable systems for improved diagnostics and greater exchange of data.
- **DOE’s Home Improvement Catalyst Initiative is working to compile best practices and drive more HVAC quality installations, including through:**
  - Industry workshops to exchange views and address current barriers.
  - Draft KPIs, to be developed over the coming months. Industry’s input will also be sought.

Best Practices: U.S. Environmental Protection Agency & Southface Energy Institute

U.S. DEPARTMENT OF ENERGY

EPA's ENERGY STAR Verified HVAC Installation Program (aka "ESVI")

Jonathan Passe
Chief, ENERGY STAR Residential Branch
U.S. Environmental Protection Agency

EPA's ENERGY STAR Program

- Long history of successfully promoting high-efficiency HVAC equipment and other energy-efficient consumer products
- Utilities, contractors, and consumers have all readily adopted the opportunity
- Why?
  - Utilities/Sponsors – Cost-effective way to meet savings goals using a nationally-recognized and trusted platform
  - Contractors – Up-sell to higher efficiency equipment
  - Consumers – Lower bills; greater comfort
- Plus, the power of the government-backed, trusted ENERGY STAR label

Everybody wins!

The QI Conundrum

- We all know there's a problem out there!
  - We've had the QI-5 Standards for while, but uptake has been limited
- In general, utilities, contractors, and consumers have **NOT** readily adopted the opportunity
- Why?
  - Utilities/Sponsors – Too complicated, too expensive, too burdensome
  - Contractors – Too complicated, too expensive, no consumer demand
  - Consumers – Too complicated, too expensive, no one selling it
- Plus, no ENERGY STAR *(maybe?)*

Everybody loses!

The Verification/QA Problem

- Historically, QI programs have had to rely on boots-on-the-ground to document compliance
  - This is a big driver of high programmatic costs and burden
- Today, technology solutions & smart tools are emerging as an opportunity to more cost-effectively to deliver programs
- Ultimately, industry/stakeholder community need to define standard expectations to demonstrate for acceptance and use in our programs
- Positive signs:
  - ACCA's recent work revising the QI Verification Protocols (QIvP-9) Standard
  - DOE's Home Improvement Catalyst initiative (HI-Cat)
  - CEE's efforts to identify strategies to achieve the benefits of QI, while minimizing burden on customers, and contractors, and utilities

But in the meantime…

EPA's ESVI Pilot Program

- Partnering with Program Sponsors to 'road-test' different technology solutions and tools to help deliver QI
- Participating programs must demonstrate compliance with both QI-5 & QIvP-9
  - Sizing, Selection, Installation, Commissioning, Ducts, Verification
- 3 Pilots recently launched; each based on a different technology approach
  - ACCA (mobile app)
  - Southface/Emerson/Reliable (ComfortGuard)
  - Cedar Falls Utilities (ESI, with additional requirements)
- Pilots must report jobs and data on technology performance to EPA
  - Results will be used to support DOE's HI-Cat effort and CEE's work

We're looking for more partners and technology solutions to work with!

SOUTHFACE ESVI PROGRAM

DOE PEER EXCHANGE CALL
HOME IMPROVEMENT CATALYST
HVAC INSTALLATIONS THAT DELIVER

JUNE 15, 2017

Brad Turner
Director, Education & Technical Assistance
Southface

ESVI PARTNERSHIP

Southface

Comfort Guard

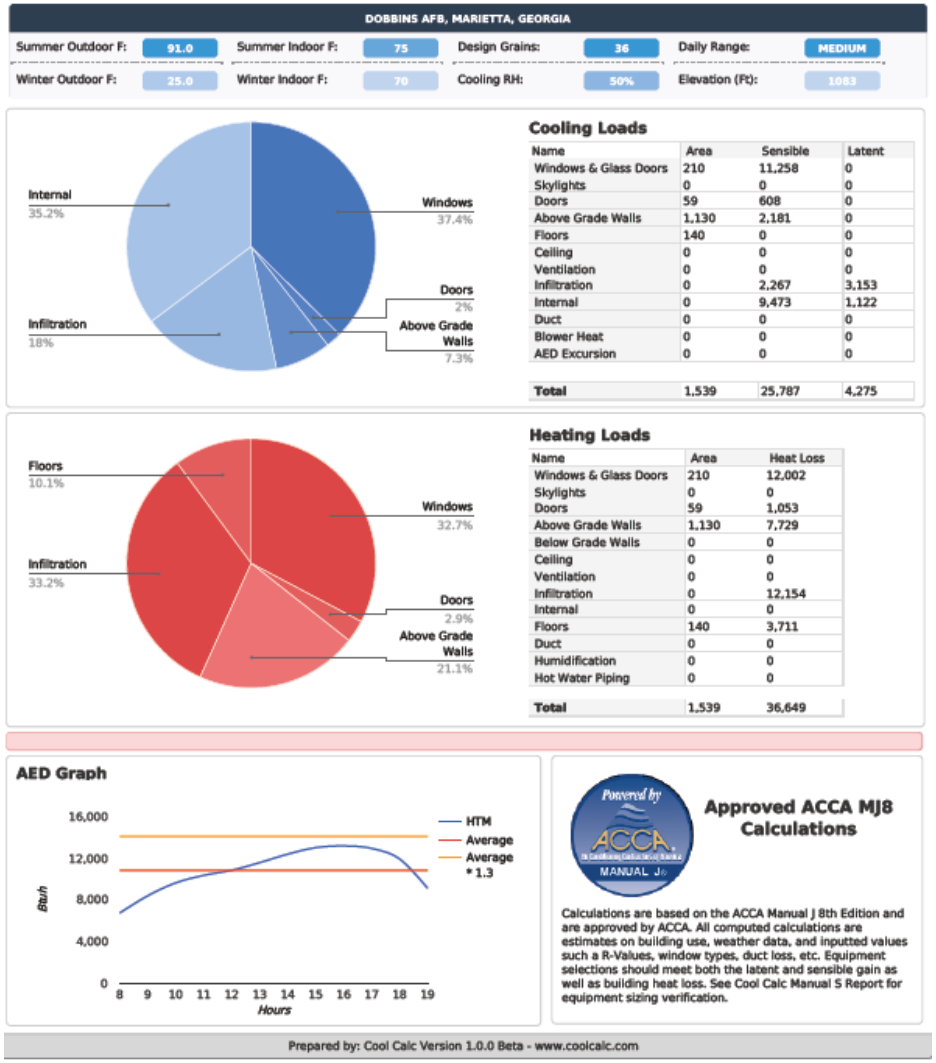
RELIABLE
HEATING & AIR
PLUMBING • ELECTRICAL
HOME PERFORMANCE

4 KEY ELEMENTS OF ESVI

1. Properly Sized Equipment
2. Properly Selected Equipment
3. Properly Installed Equipment
4. Properly Functioning Distribution System

4 KEY ELEMENTS OF ESVI

1. Properly Sized Equipment



DOBBINS AFB, MARIETTA, GEORGIA

Summer Outdoor F:	91.0	Summer Indoor F:	75	Design Grains:	36	Daily Range:	MEDIUM
Winter Outdoor F:	25.0	Winter Indoor F:	70	Cooling RH:	50%	Elevation (Ft):	1083

Cooling Loads

Name	Area	Sensible	Latent
Windows & Glass Doors	210	11,258	0
Skylights	0	0	0
Doors	59	608	0
Above Grade Walls	1,130	2,181	0
Floors	140	0	0
Ceiling	0	0	0
Ventilation	0	0	0
Infiltration	0	2,267	3,153
Internal	0	9,473	1,122
Duct	0	0	0
Blower Heat	0	0	0
AED Excursion	0	0	0
Total	1,539	25,787	4,275

Heating Loads

Name	Area	Heat Loss
Windows & Glass Doors	210	12,002
Skylights	0	0
Doors	59	1,053
Above Grade Walls	1,130	7,729
Below Grade Walls	0	0
Ceiling	0	0
Ventilation	0	0
Infiltration	0	12,154
Internal	0	0
Floors	140	3,711
Duct	0	0
Humidification	0	0
Hot Water Piping	0	0
Total	1,539	36,649

AED Graph

Approved ACCA MJ8 Calculations

Calculations are based on the ACCA Manual J 8th Edition and are approved by ACCA. All computed calculations are estimates on building use, weather data, and inputted values such a R-Values, window types, duct loss, etc. Equipment selections should meet both the latent and sensible gain as well as building heat loss. See Cool Calc Manual S Report for equipment sizing verification.

Prepared by: Cool Calc Version 1.0.0 Beta - www.coolcalc.com

4 KEY ELEMENTS OF ESVI

2. Properly Selected Equipment

AHRI CERTIFIED® www.ahridirectory.org

This combination qualifies for a Federal Energy Efficiency Tax Credit when placed in service between Feb 17, 2009 and Dec 31, 2016.

Certificate of Product Ratings

AHRI Certified Reference Number: 8678650 Date: 11/30/2016

Product: Split System: Air-Cooled Condensing Unit, Coil with Blower

Outdoor Unit Model Number: 4TTR6030J1

Indoor Unit Model Number: 4TXCB003DS3

Furnace Model Number: *UD1B060A9H3

Manufacturer: TRANE

Trade/Brand name: TRANE

Region: All (AK, AL, AR, AZ, CA, CO, CT, DC, DE, FL, GA, HI, ID, IL, IA, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, UT, VA, VT, WA, WV, WI, WY, U.S. Territories)

Region Note: Central air conditioners manufactured prior to January 1, 2015, are eligible to be installed in all regions until June 30, 2016. Beginning July 1, 2016, central air conditioners can only be installed in region(s) for which they meet the regional efficiency requirement.

Series name: XR16

Manufacturer responsible for the rating of this system combination is TRANE

Rated as follows in accordance with AHRI Standard 210/240-2008 for Unitary Air-Conditioning and Air-Source Heat Pump Equipment and subject to verification of rating accuracy by AHRI-sponsored, independent, third party testing:

Cooling Capacity (Btuh):	29000
EER Rating (Cooling):	14.00
SEER Rating (Cooling):	16.50
IEER Rating (Cooling):	

* Ratings followed by an asterisk (*) indicate a voluntary rerate of previously published data, unless accompanied with a WAS, which indicates an involuntary rerate.

DISCLAIMER
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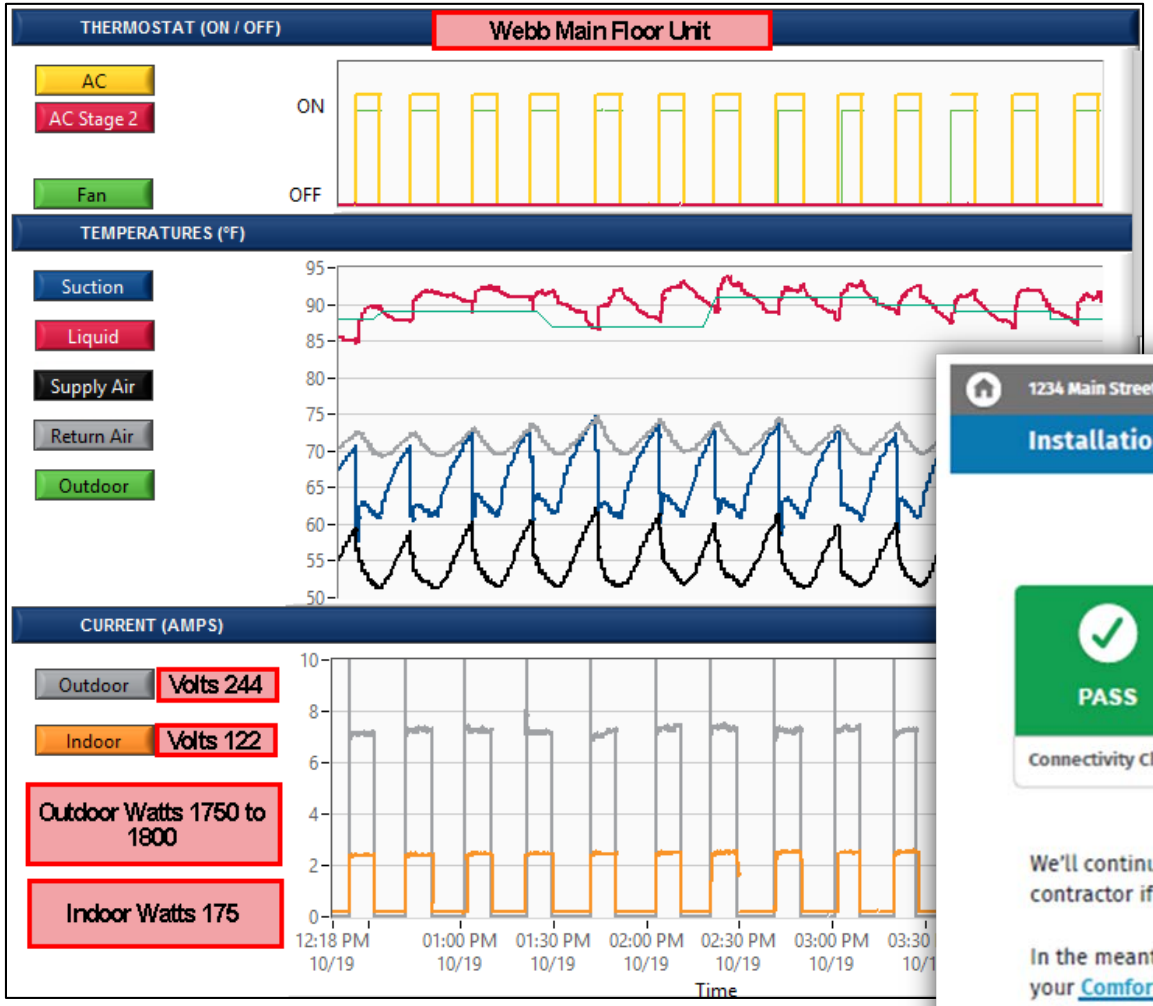
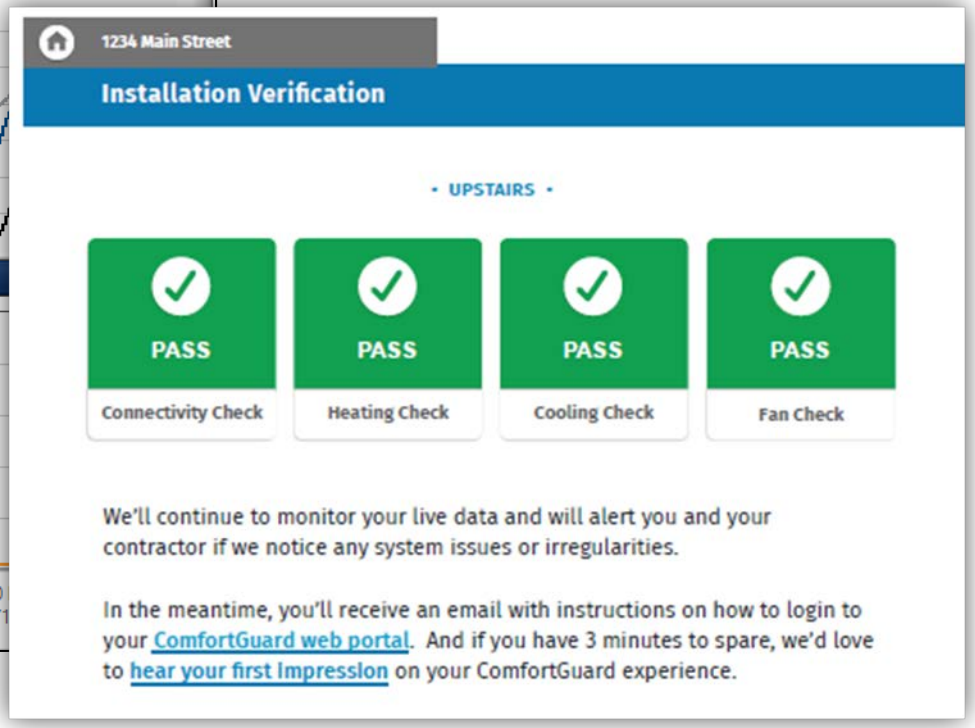
4 KEY ELEMENTS OF ESVI





3. Properly Installed Equipment

4 KEY ELEMENTS OF ESVI

4. Properly Functioning Distribution System

CHALLENGES AND BENEFITS

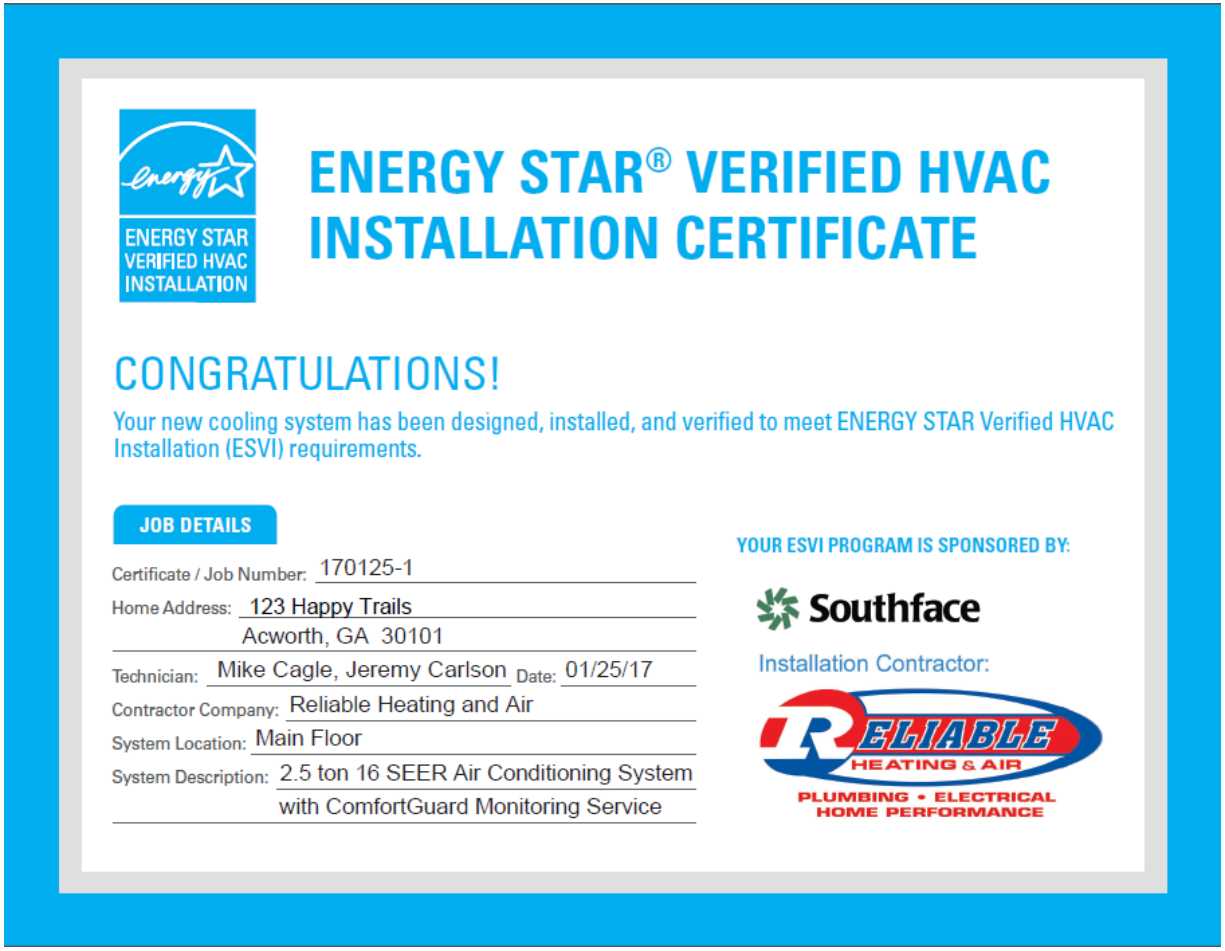
CHALLENGES:

- Integrating ESVI into sales process / additional cost
- Incorporating duct leakage testing
- Data collection required for proper load calculation
- Cost of duct sealing to meet program requirement

BENEFITS:

- Proper installation of HVAC equipment!
- Reduced energy consumption and greater cost savings to client
- Targeted maintenance and prevention of major system failure
- Improved business operations for contractors
- Market differentiation for contractors

ESVI CERTIFICATE



ENERGY STAR VERIFIED HVAC INSTALLATION

ENERGY STAR® VERIFIED HVAC INSTALLATION CERTIFICATE

CONGRATULATIONS!

Your new cooling system has been designed, installed, and verified to meet ENERGY STAR Verified HVAC Installation (ESVI) requirements.

JOB DETAILS

Certificate / Job Number: 170125-1

Home Address: 123 Happy Trails
Acworth, GA 30101

Technician: Mike Cagle, Jeremy Carlson Date: 01/25/17

Contractor Company: Reliable Heating and Air

System Location: Main Floor

System Description: 2.5 ton 16 SEER Air Conditioning System with ComfortGuard Monitoring Service

YOUR ESVI PROGRAM IS SPONSORED BY:

Southface

Installation Contractor:

RELIABLE HEATING & AIR
PLUMBING • ELECTRICAL
HOME PERFORMANCE

FOR MORE INFO:

Brad Turner

www.southface.org

EPA's ESVI Pilot Program

- An opportunity to deliver efficient equipment **AND** Quality Installation
- Utilities, contractors, and consumers can more readily adopt this opportunity (*hopefully*)
- Why?
  - Utilities/Sponsors – Cost-effective way to **REALLY** meet savings goals
  - Contractors – Up-sell efficiency **AND** verified performance
    - Fewer callbacks; happier customers; more referrals; greater profitability
  - Consumers – Even lower bills; even greater comfort; peace of mind
- Plus, the power of the government-backed, trusted ENERGY STAR label

Everybody wins! *(again)*

Reliable Heating&Air @ReliableAir · 5m

@Wendys reading ur hilarious tweets made this digital marketing team go get a Daves single!! Forgot how good they r! pic.twitter.com/PhilxIWPGY – at Reliable Heating and Air

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Learn more at:
energystar.gov/esvi

Email us at:
esvi@energystar.gov

Presentation Highlights: U.S. Environmental Protection Agency & Southface Energy Institute

- **HVAC conundrum:**
  - HVAC stakeholders have readily adopted the ENERGY STAR Program, capitalizing on its brand awareness and marketing advantage;
  - BUT participation in quality installation (QI) initiatives (e.g. adoption of QI-5 Standards) has been limited.
- **From the resource-intensive, boots-on-the ground approach to real-time data**:
  - Independent verification through automated validation systems can help keep costs down.
  - The ComfortGuard technology used by one of the EPA & partners pilots uses sensors installed on the HVAC systems to monitor installation quality and performance.
- **Adoption of the ENERGY STAR Verified Installed (ESVI) Program is a cost-effective way for programs to meet energy savings goals.**
  - If programs solely base their energy savings estimates on the efficiency of HVAC equipment without factoring in installation quality, they may not achieve the full amount of potential savings.

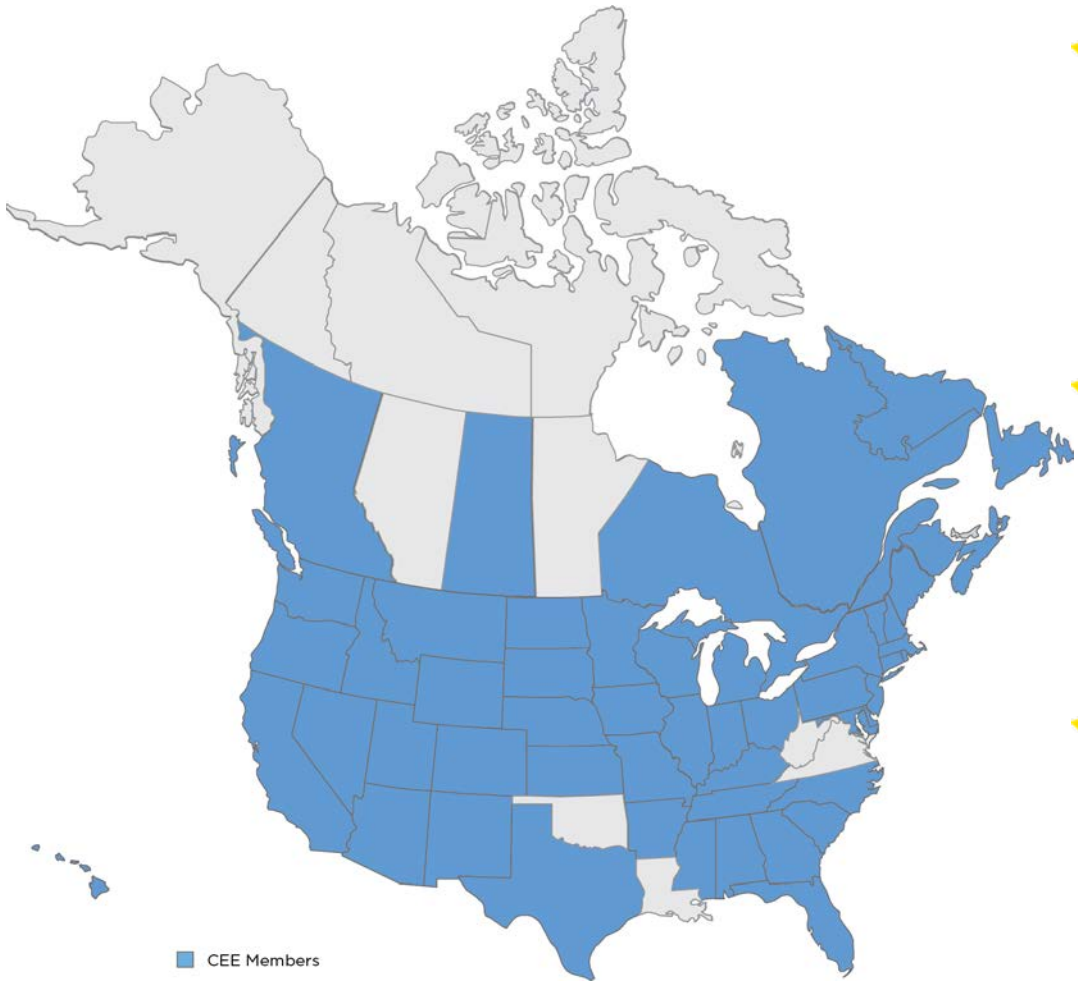
Best Practices: Consortium for Energy Efficiency

U.S. DEPARTMENT OF ENERGY

Making Quality HVAC Installations Mainstream

John Taylor
Deputy Director
Consortium for Energy Efficiency

CEE Today



- CEE brings together 100 program administrators serving all or part of 45 states and 7 provinces
- CEE program model was recognized by the EPA with the 2009 Climate Protection Award

- CEE is a member-driven nonprofit, governed by a Board of Directors from member organizations

CEE members work together and with stakeholders to achieve higher savings

Members

- Efficiency Program Administrators—utilities and nonutilities with ratepayer funded programs
- Other Organizations
  - DOE, EPA, NRCan
  - National labs
  - Vetted and Legacy Non-Profits
  - State and provincial energy offices

Coordination

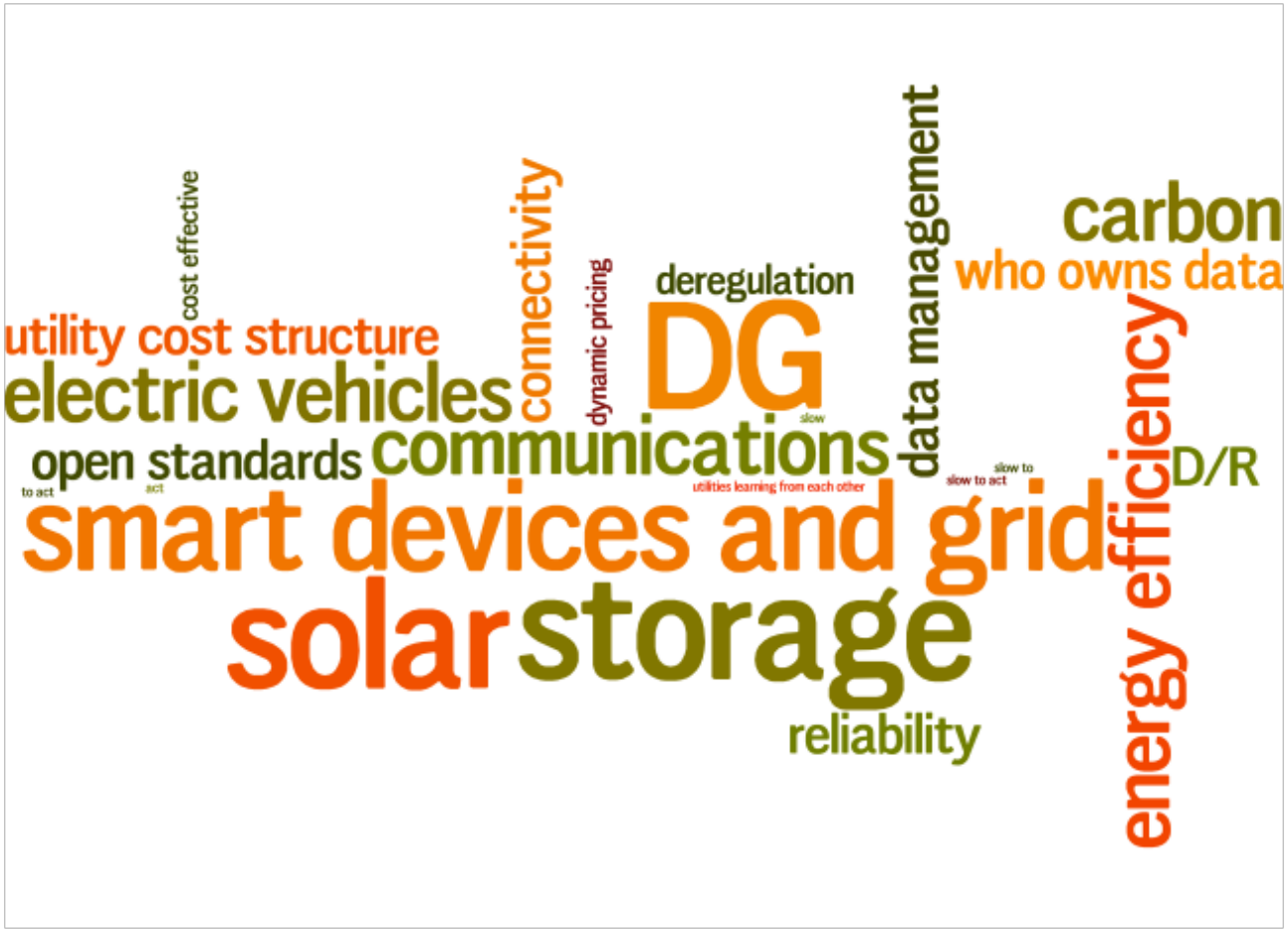
- EPRI, GTI, AGA, IEE

Trade allies

- AHRI, HARDI, ACCA

Manufacturers and others are consulted about aspects for program implication

The Energy Efficiency Industry is Facing Change



Examples of Non-Energy Impacts

Residential

- Lighting Quality
- Property Value Increase
- Thermal Comfort
- Noise Reduction
- Home Durability
- Reduced Equipment Maintenance

Low-Income

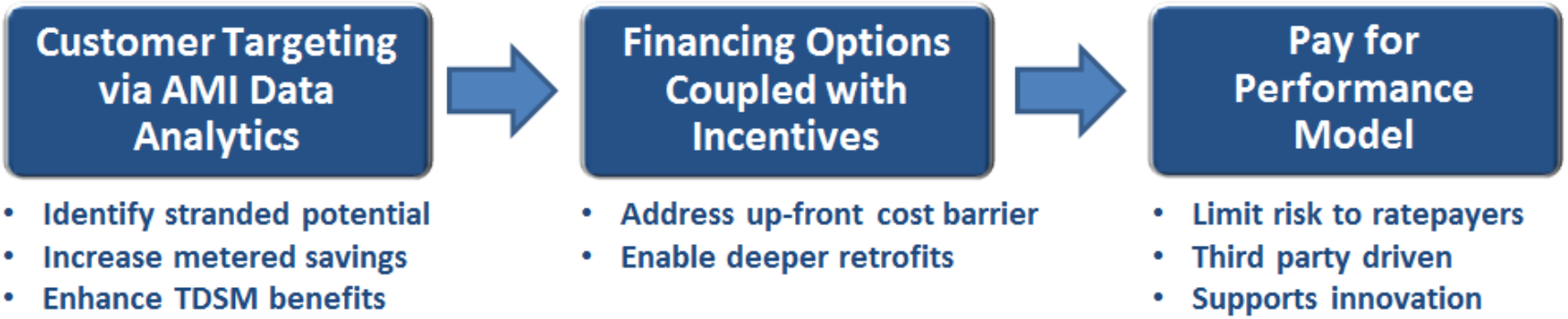
- Fewer bad debt write-offs
- Rate Discounts
- Health Benefits
- Improved Safety

C&I

- Administrative costs
- Other labor costs
- Operations & maintenance costs
- Product spoilage
- Rent/Sales revenue
- Waste Disposal

One Relevant Strategy—Where California is Likely Heading

Strategy 1: Targeted Interventions



http://www.caeecc.org/business-plans

CEE's HVAC QI Initiative: Present Day

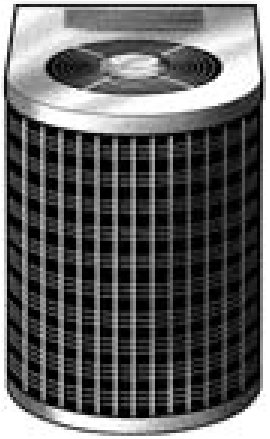
- Objective: Focused on market adoption and quality installation of high efficiency equipment
- Goals:
  - Increase contractors offering QI (ACCA 5/9)
  - Increase consumer awareness
  - Increase number of quality installs

Revising the Initiative

- To Achieve Scale!!!
- We're asking these questions:

1. Should objective be modified to emphasize QI for ALL equipment?
2. Should goals explicitly support strategies that invest resources in contracting businesses to embrace QI?
3. What is the minimum level of verification necessary? Can we be more targeted?
4. Is it appropriate to explicitly prioritize QI over promotion of high efficiency equipment?

The HVAC System of the Future



1. Variable capacity
   - Super-efficient seasonally
   - Efficient during peak demand
2. Dispatchable, grid-beneficial
3. Connect via open standards
4. Minimize truck rolls
5. Data reporting to verify performance
   - provide energy saving insights
6. Consumer amenity (comfort, control, etc.)

Contact

John Taylor
Deputy Director

Presentation Highlights: Consortium for Energy Efficiency

- **Evolving energy markets will increase awareness on HVAC quality installations:**
  - Energy efficiency programs are now more customer-centric and engaging more in partnerships.
  - Non-energy impacts are currently included in the overall energy saving calculations.
- **The Pay for Performance model** is increasingly becoming a reality due to current smart meters. This is where California is most likely heading.
- **Smart meters/equipment can make quality installations become the norm:**
  - **More targeted and smarter verification** means fewer inspections performed in the field.
  - **Standardizing fault detection** regardless of the tools used, will help contractors identify and fix any issues in a consistent way.
  - **Real data and verified performance** can help communicate the business case to homeowners.

Residential Program Solution Center

Visit us!
rpsc.energy.gov

A living repository of resources for residential energy efficiency programs on these key components:

- Program Design & Customer Experience
- Marketing & Outreach
- Financing
- Contractor Engagement & Workforce Development
- Evaluation & Data Collection
- Market Position & Business Model

Additional related resources

- **Northeast Energy Efficiency Partnerships' (NEEP) papers on cold climate heat pumps:**
  - Cold Climate Air-Source Heat Pump Specification V2.0 (May 2016)
  - Cold Climate Air-Source Heat Pump Specification V2.0 Memo (May 2016)

- **Peer Exchange call summaries on related topics:**
  - Home Improvement Catalyst: Engaging Trades in Optimizing HVAC System Performance (January 2017)
  - Home Improvement Catalyst - Maximizing HVAC Performance Through Contractor Partnerships (201) (September 2016)
  - Home Upgrades: Leveraging HVAC Upgrades for Greater Impact (201) (November 2015)
  - Opportunities for Building America Research to Address Energy Upgrade Technical Challenges: HVAC, Envelope and IAQ (July 2015)

Upcoming Seasonal Messaging Opportunities

Now is the time to start planning energy efficiency messaging campaigns for the fall season.

Here are some ideas to get you started. Please let us know what you come up with!

Sept 22 – Dec 20
Fall Season

End of August & September
Back to School

September 10
National Grandparents Day

The Residential Energy Services Network (RESNET)
Poster

U.S. Department of Energy
Article & Video: 5 Back-to-School Resources to Help You Learn About Energy

For related seasonal messaging opportunities, visit the Better Buildings Residential Network website:
Fall: Energy Saving Changes with the Season

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:

- June 22: Car Talk: Electric Vehicles and Residential Energy Efficiency
- June 29: Community-Based Social Marketing: Using Social Science and Data to Change Behavior
- July 6: No call
- July 13: Resilience and Energy Efficiency in Low-Income Communities
- July 20: Bullseye: The Advantages of Targeted Marketing
- July 27: Making Program Evaluation Work for You

Send call topic ideas to peerexchange@rossstrategic.com

See the Better Buildings Residential Network Program website to register

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 Twitter with #BBResNet

Better Buildings LinkedIn

We can't wait to hear from you!

U.S. Department of Energy Solar Decathlon

Oct 5-15, 2017 DENVER

- 13 Collegiate teams compete in 10 contests
  - New for 2017: Innovation and Water
- Winning team best blends technology, market potential, design excellence with smart energy solar production and maximum energy and water efficiency.
- Large free public event – showcases best of clean energy technology
- Denver location: new, mixed use smart community on transit line near Denver International Airport
- Sponsorship Opportunities
- Info: www.SolarDecathlon.Gov

Solar Decathlon 2015 Teams in Irvine, Calif.
Credit: Thomas Kelsey/U.S. Department of Energy Solar Decathlon

Addenda: Attendee Information and Poll Results

U.S. DEPARTMENT OF ENERGY

Call Attendees: Network Members

- Alaska Housing Finance Corporation
- Center for Sustainable Energy
- City of Cambridge
- City of Kansas City
- CLEAResult
- Ecolibrium3
- Ecolighten Energy Solutions Ltd.
- Eden Housing
- Energy Efficiency Specialists
- EnergyWize
- Fort Collins Utilities
- GoodCents
- Honeywell International, Inc.
- International Center for Appropriate and Sustainable Technology (ICAST)
- Michigan Saves
- National Association of State Energy Officials (NASEO)
- Northeast Energy Efficiency Partnerships (NEEP)
- Southface
- United Illuminating Company

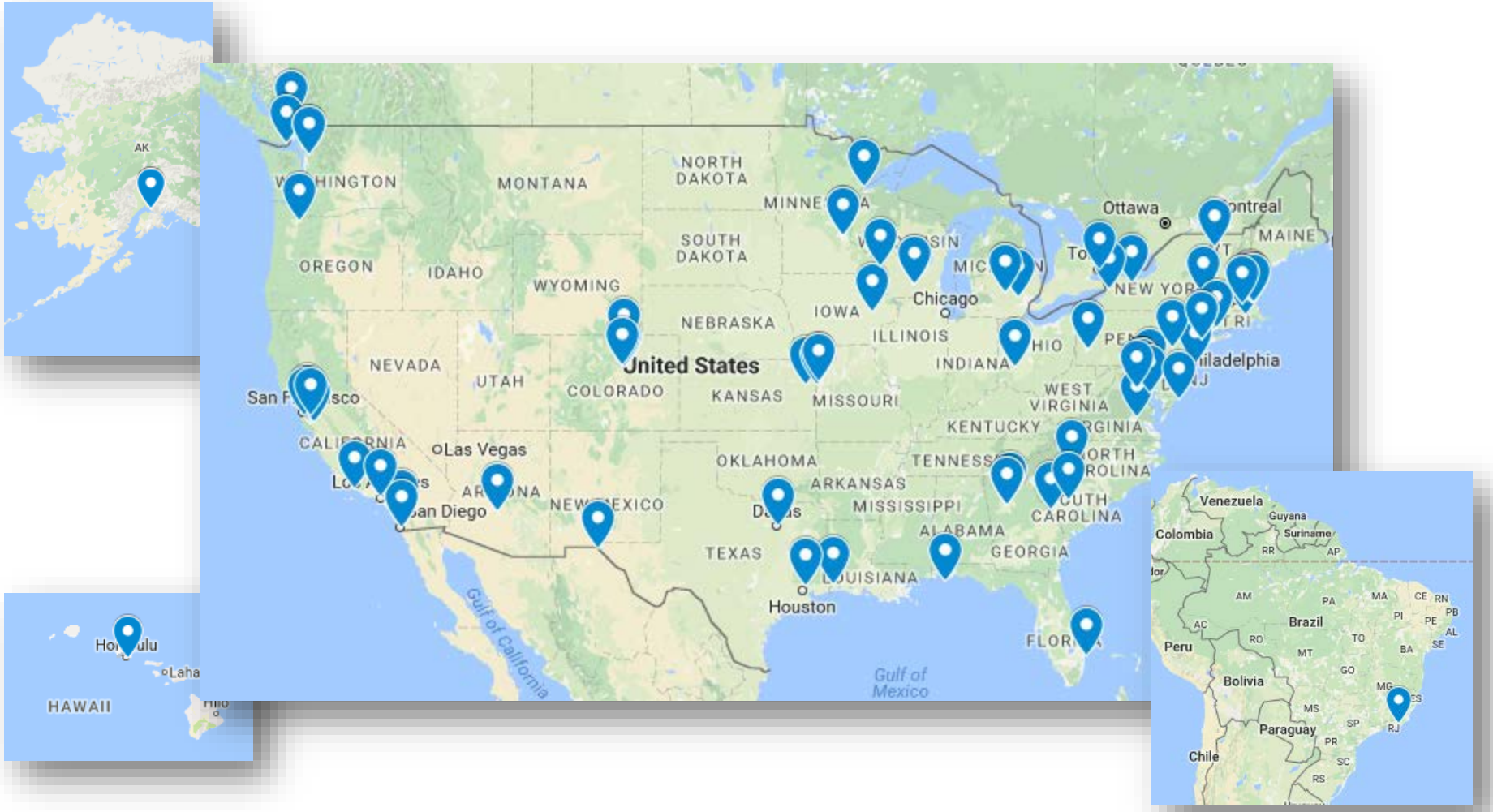
Call Attendees: Non-Members (1 of 2)

- Air Conditioning Contractors of America (ACCA)
- ACTION Housing, Inc.
- Association for Energy Affordability
- Arizona State University
- Augusta Technical College
- Center for Sustainable Building Research
- CO2.FI
- Consortium for Energy Efficiency
- County of Santa Barbara (CA)
- Danfoss
- Decent Energy, Inc.
- DNV GL
- Energy Information Administration (EIA)
- El Paso Electric
- Electric Cooperatives of South Carolina
- Enbridge Gas Distribution Inc.
- Energetics Incorporated
- Energy Solutions Professionals
- EverReady Home Inspections
- Focus on Energy
- The Green Team
- Greenbanc
- U.S. General Services Administration (GSA)
- Hunter Industries, Inc

Call Attendees: Non-Members (2 of 2)

- ICF International
- Jofforts Energy
- Johnson Home Performance, Inc.
- University of Kansas
- LogMeIn, Inc.
- Lutron Electronics Company
- Massachusetts Department of Energy Resources
- Massachusetts University
- NANA Regional Corporation
- National Fuel Gas Company
- Navigant
- New Ecology
- Nexant
- Off The Grid Renovations, LLC.
- Pearl Home Certification
- Pond & Company
- Proctor Engineering Group
- Rheem Manufacturing Company
- Richmond Region Energy Alliance
- Bonneville Power Administration (WA)
- San Diego Gas & Electric
- Schreiner Design
- Snohomish County (WA)
- Sustainable South Bronx
- Thermostat Recycling Corporation
- University of Minnesota

Call Attendee Locations



Better Buildings U.S. DEPARTMENT OF ENERGY

U.S. DEPARTMENT OF ENERGY

Opening Poll

- Which of the following best describes your organization's experience with engaging contractors in HVAC optimization?
  - Some experience/familiarity – ***44%***
  - Very experienced/familiar – ***29%***
  - Limited experience/familiarity – ***15%***
  - No experience/familiarity – ***6%***
  - Not applicable – ***6%***

Closing Poll

- After today's call, what will you do?
  - Seek out additional information on one or more of the ideas – ***67%***
  - Consider implementing one or more of the ideas discussed – ***22%***
  - Make no changes to your current approach – ***6%***
  - Other (please explain) – ***5%***