

Communication of Energy Efficiency Information to Remodelers: Lessons From Current Practice

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Building America Retrofit Alliance

October 2012

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These tables were created by the Building America Retrofit Alliance.

Definitions

BARA	Building America Retrofit Alliance
BPI	Building Performance Institute
HPwES	Home Performance with ENERGY STAR [®]
EEBA	Energy and Environmental Building Alliance
NAHB	National Association of Home Builders
PD&R	U.S. Department of Housing and Urban Development Office of Policy Development and Research
WAP	Weatherization Assistance Program
WxTV	Weatherization TV

Executive Summary

Various programs and entities have attempted to provide energy efficiency and building science information to remodeling contractors using their own techniques and content. However, the remodeling industry is large and fragmented and, as such, what is effective for some contractors may not be effective for others. Given these variables, this report sought to determine the most effective ways to communicate building science and energy efficiency information to remodelers by considering four questions:

- How are current programs and industry media communicating building science and energy efficiency information to remodeling contractors?
- Are those methods effective?
- What types of building science and energy efficiency communication does a sampling of remodelers think is effective?
- When working on a project that requires learning a new energy efficiency construction technique, what type of training and/or communication does a small group of remodelers prefer?

The results of these inquiries did not result in a definitive conclusion about the most effective method of communicating building science and energy efficiency information to remodeling contractors, but the research findings will enhance the way that Building America results are communicated to remodelers. In-person communication is still considered the most effective way to relate most types of information, but online delivery can be effective on its own and as a reinforcement of other modes of communication. Print publications are still the backbone of industry communication; however, many are viewed online rather than as hard copies. All communication should strive to engage multiple modes of learning and to present a clear and accurate message that motivates remodelers to learn.

1 Introduction

The remodeling industry is large and extremely fragmented. There are about 650,000 remodeling and specialty trade contractor businesses in the United States (Joint Center for Housing Studies of Harvard University 2011). This includes businesses with payroll and those that can be classified as self-employed. Most are small businesses. As such, characterizing the industry with regard to effective communication is challenging.

Previous home building industry research determined the information needs and available resources for builders and remodelers (Hanley Wood 2010) and how innovation is diffused in the home building market (PD&R 2004). Although this research provides a rich context for further inquiry, it does not address how to effectively communicate building science and energy efficiency information to remodelers.

Hanley Wood (2010) found that, among remodelers, the greatest information need was technical, followed by customer service, product information, and regulatory requirements. Survey respondents indicated that trade magazines provided the most useful information. This result may not be surprising, as the survey respondents were among Hanley Wood's database of email and direct mail subscribers as well as users of Hanley Wood websites and other resources. Remodelers also cited trade magazines as "very trustworthy." Conferences and seminars and industry peers tied for second place. In addition, two-thirds of remodelers strongly agreed that "...the Internet opens a world of information that is not readily available in print." Remodelers were also found to use personal digital assistants, smartphones, and computers extensively in the field.

A Housing and Urban Development Office of Policy Development and Research (PD&R 2004) study sought to uncover "how and under what circumstance residential housing innovations become standard industry practices." Although the focus of the research was new home builders (not remodelers),¹ the research question relates to the current research that assumes that, for innovation to be adopted, it needs to be effectively communicated and that much of the innovation in the building industry is centered on energy efficiency. As such, the study's finding about information sources used by builders to learn about new materials and methods may be helpful. The study differentiates between early adopters, middle-stage adopters, and late-stage adopters. This distinction carries through to the sources of information used by the different groups. The study states that early adopters, "...learn about technology from the government..., National Association of Home Builders (NAHB) seminars, universities, and the Internet. Middle- and late-stage adopters are more likely to learn about new technologies from other builders and trade shows." Across all groups, only 5% cited the Internet as a "highly influential" information source. However, the result may be of limited use because the study was completed more than seven years ago and the Internet's use as an information source has exploded in recent years. Further, respondents may be self-selected, because this was a paper survey sent through the mail. An electronic survey, such as the one conducted by Hanley Wood, may produce very different results.

¹ Seven percent of the 245 respondents identified themselves as home improvement contractors/remodelers.

The studies noted above seem to vary with regard to how information is obtained by the industry, but clearly electronic media play a larger role in how information is communicated to remodelers. However, both the Hanley Wood and PD&R studies suggest that remodeling contractors still find tangible, paper-based sources highly useful.

The PD&R study found that the builders are interested in innovative ideas that can help them improve quality, while a Joint Center for Housing Studies at Harvard University study found that the use of green products, including those that improve energy performance, depend highly on government support (Park 2009). Innovation in construction and the use of green products are not synonymous, but it is fair to say there may be significant overlap between the two areas. The PD&R study and a recent survey of contractors by the NAHB Research Center (Wood, 2011) noted that clients often do not support incorporating energy efficiency into remodeling jobs.

The Building America Retrofit Alliance (BARA) team held an expert meeting on media use that focused on exploring opportunities to “transform the remodeling industry...through new media strategies” (BARA, 2011). Two key findings from the meeting were that content overrides format and remodelers need to be motivated to take on new energy efficiency information. The group widely assumed that the primary motivator for learning is the potential for increased revenue.

Research on education and communication for adult learners ranges from studies on how text should be laid out on Web pages (Nielsen 1997) to how educators can help adult students take on a leadership role in their own learning (Edmunds 2002). Andragogy is the theory of adult learning and Malcolm Knowles is recognized as an expert in the field. Current adult education practices are dominated by Knowles’ assumptions (Krosney, 2011). These assumptions are:

- Need to know—adults need to know why they should learn something (Ota, DiCarlo, Burts, Laird, & Gioe, 2006)
- Self-concept—adults believe they are responsible for their own lives, so their education needs to foster self-direction (Ota, DiCarlo, Burts, Laird, & Gioe, 2006)
- Experience—adult learners bring a variety of experiences to the table; this should be acknowledged and folded into the curricula when feasible (Ota, DiCarlo, Burts, Laird, & Gioe, 2006).
- Readiness to learn—adults are ready to learn something when they need to know it in order to help them deal with situations (Knowles, 2005).
- Learning orientation—“Adults are life, task, or problem centered in their orientation to learning. They want to see how what they are learning will apply to their life, a task they need to perform, or to solving a problem” (Fidishun, 2000).
- Motivation to learn—Adult learners can be motivated by external factors such as making more money or getting a better job, but their strongest motivators are internal, such as increased job satisfaction and self esteem (Ota, DiCarlo, Burts, Laird, & Gioe, 2006).

These assumptions, along with issues specific to remodelers, served as a framework for the assessment of the communications and training examined in this report and ultimately for the recommendations for the Building America program to effectively communicate energy efficiency concepts to the remodeling industry.

2 Research Goal and Approach

This project sought to find the most effective ways to communicate building science information and energy efficiency guidelines to remodeling contractors and to use those findings to make recommendations for the communication of Building America research.

This goal was pursued by:

- Assessing the presumed effectiveness of selected trainings and communications currently available in the remodeling market.
- Conducting an electronic scan of over 700 remodelers to find out what types of energy efficiency and building science communication they consider effective.
- Observing the training preferences of a small group of remodelers learning an energy efficient construction technique as part of a Center for Building Knowledge (CBK) at the New Jersey Institute of Technology study.

By finding the most effective ways to communicate building science and energy efficiency information to remodeling contractors, the Building America program can develop successful techniques and tools for successfully transferring research, strategies, and techniques to the remodeling market and further the program's goal of improving existing home efficiency by 30%–50%.

3 Effectiveness of Selected Programs and Trade Media: Existing Educational Programs That Target Remodelers

3.1 Home Energy Efficiency Programs

Considering the vastness of the remodeling industry in the United States, the BARA team chose to assess communications supporting the two largest home energy efficiency programs in the United States and four large trade publications directed toward remodelers.

The U.S. Department of Energy's Weatherization Assistance Program (WAP) and the Home Performance with ENERGY STAR[®] program (HPwES) are the largest home energy efficiency programs in the United States. Both programs have evolving training programs and educational resources.

WAP provides energy upgrades to homes in which residents meet income eligibility requirements. The program has weatherized more than 6.4 million dwellings and, more recently, weatherizes about 150,000 homes per year. There are more than 900 local weatherization agencies that together employ 23,000–25,000 workers (WAPTAC 2011).

The HPwES program is a market-rate program with various levels of available subsidies. HPwES has upgraded about 75,000 homes since it officially rolled out in 2007 (U.S. EPA and U.S. DOE 2011). While HPwES is much smaller than WAP, it is still the largest market-rate existing home energy efficiency program in the country (Schrader, 2011). HPwES work is typically done by Building Performance Institute (BPI) Certified Professionals. In 2010, there were 20,236 BPI Certified Professionals in the United States (BPI, 2010).

Two national trade associations exclusively serving remodelers are the National Association of the Remodeling Industry (NARI), with nearly 7,000 members (Taddei 2011), and the NAHB Remodelers Council, which has about 14,000 remodeling industry members (NAHB 2011). Both groups offer education in the realm of green and energy efficiency through targeted coursework.

NARI offers a Green Certified Professional credential. To earn this credential a candidate must pass an exam. To be eligible to sit for the exam, the candidate must complete 16 education hours addressing green or sustainable building or remodeling principles within the past five years or be enrolled in the NARI Green Remodeling Course. The Green Remodeling Course is given in person, two hours per week, for 12 weeks. Course structure is primarily slideshow lectures and discussion. NARI also offers continuing education through its Knowledge Community seminars. These are offered as live webinars and then as archived streamed content via the NARI website (NARI 2011). A sampling of these webinars reveals them to be voice-over slide presentations with graphics and illustrations supported by text. NARI currently has approximately 150 Green Certified Professionals (Taddei, 2011).

The NAHB Remodelers Council offers a Certified Green Professional designation. NAHB does not have an exam for this certification and it is not specific to remodelers. The coursework for this credential is delivered as in-person seminars with local experts around the country. The format is lectures with slide presentations. A search on the NAHB website for remodelers with the Certified Green Professional credential produced 360 results (NAHB, 2012).

Because the NARI and NAHB green certification programs represent a relatively small number of remodelers, their educational materials were not included in the analysis.

Manufacturers that supply products to the remodeling industry, particularly products intended to improve energy efficiency, invest in builder training. That training pertains to the use of the manufacturer's product and, as such, can be very narrow in scope. Manufacturer training warrants a separate study and is not included in this project's research.

The trade media reviewed in this study include: *Professional Remodeler*, *Remodeling Magazine*, *Fine Homebuilding*, and *Green Building Advisor*. *Professional Remodeler* has a readership of 82,000 (Sweet, 2012) and *Remodeling Magazine* has 80,647 subscribers (Hanley Wood, 2011). *Fine Homebuilding* has 285,000 subscribers and, while it is not exclusively written for remodeling contractors according to an analysis of their audience, professional remodelers account for 58,000 of their readers (Fine Homebuilding, 2011). *Green Building Advisor* has more than 100,000 subscribers; however, a breakdown of the number of remodelers was not found.

3.2 Assessment of Effectiveness

Determining what type of communication is effective does not lend itself to a clearly quantifiable test; instead a qualitative analysis is more appropriate. The BARA team assessed the training and media discussed above using a series of questions based on Knowles' assumptions discussed in Section 1. The assumptions are modified to reflect the subgroup of adult learners at hand, which includes remodeling contractors, and to the content being addressed, which includes energy efficiency and building science information. The resulting assessment questions follow:

- Need to know
 - Is there a clearly defined need to know this information?
- Self-direction
 - Is the information provided in a way that allows for self-direction and accommodates different learning styles?
 - Visual
 - Auditory
 - Kinesthetic (learning by doing)
- Experience
 - Does the information consider a remodeler's prior experience and is there an opportunity for that experience to be shared?
- Applicability/technical merit
 - Does the information apply to a specific problem or task and will it provide technically sound guidance for resolving the problem or completing the task?
- Motivation
 - Can this information lead to making more money, getting a better job, or increasing job satisfaction?

3.2.1 Weatherization Assistance Program

WAP provides energy upgrades to homes where the resident meets income eligibility requirements. WAP has weatherized more than 6.4 M dwellings and currently weatherizes about

150,000 homes per year. There are over 900 local weatherization agencies and WAP employs 23,000–25,000 workers (WAPTAC 2011).

WAP, while federally sponsored, is typically run through each state’s energy office. Weatherization Training Centers are either state sponsored or supported to provide training to subgrantees. These centers provide training based upon WAP’s core competencies and must meet the standards for quality training required by the program. The core competencies were created based on the courses offered by different weatherization training centers and from the technical program standards in several states. Prior to 2010, there were 15 Weatherization Training Centers in the nation. With 2010 ARRA funding, an additional 11 training centers were established, for a total of 26 (WAPTAC, 2011). The training centers and other programs throughout the country provide a full range of training courses for weatherization workers. Potential workforce members participate in classroom, laboratory, and hands-on training to learn how to properly identify and correct residential energy use problems. WAP supplements the in-person/field training with online training and resources. WAP has a set of standardized curricula for each of the various weatherization professional positions (see Figure 1). These curricula provide comprehensive training session modules for new and experienced members of the weatherization workforce. Standardized curricula exist for:

- Weatherization Installer/Technician Fundamentals
- Weatherization Installer/Technician Intermediate
- Weatherization Installer/Technician Mobile Homes
- Energy Auditor – Single Family
- Energy Auditor – Multifamily
- Crew Chief
- Weatherization Technical Monitor/Inspector
- Mechanical Systems – Multifamily
- Train the Trainer
- Health and Safety Training for Programmatic Staff

Each of these modules contains a range of topics relevant to the particular workforce position.

Presentations designed for instructors are available as slideshow or pdf files and speaker notes are provided as well as lesson plans, prop specifications, and reference materials. Slide presentations use a blend of graphics and text as appropriate. While some slides are all text, most use example photos, graphics, and slide animations liberally. As can be seen in the presentations, and is echoed by weatherization trainers, information is broken down into small pieces and reinforced with visuals and hands-on practice (Redmond 2011).

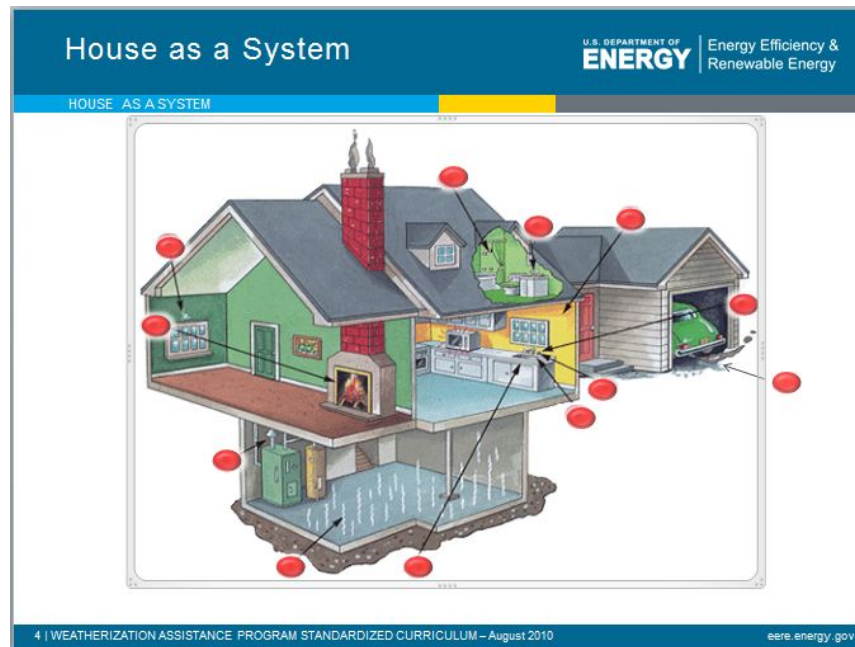


Figure 1. WAP standardized curriculum—building assessment, house as a system

WAP’s standardized curriculum is the backbone of material from which trainers and agencies work to convey information in multiple modes—telling, showing, and doing. Using this blended approach—introducing concepts and information in the classroom, having concepts demonstrated by an instructor or technician, and having students perform tasks—reinforces the information through multiple modes of learning. Because many weatherization workers learn by doing, this multipronged approach is key to effectively conveying the message (Neal 2011). At the Bergen County Community Action Program facility in Hackensack, New Jersey, instructors hold lectures in the morning, when people are most alert. Afternoon training includes watching demonstrations and doing hands-on exercises. Trainers understand that this may be the first time that participants have been in a classroom since high school and use active learning techniques to maintain students’ interest (Neal 2011).

Considering the assessment questions established for this research, WAP curricula appear to effectively address the needs of adult learners both in its overall structure and in specific lessons:

- **Need to know.** The curricula are based on WAP’s core competencies, so the content correlates directly to the information weatherization workers need to know.
- **Self-direction.** Although WAP classroom training is very structured, the online resources (www.waptac.org) allow for self-direction. The curricula accommodate different learning styles by providing resources that are visual and auditory (narrated electronic slideshow presentations) and kinesthetic (hands-on instruction in the classroom and the field).
- **Experience.** The weatherization worker’s level of experience varies , from installer-technicians to energy auditors to crew chiefs. WAP classroom training provides the opportunity for attendees’ experience to be brought into the classroom through

discussion. Whether this is done or not depends on the skill of the instructor, but those interviewed for this report make a point to incorporate applicable experiential input from trainees. The information is also presented through experiential learning techniques that resonate with kinesthetic learners.

- **Applicability/technical merit.** WAP curricula are typically divided into concepts (e.g., house as a system, energy movement) or tasks (e.g., conducting an exterior visual assessment of a dwelling, running a blower door test). Each concept applies directly to weatherization tasks or provides a conceptual context. WAP has been around since 1976 and, as such, the technical merit of its material is well proven. On the program’s “Meet Our Experts” page (www.waptac.org), users can view the extensive experience of the professionals guiding the program.
- **Motivation.** WAP training has a clearly defined hierarchy through which trainees can rise with further training.

Online resources to reinforce in-person training are embraced by WAP. Weatherization TV (WxTV), WAP’s online weatherization training program, provides what it calls “entertainment-based learning” (WxTV 2011). The show was developed in 2010 by the Montana Weatherization Training Center, which is part of Montana State University’s Extension Housing and Environmental Health program.

WxTV episodes are typically 12–15 minutes long and are filmed throughout the United States. WxTV’s strategy is typically to dive deep into a subject and then to back out. This strategy shows viewers where they are ultimately headed right from the beginning. WxTV makes a concerted effort to strike a balance between providing useful technical information and keeping it entertaining. Episodes range from general to advanced, and the program uses a combination of field footage, two-dimensional and three-dimensional graphics, and animation. Content is primarily technical how-to information. Much of the field footage in the episodes comes from weatherization crews around the country who perform the work and shoot the footage. WxTV ships the camera to the local weatherization agency, and the local crew documents the work. The informal approach allows the workers to be comfortable in front of the camera. Further, because the camera person is one of the crew, he or she realizes what weatherization workers need to see and focuses the camera on critical details (Cusomato 2011).

WxTV breaks large subjects into smaller pieces to limit episode length and to allow content to be dealt with comprehensively. For example, Blower Door Basics is addressed over a series of three episodes: Part 1 – Prep & Setup; Part 2 – The Test Process; and Part 3 – The Breakdown.

Part 1 – Prep & Setup (see Figure 1) systematically documents the process for preparing for the blower door test. It demonstrates how to calculate a home’s volume, verify that all combustion appliances are off, note where leakage may be anticipated, and outlines other procedures that need to be followed to prepare the blower door test.



**Figure 2. WxTV, Blower Door Basics, Part 1 –
Prep & Setup**

Part 2 – The Test Process (see Figure 3) features Anthony Cox, a weatherization trainer. He begins by discussing building science basics and the training tool he uses, the Tell Tale House. Then he demonstrates a typical test procedure for a manual blower door test and describes the troubleshooting that takes place during the test. The video also shows how to feel for air leaks and use a smoke pencil while the house is depressurized. It is evident that some content in the episodes benefits from the video format over static images and written information, particularly when the concepts regarding the building science behind blower door testing and the associated energy efficiency impacts of infiltration are related.



**Figure 3. WxTV's Blower Door Basics, Part 2 –
The Test Process**

Part 3 – The Breakdown (see Figure 4 and Figure 5) uses animation to illustrate depressurization of a home during a blower door test. Being able to peel away layers of the home to show potential leakage paths helps convey the issue of infiltration very clearly. Part 3 also demonstrates how to calculate air changes per hour at 50 Pascals (ACH50) and natural air changes per hour.



Figure 4. WxTV, Blower Door Basics: Part 3 – The Breakdown

WxTV’s Blower Door Basics series holds up well to the assessment criteria outlined in Section 1.

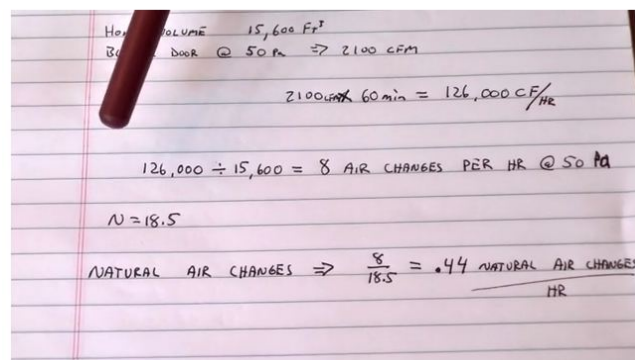


Figure 5. WxTV, Blower Door Basics: Part 3 – The Breakdown

- **Need to know.** From the outset, it is clear to the learner what information will be provided and why it is needed. In this case, the Blower Door Basics: Part 1 summary states that the pretest inspection, preparation of the home and setup of the blower door is covered. Summaries of Parts 2 and 3 are as detailed as Part 1’s and focus on the kind of task-oriented information a weatherization worker seeks. In the future, WxTV will provide learning objectives for each video. For each episode, the learning objectives will outline the “need to know basics.” WxTV’s content also provides information that solves a specific problem or applies to a specific task.
- **Self-direction.** WxTV episodes allow the viewer’s learning to be self-directed and trainees can move through the content at their own pace and in any order. The videos address visual and auditory learning styles. Again referring to the Blower Door Basics series, all tasks are demonstrated and narrated in detail and important points are presented

as bulleted text. There is not much opportunity for kinesthetic learning through WxTV. A clear example of how WxTV and WAP standardized curricula complement each other is evident in the blower door testing task. On WxTV, the presenter shows how to do the necessary math to interpret the testing results, as shown in Figure 5. The slides in Figure 6 and Figure 7 show how that same calculation is presented in the WAP curricula. Each step in the calculation is clearly noted, and the slide presentation can be printed for later reference.

- **Experience.** Viewer’s experience cannot be incorporated into the video content, but the site now has a blog feature where viewers can comment on episodes. In this way, discussions with other viewers about experience related to the video can ensue.
- **Applicability/technical merit.** Similar to the need to know criterion, the WxTV episodes are task specific and provide detailed guidance on weatherization work. The host’s credentials as a weatherization training and engineer and his expertise in demonstrating tasks and explaining concepts lends technical merit to the information. Episodes also feature other recognized experts and footage of weatherization work crews. As such viewers can trust that the content is accurate.
- **Motivation.** Much like the WAP curriculum itself, the WxTV episodes are designed to help people do their jobs better or learn new skills to move up the weatherization workforce ladder. Inherent to the program and structure is the outward incentive to learn the content.

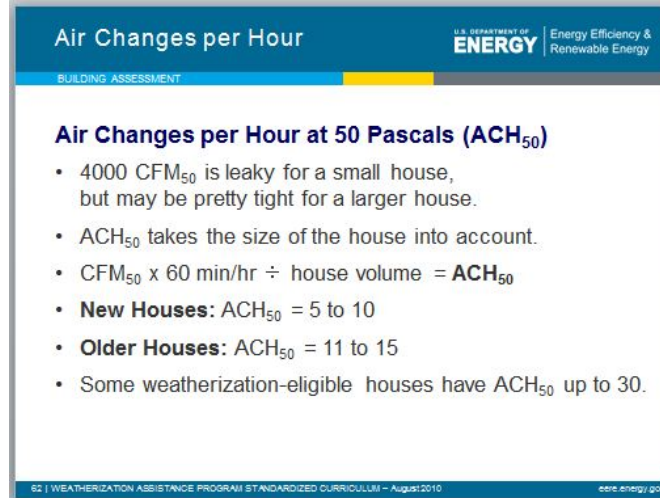


Figure 6. WAP standard curricula—building assessment

CFM₅₀ vs CFM_{natural}

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

BUILDING ASSESSMENT

- **CFM₅₀** = Air leakage with blower door
- **CFM_{natural}** = Natural (every day) air leakage
- **CFM₅₀ / “n” factor** = CFM_{natural}
- **n factor** depends on climate, building height, and shielding from wind; assumes random holes
- **n** ranges from 9.8 to 29.4, but typically averages 20
- *Example:* 4000 CFM₅₀ / 20 = 200 CFM_{natural}

60 | WEATHERIZATION ASSISTANCE PROGRAM STANDARDIZED CURRICULUM - August 2010 eere.energy.gov

Figure 7. WAP standard curricula—building assessment

The WAP and WxTV provide a strong example of effective communication to the remodeling industry.

3.2.2 Home Performance with ENERGY STAR

The HPwES program is active in 31 states. The majority of HPwES programs are sponsored by one or more utilities and administered by the utilities themselves or an overarching entity that administers the program for multiple utilities. A detailed breakdown of program administration by state is included in Appendix A. Most HPwES programs require contractors who participate to have BPI certification as a Building Analyst and Building Envelope Specialist (Schrader, 2011). Training is not required to earn this credential, but most BPI certified professionals do participate in BPI approved training as preparation for the certification exams. BPI approved training is provided by 27 training affiliates. There is also BPI approved continuing education provided by training affiliates and other organizations that have BPI approved coursework. As shown in Table 1, the majority of affiliates offer a combination of classroom and in-field training. A select few also offer online training and two offer online content exclusively.

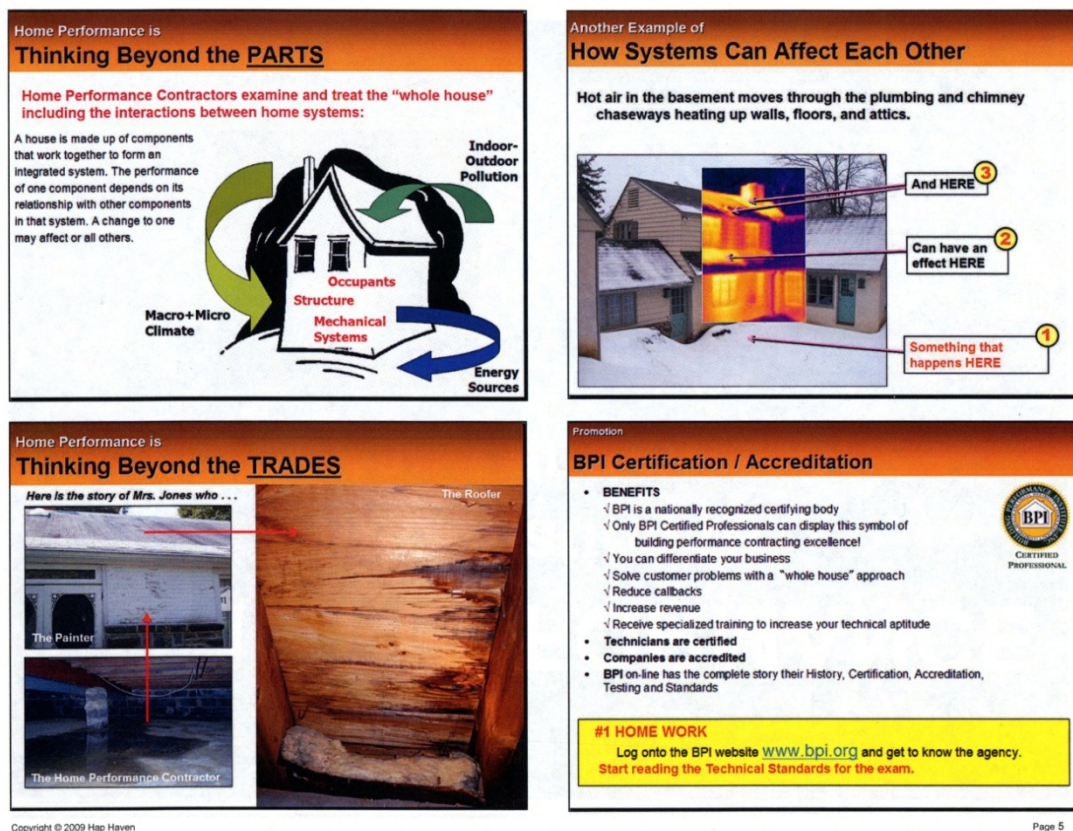
Table 1. Training Practices by BPI Affiliates
(distilled from content on the BPI website, www.bpi.org)

Organization	Training Summary of BPI Certification Courses					
	Classroom	Field	Laboratory	Webinar	Prerecorded Online	Other
411 Energy Experts	✓	✓				
Academy for Energy Efficiency Training	✓	✓			✓	✓
Apple Blossom Energy	✓		✓			
Association for Energy Affordability	✓	✓				
Building Performance Engineering	✓	✓				
Cape Fear Green Building Alliance	✓	✓			✓	
CEEBS: Association for Energy Affordability	✓	✓				
CleanEdison	✓	✓				
ECA Building Analyst Training	✓	✓	✓			
Energy Audits Unlimited	✓	✓				
Energy Conservation Group	✓	✓				
Energy Conservation Training Company	✓	✓				
EnergyScore	✓	✓				
Everblue	✓	✓		✓		
Fond du Lac Tribal and Community College	✓	✓				
Green Dream Group Building Performance Workshop	✓	✓				
Home Energy Team Institute					✓	
Home Star Iowa Building Analyst Training	✓	✓				
NorthWest Arkansas Community College	✓	✓				
NYSWDA – Building Analyst	✓	✓	✓			
Pitt Community College Building Analyst Training	✓	✓				
Priority Energy	✓	✓				
Rolla Cornerstone LLC Building Analyst	✓	✓				
Saturn Resource Management					✓	
SENCON Building Analyst Training	✓	✓				
Aouthface BPI Building Analyst Professional Training	✓	✓				
Sustainable Resources Center Building Analyst Training	✓					
Totals	25	23	3	1	4	1

While the trainings vary among BPI affiliates, the curriculum is aligned with BPI’s comprehensive standards for home performance professionals (Building Performance Institute, 2010) and often use “*Residential Energy: Cost Savings and Comfort for Existing Buildings*” (Kriger & Dorsi, 2009) for the course textbook.

Typically, classroom instruction is focused on PowerPoint-driven lectures that are also provided as print documents for attendees to take notes. The lectures are usually visually rich with image-heavy content. This approach allows for an audience that is largely oriented toward physical work and days on the jobsite to receive information that is illustrated rather than written. Text is used, but the majority of information is in graphic or photographic form. Classroom training appears to be similar to WAP classroom training, except at a much more accelerated pace. BPI trainings are designed for working contractors and individuals who are making a career change. Providers limit the length of training to several days to accommodate working contractors’ schedules. An informal discussion with several industry members suggests that the pace of coursework is often too fast for individuals coming from other fields (Kenny 2011).

Figure 8 shows example slides from a BPI certification training that demonstrate the graphic approach to conveying building science concepts.



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Page 5

Figure 8. BPI trainer’s slides on home performance
(Copyright 2009 US Green Home. Reprinted with permission.)

Field training typically involves demonstration of combustion safety testing, blower door testing, and other auditing tasks. Trainees typically assist with testing or perform the tasks. The intent of the hands-on demonstrations is to reinforce the classroom teachings and allow individuals to learn by doing.

Online training for BPI certification is offered either as prerecorded lessons or live webinars. One of the two BPI training affiliates that offer online courses exclusively uses a combination of recorded classroom training, recorded field work, slideshow presentations, reading resources, and detailed text (Theriault 2011).

One affiliate uses Intercaz, a game-based approach to combustion safety testing, as part of its training (see Figure 9).

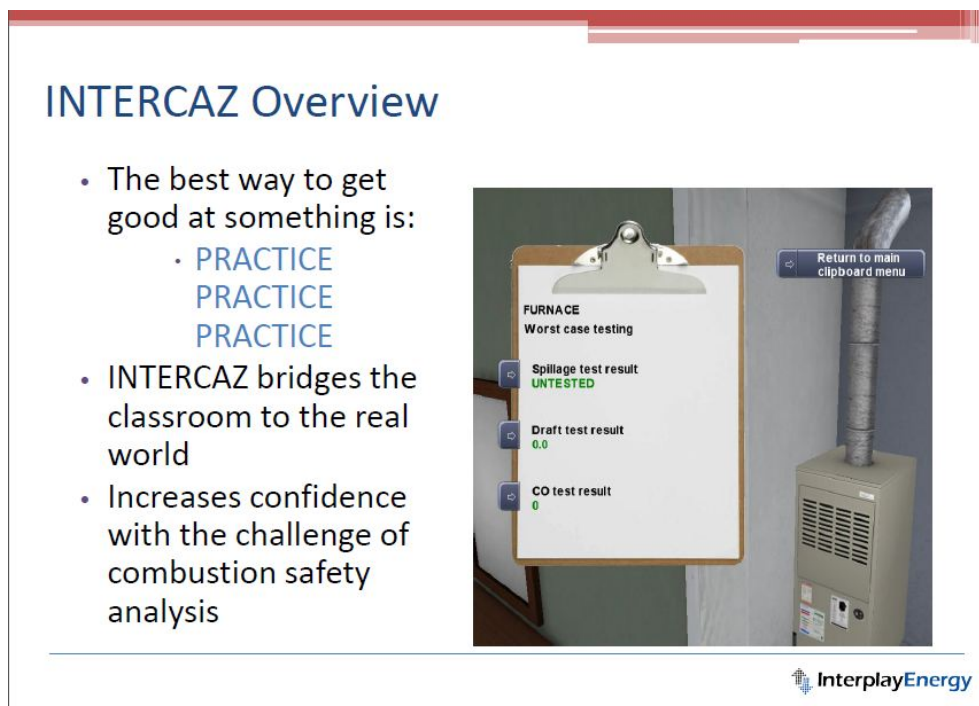


Figure 9. Intercaz overview slide

(Quirk 2011)

Since the majority of BPI training affiliates offer slide-driven classroom presentations followed by field instruction, BARA analyzed a representative training offered by GreenHomes USA against the assessment criteria.

- **Need to know.** In HPwES, like WAP, the incentive for learning is integral to the program. To become BPI certified, students must pass exams for which the trainings help prepare them. In most locations, BPI certification is required to work as an HPwES contractor. Beyond needing to know the information in order to pass written and field exams, HPwES contractors need to learn how to execute auditing tasks, such as combustion safety testing and blower door testing, to perform their jobs.

- **Self-direction.** Traditional HPwES training, like WAP training, accommodates auditory, visual, and kinesthetic learning styles. Online training offers limited kinesthetic learning opportunity, although the Intercas training attempts to replicate kinesthetic learning to some degree. What Intercas and other online trainings offer more readily than classroom and field training is the option for users to move at their own pace, in their own desired sequence.
- **Experience.** Classroom trainings can provide the opportunity for the experience of attendees to be incorporated into the teachings. Prerecorded online trainings do not have that capacity. Live, streamed trainings allow for classroom participation and discussion and the chance for participant experience to be shared.
- **Applicability/technical merit.** BPI training materials reviewed for this research show specific instruction on auditing tasks and energy efficiency measure tasks. There is some time spent on building science concepts and health and safety to provide a context for the more specific instruction. The technical merit of the training material stands on the BPI standards and the reference documents and industry experts that created the standards.
- **Motivation.** Again, there is a parallel between HPwES and WAP with regard to the motivation to learn. In both programs, the students’ “need to know” is directly linked to the motivation. These trainings allow individuals to understand and execute the tasks needed for HPwES participation.

3.2.3 Professional Remodeler and Remodeling Magazine

These magazines appear to take a similar approach to building science and energy efficiency content in their print format. They provide general information about concepts and strategies.

Professional Remodeler’s one-page column, called “Building Science,” typically addresses an overall concept such as ventilation or moisture management. As can be seen in Figure 10, the graphics do not provide specific instruction, but illustrate an overall concept.

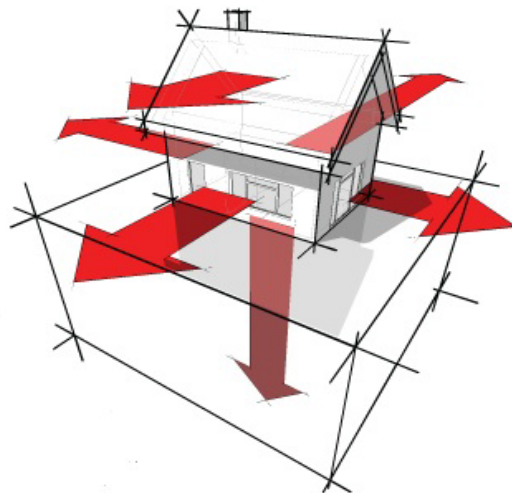


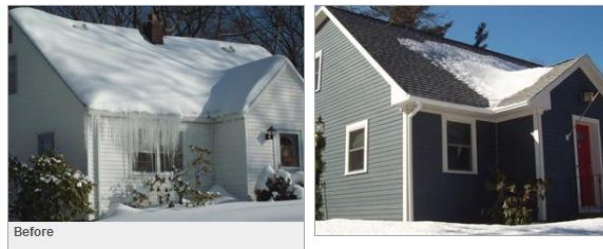
Figure 10. Professional Remodeler illustration, “Do houses need to breathe?”

The magazine targets this column to the average remodeler and strives to avoid being overly technical. It also wants to be sure that the information presented is directly applicable to work that remodelers are engaged in. In response to readers' who want more building science coverage, *Professional Remodeler* began having a regular article from the Energy and Environmental Building Alliance (EEBA) in every issue since April 2012 (Sweet, 2012).

Remodeling Magazine typically features a real project to cover building science and energy efficiency issues. A recent feature in the June 2012 *Remodeling Magazine*, "Deep Energy Retrofits, Laying it on Thick (and Tight) for a High Performance Shell," provides a fairly detailed description of the materials and strategies used for the retrofit, as well as the rebates and costs involved.

As shown in Figure 11, the images from the article provide a dramatic example of the home's improved performance after the renovation and a photo of the rigid foam installation.

Ending Ice Dams



Synergy Companies Construction extended the rakes and eaves of the new roof past the horizontal plane of the sidewalls to even out the temperature across the roof surface and to eliminate the formation of ice dam at the gutter line — and potential moisture problems. "Clients are always amazed as they look around at their neighbors' ice dams and realize they no longer have to deal with this issue," Bergeron says.

Layered Approach



Figure 11. Remodeling Magazine deep energy retrofit article
 (photo by Synergy Construction, LLC [Binsaca 2011])

Remodeling Magazine also has a monthly section called, "Home Performance." In the print version of the magazine, the section contains brief pieces on issues pertinent to the home

performance contractor industry. On the website, more detailed information on stimulus tax credits, green awards and competitions, green products, standards, and remodeling is covered.

According to one of the magazine's feature writers, the goal is to boost professionalism among remodelers and to highlight business opportunities. The editors recognize that there are vast resources for obtaining information on building science and energy efficiency, so, instead of focusing on technical issues, it highlights professional opportunities that can come from putting building science knowledge into practice. To this end, the magazine features projects by remodelers that have successful businesses doing energy retrofit work (Binsaca, 2012).

More detailed information on building science and energy issues is available on the related Remodeling TV section of the magazine's website. Remodeling TV provides how-to videos and information on products and green design (see Figure 12). For example, Green Review on Windows is a five minute video that follows two green building experts from the magazine around a builder's show discussing window products. The discussion is general, but it does touch on the U factor of the windows and skylights. The how-to section offers videos that instruct viewers how to execute various construction details. A Thermal Bridging video illustrates construction details to reduce thermal bridges and demonstrates how to build them. The videos complement the magazine site by providing more depth and a broader range of energy efficiency and building science content.



Figure 12. Remodeling TV video on thermal bridging
(Hanley Wood 2011)

- **Need to know.** *Professional Remodeler* chooses building science topics that are currently relevant, such as “Do Houses Need to Breathe?” and “Moisture Management in Remodeling Projects.” There is a strong message in these titles that contractors need to know this information. *Remodeling Magazine* is less successful at demonstrating the need to know. Its articles typically use a project to discuss the subject and project costs but a pressing need to know is less clear. The Remodeling TV content is narrower in scope, covering specific aspects of energy efficiency and discussing what can go wrong if the guidance is not followed. It dovetails well with the magazine, but a direct link between the video content and projects in the magazine would more strongly reinforce both.
- **Self-direction.** All these sources allow for self pacing and self-direction. The magazines accommodate visual learners exclusively, while Remodeling TV addresses both visual and auditory learning.
- **Experience.** Static resources like print versions of magazines don’t incorporate direct reader experience. Online versions allow for comments on articles and for content to be shared via social networking sites.
- **Applicability/technical merit.** *Professional Remodeler* tailors its building science article to a specific task or problem; *Remodeling Magazine*’s energy efficiency focused articles are not specific to a task, although Remodeling TV serves that purpose. Professional Remodeler’s building science content comes from EEBA experts., so readers can have confidence in the technical merit of the articles (Sweet 2012). Remodeling TV uses presenters that are either experienced contractors themselves or recognized experts from the magazine.
- **Motivation.** Both *Professional Remodeler* and *Remodeling Magazine* emphasize the business aspect of remodeling, as such the motivation to pick up the magazine is for sustaining and potentially growing a business. Building science and energy efficiency are incorporated to serve that end and are presented as business opportunities.

3.2.4 Fine Homebuilding

Fine Homebuilding uses an approach called surf/snorkel/dive (Morrison 2011) to allow readers to engage at a level they are comfortable with and go deeper as interest and time allows. The magazine addresses energy efficiency and building science consistently in every issue. This content is augmented by material on the magazine’s website. Figure 13 shows the type of detailed information and quality of illustration that is typical of the magazine. The online version has videos and blogs.

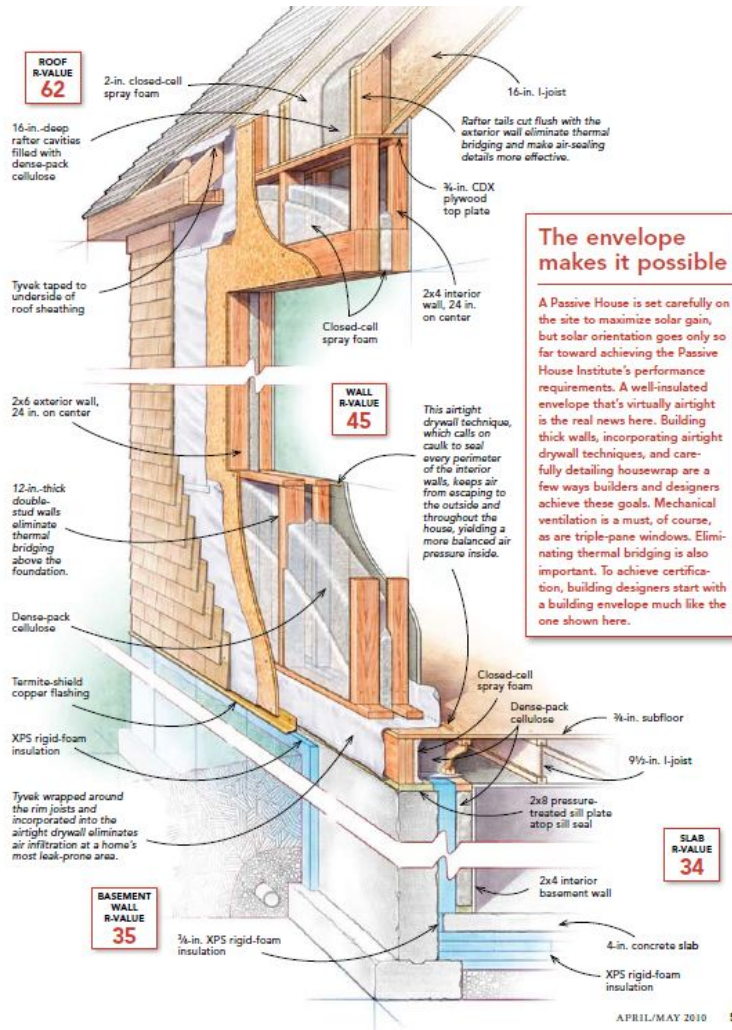


Figure 13. Fine Homebuilding passive house illustration (Kolle 2010)

- **Need to know.** *Fine Homebuilding* does a good job of conveying the importance of an article’s information without being alarmist. A scan of article titles shows examples like “Stormproof your Roof” and “It’s Time to Switch to Cap Fasteners.” Videos titles are more straightforward and clearly state what you’ll see: “Air Sealing a Soffit or Chase,” and “Making Basic PEX Connections” (Fine Homebuilding, 2012).
- **Self-direction.** Self-direction is accommodated by the print and Web resources. As with the other print material discussed, visual learners are accommodated while the Web resources incorporate visual and auditory learning.
- **Experience.** *Fine Homebuilding* has a multipage “Letters” section at the beginning of every issue. Letters often feature a reader’s spirited opinion about an article based on personal experience. The content is valuable and sometimes warrants a response from the author or magazine editor. The website has a section for forums, Break Time, that allows active discussions among users. Many subjects have had thousands of posts.
- **Applicability/technical merit.** Technical merit and applicability is a particular strength of *Fine Homebuilding*. The content is usually very task-specific. Contributing writers are not journalists; they are builders and designers writing from experience. This experience is important for the magazine’s readership, of which about half are professionals in the building industry and half are do-it-yourselfers (Taunton Publishing 2009).
- **Motivation.** Being able to do things well appears to be the implied motivation of content in *Fine Homebuilding*, as evinced by the publication name. Doing something well is considered an internal motivator and is a potentially stronger driver of behavior than external motivators, such as making money (Fidishun 2000). In the case of Fine Homebuilding’s readers, taking pride in one’s work and knowing that what you’re building will last are prime motivators.

3.2.5 Green Building Advisor

The *Green Building Advisor* website (www.greenbuildingadvisor.com) (see Figure 14) uses a combination of blogs, forums, downloadable construction details, instructional videos, animated graphics, and in-depth articles about energy efficiency and building science.

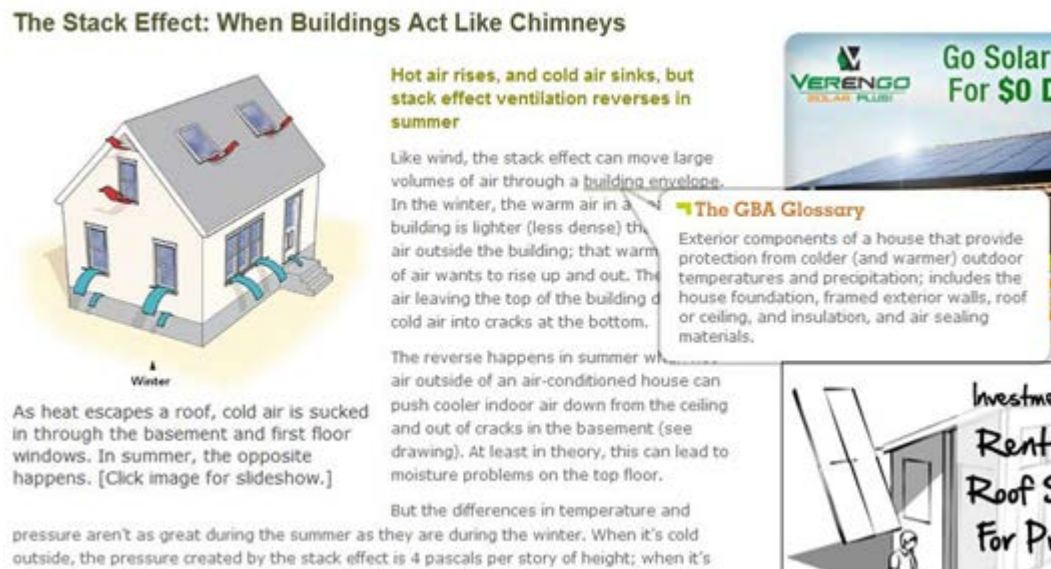


Figure 14. Green Building Advisor article on stack effect showing example pop-up glossary entry (Morrison 2011)

While the site offers basic information about green construction practices, most of the content is geared toward experienced industry members. The site's forum allows readers to comment on articles and receive comments from the author and other readers. Comments often relate field experiences and can make the content more compelling for readers. Learning about energy efficiency techniques from a green building site is expected; learning from a builder with firsthand experience may resonate more deeply with the audience.

- **Need to know.** Like *Fine Homebuilding*, *Green Building Advisor* blogs and videos are named to convey the content's importance, such as "Can Spray Foam Rot Your Roof?" that compel readers to review the content.
- **Self-direction.** As a website, information obtained from *Green Building Advisor* is completely driven by the user; there is no prepackaged issue or collection of articles. The only structure is the tabbing at the top of the page. For readers that are accustomed to print resources, it may be disorienting. The multimedia format of the site is well suited to auditory and visual learners.
- **Experience.** *Green Building Advisor* blogs typically elicit many comments and lively discussions with the author and among commenters. The experience of the participants is captured well by this site.
- **Applicability/technical merit.** *Green Building Advisor* content is task specific and contributors are recognized experts in the industry.
- **Motivation.** Motivation to learn varies across different areas of the *Green Building Advisor* site. For example, the "Business Advisor" blog addresses financial motivation, selling green, increasing website traffic, and giving employee bonuses. Other blogs focus on building and concept rather than business issues. Energy and building

science information is often cast as a way to avoid problems. For example, a recent popular posting on the site was titled, “What’s Wrong with This Insulation Job?” (Hammon 2012).

3.3 Assessment Summary

Table 2 summarizes the programs and assesses their information based on the criteria outlined in Section 1.

Table 2. Assessment Results Summary

Program/Media	Assessment Results Summary				
	Need To Know	Self-Direction/ Learning Style	Experience	Applicable Technical Merit	Motivation
HPwES Using BPI Professionals	Yes For BPI certification	Somewhat Classroom is structured; Web resources are self- directed. All learning styles accommodated	Yes Incorporated into live training	Yes Task specific, based on BPI standards and uses industry experts	Yes To work in the HPwES program.
WAP	Yes Clearly stated	Somewhat more structured than self-directed All learning styles accommodated	Yes Incorporated into live training	Yes Task specific, uses weatherization experts	Yes To advance in WAP program and do job well
WxTV	Yes Clearly stated	Yes Self-directed Addresses visual and auditory learning	Yes Episode blogs highlight experience of viewers	Yes Task specific Uses weatherization experts	Yes To advance in WAP program and do job well
Professional Remodeler	Yes Clearly stated	Yes Self-directed All but kinesthetic learning is accommodated	Somewhat Not in print. Online version allows for comments and social networking	Yes Issue specific, uses industry experts	Somewhat The business advantage of understanding building science is implied but not explicit

Program/Media	Assessment Results Summary				
	Need To Know	Self-Direction/ Learning Style	Experience	Applicable Technical Merit	Motivation
<i>Remodeling Magazine and Remodeling TV</i>	Somewhat Magazine is less specific, <i>Remodeling TV</i> makes need to know clear	Self-directed All but kinesthetic learning is accommodated	Somewhat Not in print. online version allows for comments and social networking	Somewhat Not issue specific but industry experts are used	Yes Successful business doing high performance projects are highlighted
<i>Fine Home Building Magazine and Website</i>	Yes Clearly stated	Yes Self-directed All but kinesthetic learning is accommodated	Somewhat Not in print. Online version allows for comments and social networking	Yes Task specific, uses industry experts	Yes Doing the job well
<i>Green Building Advisor Website</i>	Yes Clearly Stated	Yes Self-directed All but kinesthetic learning is accommodated	Yes Through blog and comments	Yes Task specific. uses industry experts	Yes Selling green and doing a job well are addressed

3.4 Applicability to Building America

These programs and publications have transferable strategies that can inform the way Building America communicates its content. HPwES and WAP have the advantage of offering in-person training, augmented by electronic resources. The publications and media each have their own strengths, with *Professional Remodeler* and *Remodeling Magazine* primarily addressing the business of remodeling, and *Fine Homebuilding* and *Green Building Advisor* involved in the knowledge and craft of building. The transferable strategies from each are folded into Section 4.

3.5 Remodeler Evaluation

To gain an understanding of what remodelers find effective when receiving information on building science and energy efficiency, a survey was created and sent to members of the remodeling industry. The evaluation was sent to *Remodeler Magazine* subscribers, members of Home Energy Pros, and members of the National Association of the Remodeling Industry (NARI). Home Energy Pros is a “digital community” for home performance contractors and related individuals (Home Energy Pros, 2011). The tool was used to determine where remodelers prefer to get information about energy efficiency and building science as well as to determine what types of communications remodelers find most effective. During the two months the survey tool was open, 721 remodelers participated with a total of 497 completed evaluations.

Figure 15 depicts response to a query about what types of media formats were most useful for different types of energy efficiency information. Sixty remodelers responded to the question.

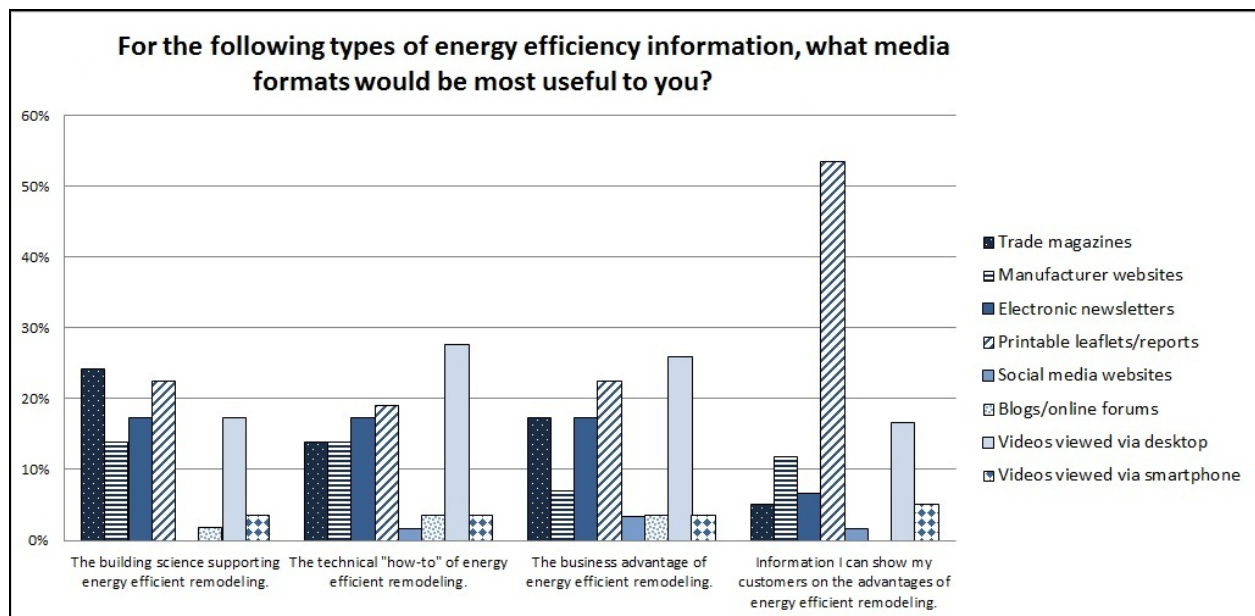


Figure 15. Remodeler survey results, useful media formats

- Remodelers found trade magazines (24.1%) and printable leaflets/reports (22.4%) to be most useful for obtaining building science information that supports energy efficient remodeling. Social media, blogs/online forums, and videos viewed via smartphone were all low scoring selections for building science information.
- Videos viewed via desktop computer came in as the top choice (27.6%) for obtaining technical “how-to” information on energy efficient remodeling.

- Videos viewed via desktop also came in as the top choice (25.9%) for getting information regarding the business advantage of energy efficient remodeling.
- Printable leaflets/reports (53.9%) were selected as most useful for information that can be shown to customers illustrating the advantages of energy efficient remodeling, with videos viewed via desktop a distant second (16.7%).

As shown in Figure 16, remodelers were asked to rate nine types of media in terms of value to them. Answers were scaled from 1 (not valued) to 5 (highly valued).

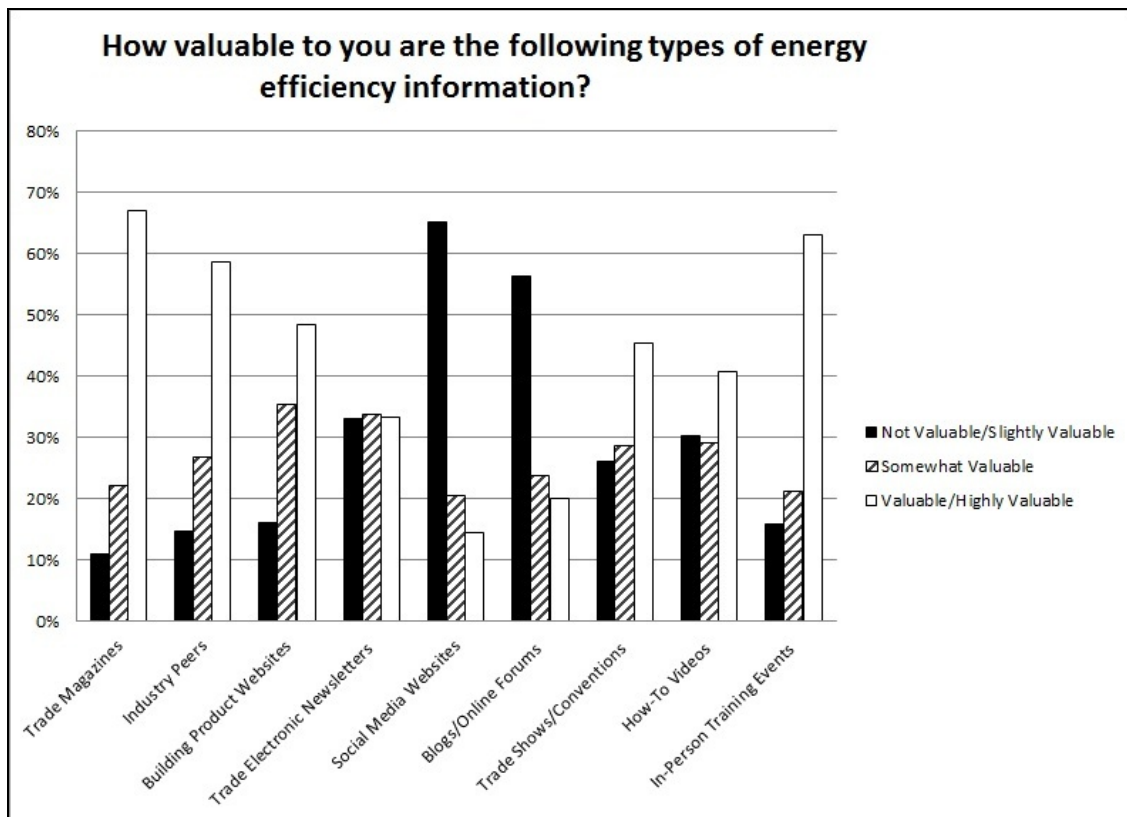


Figure 16. Remodeler survey results, valued media formats

- Trade magazines were cited most often as valuable or highly valuable (by 67% of respondents).
- In-person training events were valuable or highly valuable to 63% of respondents.
- Industry peers were valuable or highly valuable for 59%.
- Manufacturer websites were valuable or highly valuable for 48%.
- Trade shows were valuable or highly valuable for 45%.
- How-to videos were valuable or highly valuable for 41%.
- Social media and blogs ranked lowest in value—they were rated valuable or highly valuable by 15% to 20% of respondents.

- Social media and blogs ranked lowest in value—they were rated valuable or highly valuable by 15% to 20% of respondents.
- Social media and blogs were viewed as not valuable or slightly valuable by more than half of the respondents.

Electronic newsletters spanned the rankings, with 33% ranking them as not valuable or slightly valuable; 34% ranking them as somewhat valuable and 33% finding them valuable or highly valuable.

Finally, as shown in Figure 17, respondents were asked to watch a short informational video on duct sealing and rate the effectiveness of the content. (The video can be viewed at http://www.youtube.com/embed/N_xdI1RV92o.) There were 486 respondents to this question.

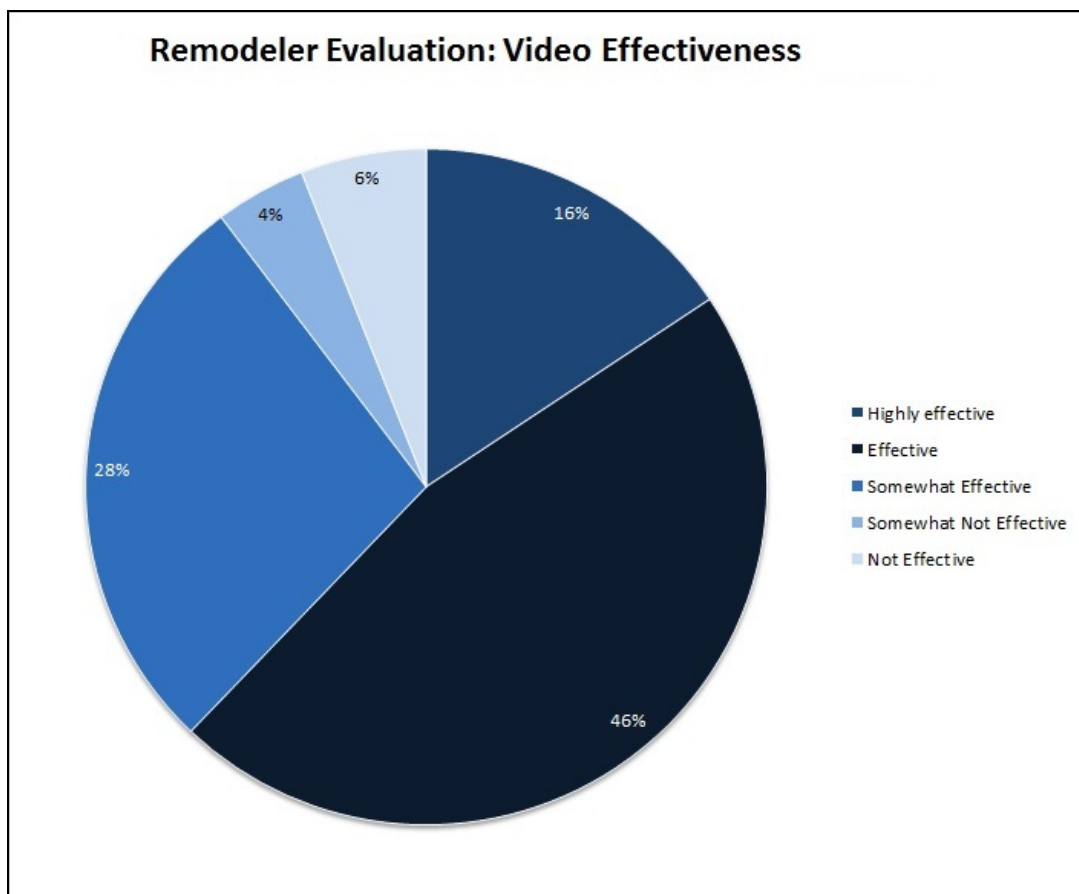


Figure 17. Remodeler survey results on effectiveness of how-to videos

Over half of the respondents (62.1%) thought the video was effective or highly effective. Only 6% thought it was not effective.

Respondents to this question were then asked how the video could more effectively communicate the content. Themes among the response were to explain why the duct was being sealed, to include more close ups or other visual enhancements, and state the specific product being used.

The results of the remodelers' scan suggest:

- There is not an overwhelming preference for a particular media format for a given type of energy information. This agrees with the finding of the BARA Expert Meeting (BARA 2011), which stated that content overrides format. There was one exception in the remodeler's scan, which was that printable information was the clear preference for material to be shared with customers.
- Traditional types of energy efficiency information are more highly valued by remodelers, including: trade magazines, colleagues, and in-person training events. Social media is not currently being embraced.
- Video can be effective for communicating how-to technical training but quality is important. Viewers need to be able to clearly see what is being done.

3.6 In-Field Case Study

BARA team member CBK at the New Jersey Institute of Technology is conducting a research study, *Re-Side Tight, Ventilate Right* (Liaukus 2011). As part of this study, four experienced siding contractors were shown how to install weather resistant barriers (WRB) as intact air barriers. This called for using installation details that are very different from a typical WRB installation. The WRB had to be sealed to the home at the bottom of the sheathing (or existing siding if the siding wasn't being removed) and at the top of the sheathing or siding. All joints in the weather resistant barrier had to be taped. And finally, at all window and door openings, self adhered flashing had to be installed to create a continuous air barrier between the window frame and the WRB. The typical installation by all four contractors did not include taping seams, sealing at the top and bottom of the sheathing, or using self adhered flashing at windows and doors.

While printed material about product installation and the building science supporting the material's use were made available to the contractors, their clear preference was on-site instruction. This was done by industry representatives over the course of several days. On-site instruction allowed the contractors to receive guidance and instantaneous feedback. This process gave contractors the opportunity to make corrections on their technique as needed. One industry representative demonstrated the installation instead of describing it. Her instruction was the most closely followed and quickly absorbed by the contractors.

The explanation of the air barrier's benefit was also most effective when related in person, on several occasions, and in different ways. Blower door test results conducted before and after air barrier installation conveyed the advantages and importance of the air barrier most effectively (see Figure 18). The test results transformed the issue of infiltration from a concept to an observable, improvable aspect of the building envelope.



Figure 18. CBK WRB study air sealing demonstration

The CBK study provided a clear “need to know”; to participate in the study, contractors had to know how to install the WRB properly. Their preference for in-field instruction is not surprising because it most easily accommodates the three learning styles. This preference agrees with the results of the remodeler survey question regarding valued media formats (Figure 17). In-field instruction also allows for unanticipated questions and circumstances to be handled. When working on existing buildings, there are inevitably unforeseen existing conditions.

The experience level of each contractor was taken into account during the in-field instruction, and their tips and techniques were incorporated into the lessons. Often their experience was a hindrance to installing the WRB properly because they were not accustomed to airtight detailing. The instruction was immediately applicable to the work at hand, but there was significant pushback on the technical merit of the approach. Contractors were used to installing house wrap a certain way, and when they were asked to do it differently, it was questioned often and, at times, forcefully, particularly when the specified installation required additional labor.

The CBK study clearly showed that in-person technical training is important when unfamiliar techniques and strategies that are counter to common residential construction practice are introduced. The CBK study attempted to use the motivation of doing a job well as the main enticement for contractors to learn the new way of installing a WRB. Ultimately, contractors were paid an honorarium to do the work as specified. In fairness to the participants, doing the work as specified took more time than they had anticipated.

4 Suggestions for Building America Communications

Although the research touches on a very small fraction of the industry, consistent patterns that emerged throughout the study allow suggestions for the effective communication of Building America research to be made.

- Accommodate different learning styles
 - Auditory learners. The Building America website does not offer content that is geared toward auditory learners. Virtually all the resources are pdf documents. Individual teams do have some video, but there are no direct links to that content on the Building America site. While turning all the pdf documents on the Building America site into video may prove too costly, selecting concepts or strategies that are particularly challenging to convey in print and interpreting those as video could limit the scope of the effort.

Additionally, content that is most often selected by site visitors could be repackaged as narrated slideshow presentations at a relatively low cost. For example, currently topping the site's most popular downloads is "Building America Best Practices Series Volume 14 – HVAC: A Guide for Contractors to Share with Homeowners." This document could serve as the source material for a narrated slide presentation broken down by subject. For example, the section on furnaces is about five pages long, with roughly 1,700 words and five images. Used as a script, the text would equate to about 13 minutes of narrated video.² If we estimate about one to two minutes per slide, more images may be needed for the presentation, but the majority of the content is already in place. Building America could also establish a slide presentation template and ask content providers to submit materials as slides with speaker notes in addition to the written reports, making the material narration-ready.

- Visual learners. Printable reports were considered highly effective for building science content in our remodelers scan. Hanley Wood (2010) and PD&R (2004) conclude that paper-based sources are highly useful to builders and remodelers. While the static documents on the Building America site may already meet visual learners' needs, the site itself is very text heavy as are the documents. More images could increase the accessibility of the content.
- Kinesthetic learners. It was clear from the practices of the WAP program, HPwES, the remodelers scan, and the CBK study, that in-person communication and training is most effective when teaching technical how-to information. This would be difficult for Building America to accommodate on its own. However, if Building America were to design some of its content as task-centered training, it could be offered as continuing education components for HPwES contractors and/or WAP workers. While this would require additional effort for the program,

² One hundred thirty words per minute is a recommended pace for narration of instructional material (DeKorne, 2011).

this approach has the advantage of allowing Building America information to reach a well-established network of trainers and contractors.

- Experience
 - Building America could harness the richness of experience among the remodelers that use its content by having a forum feature on the Building America site. There are already many other places remodelers can go for this type of exchange, but Building America may have the unique appeal of being unbiased. Users won't see an advertisement for insulation when reading forum postings about cellulose, for example.

The other approach might be to have a Building America section on the Home Energy Pros website (<http://homeenergypros.lbl.gov/>). New content from Building America could be posted regularly and readers could discuss it through comments. WxTV could be another possible strategic partner for Building America. During the research for this report, the WxTV director suggested that WxTV do an episode on the Building America program. As such there may be an opportunity to provide Building America content to the show on a regular basis.

- Applicability/technical merit
 - Building America documents need to convey what problem they are solving from the outset. As we've seen from the magazines and websites included in this research, articles such as *Green Building Advisor's* "Can Spray Foam Rot Your Roof?" not only draw in the reader but they also clearly define the problem they are solving. If the "Building America Best Practices Series Volume 14 – HVAC: A Guide for Contractors to Share with Homeowners" is again looked to as an example document, specific issues in the document can be stand alone posts or articles, such as "Should You Repair or Replace Your Furnace?" from Section 2.1.2 in the report. This finer grain indexing of Building America research would also help make the documents more search-friendly and allow users to seek solutions to specific problems.

The technical merit of Building America content could be highlighted by making the program's process of evaluating, designing, building, retrofitting, and vetting more prominent, possibly as part of a brief standard introduction in all its documents. Profiles on the experts working in the Building America program should also be featured on the Building America site. This is done on the WAPTAC site under a "Meet Our Experts" banner (WAPTAC, 2012).

- Motivation
 - As suggested for kinesthetic learning, Building America may want to consider strategic partnerships to motivate remodelers to use its content. WAP and HPwES have the power of potential income or advancement in the workplace to motivate individuals to learn their material. That could be taken advantage of by designing Building America content as drop-in lessons for either program. Publications like

Remodeling Magazine or *Professional Remodeler* that emphasize the business aspect of remodeling and the potential business opportunities of energy efficient remodeling compel readers to pick up their magazine because of that business-focused content. As such, they are a potential opportunity for Building America content to reach more remodelers. Building America could provide either magazine a synopsis of a report or a specific detail or strategy with a link to the full length content on the Building America site. This would be similar to *Professional Remodeler Magazine's* use of EEBA content on a regular basis.

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Appendix A: Home Performance with ENERGY STAR Program Administration by State

STATE	PROGRAM:	ADMINISTERED BY:			
		Utility (ies)	Non-Profit	State	Other
WA	Puget Sound Energy	•			
OR	Energy Trust of Oregon		•		
CA	California Building Performance Contractors Association		•		
	Sacramento Municipal Utility District (SMUD)	•			
NV	HomeFree Nevada		•		
UT	Utah Home Performance			•	
AZ	Arizona Home Performance	•	•		
CO	Black Hills Energy CO	•			
	Xcel Energy, Inc.	•			
OK	Public Service Company of Oklahoma (PSO)	•			
TX	Oncor	•			
	Entergy Texas	•			
	Austin Energy	•			
MN	Xcel Energy	•			
IA	Alliant Energy - Interstate Power & Light	•			
	Black Hills Energy IA	•			
	MidAmerican Energy	•			
MO	Missouri Department of Natural Resources			•	
	Metropolitan Energy Center (Kansas City)		•		
	Earthways Center (St. Louis)				•
	City Utilities of Springfield	•			
	Columbia Water and Light	•			
WI	Wisconsin Focus on Energy				•
IL	Illinois Energy Office			•	
MI	Consumers Energy	•			
OH	Dominion East Ohio Gas Company	•			
	Greater Cincinnati		•		
KY	Kentucky Housing Corporation		•		
VT	Efficiency Vermont		•		
NH	New Hampshire Home Performance with ENERGY STAR				•
MA	Mass Save				•

STATE	PROGRAM:	ADMINISTERED BY:			
		Utility (ies)	Non-Profit	State	Other
RI	National Grid (RI)	•			
CO	CT Energy Efficiency Fund				•
NJ	New Jersey's Clean Energy Program		•		
DE	Sustainable Energy Utility, a non profit created by the State of Delaware, Department of Natural Resources & Environmental Control.			•	
MD	PEPCO	•			
	Maryland Energy Administration			•	
	Delmarva	•			
	Southern Maryland Electric Cooperative (SMECO)	•			
	Constellation Energy/Baltimore Gas & Electric Company (BG&E)	•			
VA	Northern Virginia Home Performance with ENERGY STAR				•
	Local Energy Alliance Program (LEAP)		•		
	George Washington Regional Commission (GWRC)			•	
	Richmond Regional Energy Alliance		•		
NC	Advanced Energy		•		
SC	South Carolina Electric & Gas (SCE&G)	•			
GA	Jackson Electric Membership Corporation (EMC)	•			
	Southface Energy Institute		•		
FL	Gainesville Regional Utilities (GRU)	•			
	TOTALS:	25	13	6	6

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