Implementation
Standing Technical Committee

Strategic Plan, v2012a – February 2012

Committee Chair:

2011	Stacy Hunt and Deane Evans	Building Media and Building America Retrofit Alliance (BARA) BSC

Contents

Definitions

BA	Building America
BARA	Building America Retrofit Alliance
BPI	Building Performance Institute
BTP	Building Technologies Program
CEER	Cost Effective Energy Retrofit
DOE	U.S. Department of Energy
ECEEE	European Council for an Energy Efficient Economy
EPA	Environmental Protection Agency
IBACOS	Integrated Building and Construction Solutions
I-STC	Implementation Standing Technical Committee
NAHB	National Association of Home Builders
NFRC	National Fenestration Rating Council
NJIT	New Jersey Institute of Technology
NREL	National Renewable Energy Laboratory
ORNL	Oak Ridge National Laboratory
PARR	Partnership for Advanced Residential Retrofit
PNNL	Pacific Northwest National Laboratory
RESNET	Residential Energy Services Network

Preface

In September 2011, the Building America Retrofit Alliance (BARA) was tasked with assisting the National Renewable Energy Laboratory (NREL) in summarizing efforts of the Implementation Standing Technical Committee (I-STC) and preparing a strategic plan and STC management strategy for 2012.

The initial effort was focused on creating a draft I-STC Strategic Plan, which was presented to the Building America program leaders at the fall *Residential Energy Efficiency (REE) Research Planning Meeting*, October 27-28, 2011, in Washington, D.C. The revised I-STC Strategic Plan is presented in this report and to be used as the basis for 2012 planning and activities.

The I-STC priorities presented in this report were initially generated by using information provided to the BARA team by NREL and by gathering implementation gaps and barriers reported from the Residential Energy Efficiency Meetings held since July 2010. These gaps were then cataloged and vetted with the mailing list of attendees at the past I-STC meetings for prioritization. A session was presented and facilitated by I-STC co-chairs Deane Evans (NJIT) and Stacy Hunt (Confluence Communications). Meeting feedback was incorporated into each gap where appropriate. Draft strategic plan gaps were reprioritized upon further evaluation of priorities by I-STC committee members.

The I-STC conducted two electronic evaluation exercises and incorporated meeting feedback into the plan. The I-STC intends to conduct a virtual meeting in early 2012 to present and gain feedback on a management strategy for addressing key priorities in CY2012. Infrastructure will be put into place conforming to the Standing Technical Committee Guidelines published by NREL that will assist I-STC participants with collaboration activities in the calendar year.

Introduction: Strategic Goals and Integration

The overall vision of the Building America Implementation Standing Technical Committee (I-STC) is to be the trusted source of research and development results, defining and delivering reliable, cost-effective systems that reduce energy use by 30%-50%.

The mission of I-STC is to identify specific process gaps and barriers that must be addressed for Building America (BA) and its project participants to successfully:

1) Develop system solutions that successfully target key stakeholder needs.
2) Develop integrated quality assurance/quality control approaches that minimize the inherent risks associated with use of emerging innovations.
3) Develop a residential efficiency knowledge base that is a trusted source of information on emerging innovations and is accessible to all key stakeholders in the residential market delivery value chain including educators, manufacturers, suppliers, builders and contractors, real estate professionals, financial institutions, and homeowners.

BA's other STCs focus on specific technical system gaps and barriers. These STCs include:

- Hot Water
- Space Conditioning
- Envelope
- Analysis Methods and Tools
- Testing Methods and Protocols
- Lighting, Appliances, and Miscellaneous Plug Loads/Automated Home Energy Management

The core interest of the I-STC is to identify and instigate solution development, inside or outside the BA program, for the following gaps and barriers that limit:

1) The ability to clearly define key stakeholder and end-user needs.
2) Delivery of high quality, low risk solutions to market.
3) Effective distribution of BA residential efficiency knowledge.

The intent of the I-STC Strategic Plan is to document these gaps and barriers, along with projects that resolve them, for the purposes of research planning and success measurement for the BA program's research projects and research results. The I-STC Strategic Plan is intended to be a living document that is modified and updated frequently based on research and outreach project progress.

Seven gaps were identified as being high priority for the 2012 calendar year. Once addressed, these gaps will help align BA, DOE, and the building community in achieving BA goals in the coming years. Here is a brief description of each gap and how it relates to the overall goals of the BA program:

Develop an Outreach Plan for Building America: Developing an effective outreach plan for the BA program has the ability to clearly communicate to industry stakeholders BA's goals of reducing energy consumption of new and existing residences by 30%-50%. It would also clarify BA's role in the process of delivering solutions to market and raise awareness of ongoing DOE efforts to assist members of the building community. An outreach plan would also provide a platform to coordinate DOE's message across programs and provide for consistent messaging when interacting with members of the public.

The Best One-Stop-Shop Energy Efficiency Solutions for Homeowners: A one-stop-shop energy efficiency (EE) solution for homeowners is defined as a resource that is simple and easy to use for homeowners who don't have the time or resources necessary to do extensive research into the myriad of ways they can address their homes' energy efficiency needs. Identifying and cataloguing the best examples of one-stop-shop energy efficiency solutions for homeowners has the potential to significantly impact the speed at which measures are adopted in the market. Energy efficiency program administrators and other industry stakeholders would be able to rely on simple, concise methods of communicating information to a segment of the market and would not have to recreate efforts of other successful solutions. This would provide homeowners with actionable information that would allow them to reduce their homes' energy footprint.

Synergies of Having One Sticker for Builder's Challenge/ENERGY STAR/HERS Ratings: Having multiple ways to rate or score a home's energy efficiency can lead to confusion in the market that ultimately translates into inaction. Aligning efforts to score homes would provide consistent information to members of the building community that they could use to educate homeowners about possible upgrade options. This would create the opportunity to establish channels to communicate how BA research results directly impact a home's energy score, and eventually lead to a more streamlined process of measure adoption.

Implementation Process Defined with DOE/NREL: The ultimate goal of the BA program is to conduct research that leads to solutions that can be implemented to significantly decrease home energy use. The single biggest thing that can be done in 2012 to ensure that this happens is to clearly define implementation and the implementation process in the context of the BA program. A clear definition and process would significantly boost collaboration between DOE programs and provide the first steps to building a seamless process for translating current research into actionable energy efficiency measure adoption in homes.

Key Motivations, Drivers, and Needs of Various Audiences in the Energy Efficiency Value Chain: A more thorough understanding of the needs, motivations, and drivers of various audiences in the energy efficiency value chain has two primary benefits in helping to achieve BA goals. First, the information could be used in the BA research planning process. Information about audience member needs could help decide which projects to pursue that would have the greatest impact in the market. Second, understanding the motivations and drivers of various audiences could help drive the implementation process itself. Outreach strategies could be modified to incorporate messages that would speak to audience needs. Other implementation facets could be tailored to meet specific audience needs as well. This would all work together to increase measure adoption.

Improving the Speed of Gathering and Delivering Research Results: Improvements in the process of gathering and delivering research results to market would have significant benefits to achieving BA's time goals for reducing energy use in homes. Every day that goes by that current research isn't in the hands of people that can implement it is another day that a less-efficient measure is adopted. The problem is actually much worse because some opportunities to apply the most current research in a home will be lost forever if the research isn't delivered in a timely manner. It's critical to the success of the program that research is gathered and delivered as quickly as possible.

Uncovering Areas of Improvement by Performing a Value-Stream Map of the Retrofit Process: This exercise would be crucial in assisting the various DOE residential programs in identifying ways that they can effectively collaborate and leverage efforts across programs to bring solutions to market through the various programs that are currently ongoing. The value-stream mapping process might also provide a framework for discussing how collective goals of various programs can be met and what efforts can be addressed by which programs in order to avoid duplicative efforts. Research topics would also be brought to the forefront that could be analyzed for inclusion in future calendar years.

The I-STC intends to conduct a thorough review of each gap listed above with committee members and other DOE programs. The intent of this review is to ensure that all information is gathered efficiently and that all stakeholders (including other programs) have an opportunity to help shape the implementation process moving forward.

Management Plans for the 2012 I-STC

In 2012, the I-STC chairs plan to manage the I-STC in the following manner:

1. Conduct bimonthly I-STC virtual meetings, beginning in January 2012. The purpose of the monthly virtual meetings will be to discuss and coordinate gap priorities and to track the progress of related research projects that seek to close gaps. The meetings will also allow the I-STC the opportunity to identify new gaps or to clarify gaps in understanding of current research priorities.

2. Conduct two in-person meetings, one at the Spring 2012 Residential Energy Efficiency Stakeholder Meeting (Austin, Texas, 2/29-3/2/2012) and another at the fall research planning meeting in Washington D.C.

3. Set up a spreadsheet, or other format recommended by STC guidelines, listing all current gaps and gaps in the queue. This will give any committee member the ability to view gaps and to add additional information as necessary.

4. Conduct at least one reprioritization exercise. Committee members will have the opportunity to vote for gaps that they feel should receive priority by the I-STC in future months/years.

5. Facilitate any coordination necessary between research teams or DOE programs in order to perform peer reviews or close high priority gaps efficiently.

6. Update and maintain the strategic plan, incorporating the latest research and committee information at periodic intervals.

7. Monitor and report on I-STC progress. In addition to progress updates during the virtual and in-person meetings, progress reports will also be provided to DOE/NREL as necessary.

8. Recommend the formation of limited-duration subcommittees to carry out specific action items or tasks related to addressing a known deficiency in the gap-closing process.

All items above will be conducted in a cohesive manner with the goal of providing transparency into I-STC progress and closing implementation gaps in the most efficient and expedient manner possible.

Gap and Barrier Rank Summary

The following table contains the gaps that have been identified and analyzed by the I-STC to date. Gaps highlighted in yellow will be the focus of initial 2012 I-STC efforts and are discussed in detail in the strategic plan. Those with an asterisk behind the description are currently being addressed by the DOE and or other programs.

Rank	Description	Value	Cost
1	How Can an Outreach Plan for the Building America Program Help Increase Program Awareness?	H	L
2	What are the Best "One-Stop-Shop" Energy Efficiency Solutions for Homeowners to Increase Adoption in the Residential Market?	H	L
3	What Synergies Can Be Obtained by Having One Sticker for Builders Challenge/ENERGY STAR/HERS Ratings? (*)	H	H
4	How Can the Implementation Process Best Be Defined Within the Context of the Building America Program?	H	L
5	What are the Key Motivations, Drivers, and Needs of Various Audiences in the Energy Efficiency Value Chain?	H	M
6	How Can the Speed of Gathering and Delivering Research Results and Products to Market Be Improved?	H	M
7	What Areas of Improvement Can Be Uncovered by Performing a Value-Stream Map of the Retrofit Process?	M	L
8	How Would Business Model Review of Other Retrofit Programs Affect the Overall Effectiveness of the Building America Program?	M	L
9	How Could the Development of Different Delivery Mechanisms for Messaging and Delivering Information Affect the Overall Impact of the Building America Program?	M	M
10	How Might the Development of Technical Solutions and Best Practices Field Guides Developed for Different Climate Zones Improve the Efficiency of Performing Energy Efficiency Measures?	M	M
11	What Affect Would Developing Plans of Staged Energy Upgrades for Homeowners Have on Energy Efficiency Measure Adoption?	M	L
12	How Can Energy Labels that Homeowners Can Readily Understand and Assign Value to Help Increase Understanding Of Energy Efficiency Measure Implementation Benefits? (*)	M	H
13	What Process Efficiencies Can Be Gained By Having Existing Content Identified, Aggregated, Indexed, and Distributed from a Central Location?	L	M
14	How Can Open Data Repositories That Create Energy-Use Average Averages For Homeowners Be Used to Show The Cost Savings Possible By Implementing Measures? (*)	L	L
15	How Would Developing Continuous Learning Mechanisms for Contractors to Transition to Energy Efficient Design/Construction Help Increase The Supply of Skilled Labor in the Market?	L	M
16	What Affects Would the Documentation of Critical Failure Points in the Process of Implementing Energy Efficiency in Homes Have on The Speed at Which Solutions to Problems were Developed?	L	M
17	How Would the Development of Training Requirements and Training Materials Help Increase the Consistency with which Measures are Implemented in the Market?	L	M
18	How Would Implementing Point-of-Use Training and Bar Codes with Installation Instructions Affect the Number of Energy Efficiency Measures that are Implemented Correctly?	L	L
19	How Would Information Regarding Whole House Practices for the Assessment Process Help Builders/Contractors in Communicating Information to Homeowners?	L	L
20	How Would the Development of Avenues for Realtors and Appraisers to Learn about the Benefits of Energy Efficient Homes and a Standard Method of Presenting Information Help Drive Adoption in the Market?	L	L

21	What Impact Would the Development of Software That Can Rapidly Analyze Structures in the Field Have on Increasing Adoption Rates of Energy Efficiency Measures?	L	H
22	How Would Developing a Process for Producing Field Guides as Core Documents and Constant Works in Progress Help Builders/Contractors in the Energy Efficiency Measure Implementation Process? (*)	L	M
23	What Affects Would Consistent Messaging, Standards, and Requirements Across Programs Have on Increasing Awareness and Adoption of Energy Efficiency Measures in the Market?	L	H
24	How Would Guidelines for HVAC Replacement and Design in a SIP Nailbase Energy Retrofit Scenario Help Ensure Systems were Designed Properly?	L	L
25	What Impact Would Developing Simple Educational and Marketing Campaigns/Materials Aimed at Consumers Have on Increasing Energy Efficiency Measure Adoption?	L	M
26	How Would a Better Understanding of Key Disconnects Between the Heat Pump Industry and Homeowners Perceptions of Issues, Terminology, and Metrics Help Increase Adoption of Heat Pump Products in the Market?	L	L
27	What Impact Would Developing a Process to Integrate Building America Research into the Codes and Standards Development Process Have on the Energy Efficiency Market?	L	L

1 How Can an Outreach Plan for the Building America Program Help Increase Program Awareness?

Is this appropriate Building America research? Y ___ N ___ (please check all that apply)

BA Enclosures		BA Hot Water		BA Implementation	
Walls		Test Standards		Quality Control/Quality Assurance	
Roof/Ceiling		Distribution		Training	
Foundations		Condensing/Tankless		Documentation/Resources	X
Moisture		Heat Pump Water Heater		Needs Evaluation/Identification	X
Windows		Combined Space & DHW Heating		Other:	
Other:		Other:		**House Type**	
BA Space Conditioning		**BA Miscellaneous Loads**		New	X
Heating		Home Energy Management		Existing	X
Cooling		Lighting		Single-Family	X
Dehumidification		Large MELs (pools, etc.)		Multi-Family	X
Distribution		Small MELs (TVs, VCRs, etc.)		**DOE Program Areas**	
Ventilation		Other:		Emerging Technologies	
Other:		**Analysis Methods/Tools**		Deployment	X
Testing Methods/Protocols		Validation and Testing		Codes and Standards	
House Simulation Protocol		Methods and Tools		**Level of Effort (1 FTE = 1 person-year)**	
Lab Test Methods		Field Data and Audits		Low-level (<0.25 FTE)	
Field Test Methods		House Simulation Protocol		Medium-level (0.25-1 FTE)	
Other:		Other:		High-level (>1 FTE)	X
Key Stakeholders		Manufacturers		Designers	
Builders / Remodelers/Trades	X	Utilities / Efficiency Programs	X	3rd Party or Voluntary Programs	
Other:	X	Other:		Other:	

1.1 Problem Statement

The BA program lacks an official outreach plan to guide implementation activities in a cohesive manner. As a result, it becomes difficult to determine how outreach efforts align with other government programs or if synergies could be developed between BA and the outreach activities of other programs.

1.2 Background Knowledge

The Residential Buildings Team is clearly focused on developing a communications strategy for the BA program that is clear, actionable, and implementable. This effort will guide the message and mechanisms of the program. Pacific Northwest National Laboratory (PNNL) has been tasked with coordinating an overall effort focused on outreach and communications planning. The Building America Retrofit Alliance (BARA) team is researching and developing outreach plans for various distribution channels. The Better Buildings program also has several ongoing projects that seek to address outreach.

1.3 Planned or Ongoing Research

Led by DOE and PNNL, the BA program will seek to complete a comprehensive outreach and market transformation plan in 2012. The outreach and market transformation plan will tie into current DOE efforts to develop a comprehensive communications plan.

1.4 Closing the Gap

The primary strategy to close this gap will be to work with DOE, BA program leaders, and other stakeholders to identify the components necessary in a comprehensive outreach plan. Then a draft plan would be written and sent for review by stakeholders to determine if any missing components should be included, others modified, etc. Finally, the plan would be approved and an outreach plan would be initiated. This gap will be closed when a comprehensive outreach plan is finalized that NREL and other industry stakeholders can use to guide outreach efforts in the coming years. Metrics could be developed that tracked the effectiveness of each channel in disseminating information such as the amount of people that each channel reached per year, etc.

1.5 Coordination and Timeline

Short term (18 months)

2 What are the Best "One-Stop-Shop" Energy Efficiency Solutions for Homeowners to Increase Adoption in the Residential Market?

Is this appropriate Building America research? Y ___ N ___

BA Enclosures		BA Hot Water		BA Implementation	
Walls		Test Standards		Quality Control/Quality Assurance	
Roof/Ceiling		Distribution		Training	
Foundations		Condensing/Tankless		Documentation/Resources	X
Moisture		Heat Pump Water Heater		Needs Evaluation/Identification	X
Windows		Combined Space & DHW Heating		Other:	
Other:		Other:		**House Type**	
BA Space Conditioning		**BA Miscellaneous Loads**		New	
Heating		Home Energy Management		Existing	X
Cooling		Lighting		Single-Family	X
Dehumidification		Large MELs (pools, etc.)		Multi-Family	X
Distribution		Small MELs (TVs, VCRs, etc.)		**DOE Program Areas**	
Ventilation		Other:		Emerging Technologies	
Other:		**Analysis Methods/Tools**		Deployment	X
Testing Methods/Protocols		Validation and Testing		Codes and Standards	
House Simulation Protocol		Methods and Tools		**Level of Effort (1 FTE = 1 person-year)**	
Lab Test Methods		Field Data and Audits		Low-level (<0.25 FTE)	
Field Test Methods		House Simulation Protocol		Medium-level (0.25-1 FTE)	X
Other:		Other:		High-level (>1 FTE)	
Key Stakeholders		Manufacturers		Designers	
Builders / Remodelers/Trades	X	Utilities / Efficiency Programs	X	3rd Party or Voluntary Programs	
Other:		Other:		Other:	

2.1 Problem Statement

Potential energy efficiency retrofit customers often desire a simple, "one-stop-shop" choice for making their homes more energy efficient. Most information available today is focused on the entire spectrum of measures that could be adopted and what the total impact could be from these potential options. Existing solutions for homeowners who do not want to put a lot of time and effort into the energy efficiency process need to be identified and catalogued in order to streamline the adoption process for this segment of the market.

2.2 Background Knowledge

Examples of the potential complexities in the process can be found on the websites of the major big-box retailers. The Home Depot Eco-Options site has six separate categories of products that consumers are presented with when deciding on an energy efficient purchase (http://www6.homedepot.com/ecooptions/index.html?). Each category has its own calculator and list of products for homeowners to choose from. Lowe's Efficient Home website also has many how-to-guides and an audit tool designed to present a list of items that can be considered (http://www.lowes.com/cd_Efficient+Home_539377675).

2.3 Planned or Ongoing Research

The NorthernSTAR Building America Partnership is currently conducting research on the market development of retrofit packages via building supply retailers. The team is also conducting research on model private sector delivery approaches. Both of these research studies have the potential to address some of the issues surrounding this gap. Oak Ridge National Laboratory (ORNL) has a utility model that may be appropriate to explore in this context. Partnership for Advanced Residential Retrofit (PARR) has a project with CNT energy that also addresses this topic. BetterBuildings and Home Performance with ENERGY STAR are also working on projects in this area. Finally, The Home Depot's code permitting project may apply.

2.4 Closing the Gap

The strategy to close this gap will be to work with the Better Buildings Program and other BA teams to identify existing measure packages to be included in a simple, one-stop-shop offering to consumers. Next, the measure packages would be analyzed and catalogued for use by various energy efficiency programs. Finally, a simple one-stop shop measure package guideline would be developed. This gap will be closed when a homeowner wanting a simple solution to their energy efficiency needs can access the one-stop-shop measure package guideline via outlets they frequent on a regular basis. Metrics that can track this gap could include the number of simplified solution packages sold by month/year, the aggregate energy saved, etc.

2.5 Coordination and Timeline

Short term (less than one year)

3 What Synergies Can Be Obtained by Having One Sticker for Builders Challenge/ENERGY STAR/HERS Ratings?

Is this appropriate Building America research? Y ___ N ___ (please check all that apply)

BA Enclosures		BA Hot Water		BA Implementation	
Walls		Test Standards		Quality Control/Quality Assurance	
Roof/Ceiling		Distribution		Training	
Foundations		Condensing/Tankless		Documentation/Resources	
Moisture		Heat Pump Water Heater		Needs Evaluation/Identification	
Windows		Combined Space & DHW Heating		Other:	X
Other:		Other:		**House Type**	
BA Space Conditioning		**BA Miscellaneous Loads**		New	X
Heating		Home Energy Management		Existing	X
Cooling		Lighting		Single-Family	X
Dehumidification		Large MELs (pools, etc.)		Multi-Family	
Distribution		Small MELs (TVs, VCRs, etc.)		**DOE Program Areas**	
Ventilation		Other:		Emerging Technologies	
Other:		**Analysis Methods/Tools**		Deployment	X
Testing Methods/Protocols		Validation and Testing		Codes and Standards	
House Simulation Protocol		Methods and Tools	X	**Level of Effort (1 FTE = 1 person-year)**	
Lab Test Methods		Field Data and Audits		Low-level (<0.25 FTE)	
Field Test Methods		House Simulation Protocol		Medium-level (0.25-1 FTE)	X
Other:		Other:		High-level (>1 FTE)	
Key Stakeholders		Manufacturers	X	Designers	
Builders / Remodelers/Trades	X	Utilities / Efficiency Programs	X	3rd Party or Voluntary Programs	
Other:	X	Other:		Other:	

3.1 Problem Statement

There are currently three similar but distinct ratings systems in the market. Builder's Challenge EnergySmart Scale (E-Scale), HERS rating, and ENERGY STAR all provide similar information in slightly different formats. Regional programs like Oregon's Earth Advantage are also creating their own labels. This has the potential to present problems as members of the building community attempt to establish a reference point with which to discuss a home's energy efficiency score. The DOE needs to work with the three programs to establish a single format to present clear, consistent information to the public in the future.

3.2 Background Knowledge

The Builder's Challenge EnergySmart Home Scale is based on the HERS index, but displays its information in a slightly different format (http://www1.eere.energy.gov/buildings/challenge/energysmart.html). The HERS index was developed by RESNET to provide a scoring system to objectively rate a home's energy performance (http://www.resnet.us/home-energy-ratings). ENERGY STAR is a joint program by the Environmental Protection Agency (EPA) and DOE that also seeks to rate appliances and buildings using different scoring systems based on the type of construction. The DOE is also

working on the Home Energy Score tool to provide homeowners with more standardized information about their homes energy usage (http://www1.eere.energy.gov/buildings/homeenergyscore).

3.3 Planned or Ongoing Research

It is presumed that the DOE is collaborating across programs and developing a cohesive strategy, but there is no obvious public position on labeling at this time.

3.4 Closing the Gap

The strategy to close this gap will be to work with the DOE and its programs and to consult with industry members in order to develop a standard or label that all homeowners can use to measure the efficiency of their homes. An alternative would be literature that explained the nuances between the different labeling systems. This gap will be closed when homeowners and members of the energy efficiency community have one easy-to-understand label or scale to gauge the efficiency of homes. Metrics that can track this gap include the number of homes rated at each label, ratings by climate zone, etc.

3.5 Coordination and Timeline

Mid term (two to three years to align all interests and address standardization issues)

4 How Can the Implementation Process Best Be Defined Within the Context of the Building America Program?

Is this appropriate Building America research? Y ___ N ___ (please check all that apply)

BA Enclosures		BA Hot Water		BA Implementation	
Walls		Test Standards		Quality Control/Quality Assurance	
Roof/Ceiling		Distribution		Training	
Foundations		Condensing/Tankless		Documentation/Resources	X
Moisture		Heat Pump Water Heater		Needs Evaluation/Identification	X
Windows		Combined Space & DHW Heating		Other:	
Other:		Other:		**House Type**	
BA Space Conditioning		**BA Miscellaneous Loads**		New	X
Heating		Home Energy Management		Existing	X
Cooling		Lighting		Single-Family	X
Dehumidification		Large MELs (pools, etc.)		Multi-Family	
Distribution		Small MELs (TVs, VCRs, etc.)		**DOE Program Areas**	
Ventilation		Other:		Emerging Technologies	
Other:		**Analysis Methods/Tools**		Deployment	X
Testing Methods/Protocols		Validation and Testing		Codes and Standards	
House Simulation Protocol		Methods and Tools		**Level of Effort (1 FTE = 1 person-year)**	
Lab Test Methods		Field Data and Audits		Low-level (<0.25 FTE)	
Field Test Methods		House Simulation Protocol		Medium-level (0.25-1 FTE)	
Other:		Other:		High-level (>1 FTE)	X
Key Stakeholders		Manufacturers	X	Designers	
Builders / Remodelers/Trades	X	Utilities / Efficiency Programs	X	3rd Party or Voluntary Programs	
Other:		Other:		Other:	

4.1 Problem Statement

The implementation process and how it is defined by DOE/NREL needs clarification in order to have the most positive market impact moving forward. The overarching goal of all BA activity is to increase adoption of energy efficiency measures and reduce energy usage 30-50% in homes. This is extremely difficult to accomplish without a clear definition of what implementation means in the BA context, what the implementation process consists of, who the core audiences and implementation partners are, and how far BA should reach into implementation before it becomes “a job for someone else, not the research program.”

A clearly defined process and clear limitations for the BA program in regard to implementation will ensure that efforts are focused and not duplicative of other programs. This definition opens the door for a host of additional benefits: metrics to track effectiveness/efficiency, cost savings, reduced time to market of research results, etc. Without this clarity of what implementation is and what the facets are that make up a good process, all other aspects of the BA program become radically less effective.

4.2 Background Knowledge

The BA program has been hosting targeted meetings since July 2010. Throughout these meetings, there have been various ideas discussed surrounding implementation and what needs to be done to improve the process moving forward. Recently, these ideas have been aggregated in an attempt to determine a clear priority of activities that will be undertaken in the coming years.

4.3 Planned or Ongoing Research

PNNL is leading an effort to develop a communications and market transformation roadmap, in cooperation with NREL and the BARA team. Also, the I-STC will engage committee members and other stakeholders throughout 2012 to help to define the implementation process.

4.4 Closing the Gap

The primary strategy to close this gap will be to work with NREL/DOE to define an efficient implementation process for use in future years. This gap will be closed when members of the BA program can share a consistent vision of what implementation means and have a solid understanding of how their efforts fit into the overall process. Metrics could be created to track the implementation process itself.

4.5 Coordination and Timeline

Short term (less than two years)

5 What are the Key Motivations, Drivers, and Needs of Various Audiences in the Energy Efficiency Value Chain?

Is this appropriate Building America research? Y ___ N ___ (please check all that apply)

BA Enclosures		BA Hot Water		BA Implementation	
Walls		Test Standards		Quality Control/Quality Assurance	
Roof/Ceiling		Distribution		Training	
Foundations		Condensing/Tankless		Documentation/Resources	X
Moisture		Heat Pump Water Heater		Needs Evaluation/Identification	X
Windows		Combined Space & DHW Heating		Other:	
Other:		Other:		**House Type**	
BA Space Conditioning		**BA Miscellaneous Loads**		New	X
Heating		Home Energy Management		Existing	X
Cooling		Lighting		Single-Family	X
Dehumidification		Large MELs (pools, etc.)		Multi-Family	X
Distribution		Small MELs (TVs, VCRs, etc.)		**DOE Program Areas**	
Ventilation		Other:		Emerging Technologies	
Other:		**Analysis Methods/Tools**		Deployment	X
Testing Methods/Protocols		Validation and Testing		Codes and Standards	
House Simulation Protocol		Methods and Tools		**Level of Effort (1 FTE = 1 person-year)**	
Lab Test Methods		Field Data and Audits		Low-level (<0.25 FTE)	
Field Test Methods		House Simulation Protocol		Medium-level (0.25-1 FTE)	
Other:		Other:		High-level (>1 FTE)	X
Key Stakeholders		Manufacturers	X	Designers	
Builders / Remodelers/Trades	X	Utilities / Efficiency Programs	X	3rd Party or Voluntary Programs	
Other:	X	Other:		Other:	

5.1 Problem Statement

The energy efficiency value chain is made up of a diverse group of audiences that all need to be aligned in order to maximize the amount of energy efficiency measures that are implemented. There is a lack of current research that seeks to identify the motivations or needs of each group and analyze them as a comprehensive set of characteristics that make up the entire implementation value chain. Without this broad analysis of specific audiences, it is difficult to develop a comprehensive implementation plan that aligns the various audience needs into an efficient system of increasing adoption of energy efficiency measures.

5.2 Background Knowledge

There are several examples of studies that have been done on select audiences within the energy efficiency value chain. The Shelton Group conducts yearly surveys of consumers to gauge their opinions on various topics that cover energy and energy efficiency. The Home Improvement Research Institute conducts surveys every two years aimed at identifying the habits of remodelers broken into two categories: generalists and specialists.

5.3 Planned or Ongoing Research

The Cost Effective Energy Retrofit (CEER) team worked on research in 2011 that sought to gather market drivers and motivators to determine market needs. The NAHB and Integrated Building and Construction Solutions (IBACOS) teams are also working on research projects that seek to analyze needs of contractors (the title of the IBACOS project is "Transitioning Traditional Contractors into Home Performance Contractors"). The BTP program is also undertaking efforts to identify audiences and the Better Buildings program is doing work in this area as well.

5.4 Closing the Gap

The primary strategy to close this gap will be to gather market research about the motivations, needs, and drivers of various target audiences in the energy efficiency value chain and to use this information to assist in resource development to aid in streamlining the energy efficiency implementation process moving forward. This gap will be closed when DOE/NREL have objective data with which to drive decisions about future years activities. Metrics could be incorporated into future research activities aimed at analyzing the effectiveness of the resources developed.

5.5 Coordination and Timeline

Short term (two years or less)

6 How Can the Speed of Gathering and Delivering Research Results and Products to Market Be Improved?

Is this appropriate Building America research? Y ___ N ___ (please check all that apply)

BA Enclosures		BA Hot Water		BA Implementation	
Walls		Test Standards		Quality Control/Quality Assurance	X
Roof/Ceiling		Distribution		Training	
Foundations		Condensing/Tankless		Documentation/Resources	X
Moisture		Heat Pump Water Heater		Needs Evaluation/Identification	
Windows		Combined Space & DHW Heating		Other:	
Other:		Other:		**House Type**	
BA Space Conditioning		**BA Miscellaneous Loads**		New	X
Heating		Home Energy Management		Existing	X
Cooling		Lighting		Single-Family	X
Dehumidification		Large MELs (pools, etc.)		Multi-Family	
Distribution		Small MELs (TVs, VCRs, etc.)		**DOE Program Areas**	
Ventilation		Other:		Emerging Technologies	
Other:		**Analysis Methods/Tools**		Deployment	X
Testing Methods/Protocols		Validation and Testing		Codes and Standards	
House Simulation Protocol		Methods and Tools		**Level of Effort (1 FTE = 1 person-year)**	
Lab Test Methods		Field Data and Audits		Low-level (<0.25 FTE)	
Field Test Methods		House Simulation Protocol		Medium-level (0.25-1 FTE)	
Other:		Other:		High-level (>1 FTE)	X
Key Stakeholders		Manufacturers	X	Designers	
Builders / Remodelers/Trades	X	Utilities / Efficiency Programs		3rd Party or Voluntary Programs	
Other:		Other:		Other:	

6.1 Problem Statement

The process of gathering research results and delivering them quickly to implementation programs and other key audiences needs to be improved. Research is conducted over a wide variety of topics in order to identify those measures that will have the greatest impact on reducing home energy use. Improving the speed at which research information is delivered in formats that can be absorbed by a wide audience would have an extremely positive impact on reducing energy use. Without a central repository of easily-accessible data on the most current measure guidelines and without consistent and effective outreach strategies, members of the energy efficiency value chain are left without accessible information on the latest energy efficiency strategies.

6.2 Background Knowledge

BA research is difficult to access, even for those managing and participating in the program. For those on the outside wishing to implement new strategies, it would be extremely helpful to have a full list of current research results and to have easy access to modularized or "chunked" information that could allow audiences to select useful information for their practices.

6.3 Planned or Ongoing Research

The DOE plans to develop a resource tool to act as a repository for research results. NREL is also working on activities to streamline the publication process in 2011-12. BA is investing in developing market transformation strategies and consistent formats for research results, along with outreach pilots that can help to streamline the implementation process.

6.4 Closing the Gap

The primary strategy to close this gap will be to first identify and measure the current process of delivering research results to market. Next, strategies can be generated and tested to improve upon the processes in order to increase efficiencies of delivering results and products targeting broader audiences. This gap will be closed when a broad audience gains access to current research results via measure guidelines or case studies more quickly than under current circumstances (ideally the process can be measured). Metrics that could be developed include the time between research finalization and measure guideline completion, the time between research finalization and the information being placed in outlets, etc.

6.5 Coordination and Timeline

Short term (two years or less)

7 What Areas of Improvement Can Be Uncovered by Performing a Value-Stream Map of the Retrofit Process?

Is this appropriate Building America research? Y ___ N ___ (please check all that apply)

BA Enclosures		BA Hot Water		BA Implementation	
Walls		Test Standards		Quality Control/Quality Assurance	
Roof/Ceiling		Distribution		Training	
Foundations		Condensing/Tankless		Documentation/Resources	
Moisture		Heat Pump Water Heater		Needs Evaluation/Identification	X
Windows		Combined Space & DHW Heating		Other:	
Other:		Other:		**House Type**	
BA Space Conditioning		**BA Miscellaneous Loads**		New	
Heating		Home Energy Management		Existing	X
Cooling		Lighting		Single-Family	X
Dehumidification		Large MELs (pools, etc.)		Multi-Family	X
Distribution		Small MELs (TVs, VCRs, etc.)		**DOE Program Areas**	
Ventilation		Other:		Emerging Technologies	
Other:		**Analysis Methods/Tools**		Deployment	X
Testing Methods/Protocols		Validation and Testing		Codes and Standards	
House Simulation Protocol		Methods and Tools		**Level of Effort (1 FTE = 1 person-year)**	
Lab Test Methods		Field Data and Audits		Low-level (<0.25 FTE)	
Field Test Methods		House Simulation Protocol		Medium-level (0.25-1 FTE)	X
Other:		Other:		High-level (>1 FTE)	
Key Stakeholders		Manufacturers		Designers	
Builders / Remodelers/Trades	X	Utilities / Efficiency Programs	X	3rd Party or Voluntary Programs	
Other:		Other:		Other:	

7.1 Problem Statement

The retrofit process could be better understood if a value-stream map of the process was created. A value-stream map would help identify current process states and would provide analysis into areas that could be enhanced or improved. It would also help foster communication between DOE programs about areas for collaboration and help reduce the potential for programs to perform duplicative efforts. Without this analysis, it would be difficult to quantify any proposed changes or make recommendations on process improvements with any sense of the impact improvements would have over existing processes.

7.2 Background Knowledge

There are numerous examples of the value-stream mapping process being performed in various industries with measured success. The concept was originally developed by Toyota, but today is applied to a wide variety of industries and products. Once the product or process is identified, the first step is to map the current state. Next, the future state is modeled with the goal of eliminating waste in the process. Finally, an action plan is developed to make the future state a reality, replacing the current state.

7.3 Planned or Ongoing Research

The CEER team is conducting research in 2011 in order to aid in the development of a value stream map of the retrofit process. The National Association of Home Builders (NAHB) Research Center is conducting a needs analysis of retrofit contractors. The PARR team is also conducting a project in this area. In addition, there is a DOE/Booz Allen Hamilton report on retrofit business models that might apply.

7.4 Closing the Gap

The strategy to close this gap will be to gather information collected by the CEER team and identify any areas of the value-stream map process that might need further clarification or research. Any items needing further clarification would then be addressed and a final value-stream map of the process would be developed. This gap will be closed when the DOE has a completed value-stream map of the retrofit process that can be used to make improvements in the overall efficiency of the process. Metrics, such as time between steps and time to perform steps, could be developed for most steps identified in the value-stream map to track the retrofit process moving forward.

7.5 Coordination and Timeline

Short term (one year or less)

8 How Would Business Model Review of Other Retrofit Programs Affect the Overall Effectiveness of the Building America Program?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	
Single Family	
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

8.1 Problem Statement

There is not enough known about other DOE programs, such as the Better Buildings program, and what aspects of their business models might be incorporated in the BA program. This lack of knowledge means that the possibility exists that certain aspects of the program might be duplicating efforts of other programs. It could also mean that processes that other programs have streamlined are being performed less efficiently in the BA program.

8.2 Background Knowledge

There are several DOE programs and initiatives that have the potential to provide insight that could prove valuable for the BA program to incorporate as it relates to the retrofit process. An analysis of the aspects of these other programs would not only uncover aspects of the BA business model that might be improved, but could also reveal aspects of the BA program that other programs might wish to consider adopting.

8.3 Planned or Ongoing Research

The Better Buildings Program has done research on business models of other programs.

8.4 Closing the Gap

The strategy to close this gap will be to first identify the DOE programs that will need to be analyzed. Then a plan would be put in place to engage key staff of the selected program in order to gather research about their business models. This information would then be compared against the current BA business model and recommendations made for areas of the BA business model that might be considered for modification. This gap will be closed when the BA program has a comprehensive report of other program business models and areas of the current BA business model that might be analyzed in future years. Metrics could be developed to track the efficiency of certain aspects of the business model.

8.5 Coordination and Timeline

Short term (one year or less)

9 How Could the Development of Different Delivery Mechanisms for Messaging and Delivering Information Affect the Overall Impact of the Building America Program?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _ _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	**X**
Single Family	**X**
Multi-Family	**X**
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

9.1 Problem Statement

The energy efficiency value chain comprises a diverse set of audience members that have different needs when it comes to accessing information. Some people still rely on print materials to receive the bulk of their information, whereas others rely on electronic forms of information. Delivery mechanisms are also changing with the proliferation of mobile devices into the U.S. market. In order to guarantee that information is having its greatest impact, multiple formats and delivery mechanisms need to be explored for delivering BA research results to target audiences.

9.2 Background Knowledge

A study by the Home Improvement Research Institute in 2011 revealed that professionals accessing information on the jobsite nearly doubled in the past two years. A study by the Pew Research Center revealed that 83% of all adult Americans have a cell phone and 51% of those people have used their cell phones at least once to get information they needed right away. Over 2 billion videos are viewed every day on YouTube (http://www.reelseo.com/youtube-statistics/).

9.3 Planned or Ongoing Research

The BARA team is currently exploring the use of alternative forms of multi-media to produce measure guidelines as part of its 2011 activities. The team is also proposing to pilot a mobile

delivery platform in the big-box retail setting that would allow users to access text and video-based instructional materials. Another research task would produce the text and video content. The ARBI team is also piloting and evaluating different outreach and messaging techniques.

9.4 Closing the Gap

The strategy to close this gap will be to continue to perform the research functions outlined above and document the effectiveness of various delivery formats and mechanisms. The information gathered can then be incorporated into outreach channels that the BA program will develop over the course of the next several years to effectively disseminate research information in an efficient manner. This gap will be closed when all target audiences have access to BA content in a delivery mechanism that is convenient for them and in a format that allows them to effectively learn about research results. Metrics could be developed to track the amount of people accessing various types of content, the delivery mechanism that content is being accessed from, etc.

9.5 Coordination and Timeline

Short term (less than two years)

10 How Might the Development of Technical Solutions and Best Practices Field Guides Developed for Different Climate Zones Improve the Efficiency of Performing Energy Efficiency Measures?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	
Single Family	
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

10.1 Problem Statement

Contractors and other building professionals lack resources in the field that address technical issues and a defined set of best practices on how to handle these issues. As a result, there are only two things that happen when an issue arises: the contractor can choose to stop work and attempt to locate information to address the issue or they can choose to implement the solution in the best way that they know how at the time. Neither option is efficient.

10.2 Background Knowledge

The BARA team is currently conducting research aimed at characterizing the housing retrofit market and identifying common remodeling activities. In addition, the BARA team is exploring the creation of a new measure guideline based on existing research that would translate the research into multi-media tools as a means to extend its reach to key audiences. This work does not currently extend into the creation of field guides for various climate zones, however.

10.3 Planned or Ongoing Research

Part of the BA research process is to identify issues and research solutions. Research is proposed by the BARA team for the 2012 calendar year that would take existing measure guidelines and translate them into Web-accessible content modules for dissemination to a wider audience.

10.4 Closing the Gap

The strategy to close this gap will be to collaborate with NREL and other research teams to identify key research topics that have the potential to provide a large impact by being translated into field guides. Field guides would then be produced in different formats. This gap will be closed when key technical issues have been identified and contractors have access to field guides, ideally by climate zone, that contain best practices for them to follow during the energy efficiency implementation process. A set of metrics could be developed by providing contractors a feedback loop to report on the issues that they face and tracking their responses.

10.5 Coordination and Timeline

Mid term (two to three years)

11 What Affect Would Developing Plans of Staged Energy Upgrades for Homeowners Have on Energy Efficiency Measure Adoption?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	**X**
Single Family	**X**
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

11.1 Problem Statement

There is currently no consistent set of staged energy upgrades for homeowners to follow along the path to improving the energy performance of their homes. Today, homeowners are presented with different, often disparate, upgrade options depending on the source. Government, utility-incentivized energy upgrade programs, manufacturer, and retailer-provided information on energy efficiency all offer varying strategies. Quite simply, there is not a standardized path of staged energy upgrades that provides homeowners with clear, universally-recognized steps that can be taken to improve the energy efficiency of their homes. Many homeowners cannot undertake a complete, whole-house energy upgrade at once, but could perform staged upgrades over time if given proper direction. Without a consistent, streamlined set of information and priorities to follow, homeowners may not optimize the energy and cost performance of their homes.

11.2 Background Knowledge

Two examples of the disparity in information are The Upgrade Upstate Program (UUP) in New York that contains a path for homeowners to follow that differs significantly from the options for homeowners in the Energy Upgrade Program in California.

11.3 Planned or Ongoing Research

Currently, the U.S. Department of Energy's *Guidelines for Home Energy Upgrades* project is creating "standard work specifications" to guide the quality of retrofit work performed.

11.4 Closing the Gap

The primary strategy to close this gap will be to develop a consistent plan of staged energy upgrades that contractors and homeowners could reference when addressing the energy efficiency needs of their homes. This gap will be closed when a plan is developed that can be used by any BA implementation partner. Metrics that could track the effectiveness of the plan might include the number of energy upgrade programs that adopt the plan, number of downloads of the plan, the number of links to the plan from other information resources, etc.

11.5 Coordination and Timeline

Short term (one year or less)

12 How Can Energy Labels that Homeowners Can Readily Understand and Assign Value to Help Increase Understanding Of Energy Efficiency Measure Implementation Benefits?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	
Single Family	
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	X
Codes	
Standards	X
Large Scale Retrofit (Better Buildings)	

12.1 Problem Statement

Homeowners are presented with countless options, products, and information when addressing the potential to increase the energy efficiency of their homes. While the need to develop a standard sticker or rating to judge the overall performance of their homes has been identified in another gap, there is also the need for homeowners to be able to rely on a standard energy label for individual products. A standard label on products would allow homeowners to quickly judge a product's potential impact on their home and would allow them to more easily compare products in similar categories.

12.2 Background Knowledge

The ENERGY STAR label is an example of a standard label that is widely recognized to mean that the product carrying the label has met some energy efficiency standard. It is unclear however how many homeowners are aware of the specific standard that the product receiving the ENERGY STAR label has obtained, or how the ENERGY STAR designation allows them to compare products. Another example is the National Fenestration Rating Council's (NFRC) standard label to allow homeowners the ability to compare products and make informed decisions (http://www.nfrc.org/label.aspx).

12.3 Planned or Ongoing Research

It is presumed that the DOE is working with all program stakeholders on this gap.

12.4 Closing the Gap

The strategy to close this gap will be for the DOE to work with the programs and sub-programs in its department and the EPA to identify the specific information to include in a standard energy efficiency product label. The specifications of the label itself would need to be defined in order to provide clear guidelines for manufacturers to follow. The collaboration team would then need to determine which products, if any, would be required to have the standard label contained on their packaging. This gap will be closed when all members of the implementation value chain have clearly defined labeling guidelines to follow and homeowners could use this labeling when comparing energy efficient products. Metrics could track the amount of products implementing the label, the change in number of measures adopted after the standard label is adopted, etc.

12.5 Coordination and Timeline

Long term (five or more years)

13 What Process Efficiencies Can Be Gained By Having Existing Content Identified, Aggregated, Indexed, and Distributed from a Central Location?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	
Analysis Tools		Other: __Central Data Repository	X
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	
Single Family	
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

13.1 Problem Statement

There is not a central location for content related to energy efficiency information that can be easily aggregated, indexed, and distributed. Currently, content is housed in different formats or in different websites across programs in the Building Technologies Program (BTP). Accessing this information is more difficult for various audiences than if it were centrally housed. This diminishes the effectiveness of the material.

13.2 Background Knowledge

There have been discussions in 2011 centered on the creation of a resource tool that would organize information in a more efficient and user-friendly manner. This tool would be linked to the industry and would distribute content in various methods (Web, mobile, etc.).

13.3 Planned or Ongoing Research

The resource tool developed by DOE to be completed in 2012 will create this central repository.

13.4 Closing the Gap

The strategy to close this gap will be to conduct a needs analysis of the various industry stakeholders and key personnel to determine the requirements of the resource tool. A

requirements document would then be created along with visual designs of the proposed tool. Key stakeholders would sign off on the requirements document and designs. The tool would then be developed using modern technologies and processes. A user acceptance testing process would be set up to ensure that what was being built matched user requirements. The program would finally be beta tested prior to being released into a production environment. This gap will be closed when industry stakeholders can access the tool to review and access various pieces of information related to energy efficiency. Metrics could easily be developed to track the impact of specific content and the overall effectiveness of the central data repository. Number of page views, number of downloads by specific measure, number of daily/monthly unique visitors, etc., are all be metrics that could be created from the central data store.

13.5 Coordination and Timeline

Short term (two years or less)

14 How Can Open Data Repositories That Create Energy-Use Averages For Homeowners Be Used to Show The Cost Savings Possible By Implementing Energy Efficiency Measures?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	
Analysis Tools		Other: _Database_____	X
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	
Single Family	
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

14.1 Problem Statement

It is extremely difficult for most homeowners to gauge their energy use in relation to others in their neighborhood or city. This makes the process of raising awareness about steps that can be taken to reduce energy consumption challenging. An open repository of energy use information would allow homeowners the opportunity to compare their usage information to similar houses in their area. This would significantly increase awareness of energy consumption habits and should lead to more energy efficiency measures being adopted throughout the United.States.

14.2 Background Knowledge

There are examples of certain types of data being publically available, but a resource has yet to be located that allows any homeowner the ability to enter their energy use information and track average use by territory. California has aggregate use data that can be downloaded, but it does not contain specific residential information that would be of benefit to homeowners (http://ecdms.energy.ca.gov/).

14.3 Planned or Ongoing Research

We are unaware of any research centered on developing an open database that would allow homeowners to upload energy use information at this time.

14.4 Closing the Gap

The strategy to close this gap will be to work with NREL, industry associations, and various utility companies to understand the data requirements of this new database. Integration with existing utility databases could also be explored. Once the requirements have been gathered, visual designs of the user interface of the database would be produced. When the requirements and design artifacts are signed off on, development of the tool would take place. A user acceptance team would test the application prior to it being released to the public. This gap will be closed when homeowners have the ability to upload their use information into a central database and then gather information about their usage in relation to average use in their area. Because the database would most likely be Web-based, metrics could be developed that tracked monthly unique visitors, homeowners that input data per day/month, average energy use information by month/day/year, etc.

14.5 Coordination and Timeline

Short term (one year or less)

15 How Would Developing Continuous Learning Mechanisms for Contractors to Transition to Energy Efficient Design/Construction Help Increase The Supply of Skilled Labor in the Market?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	**X**
Single Family	**X**
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

15.1 Problem Statement

Contractors currently lack a clear transition path from their current trade of choice to one that fits into the energy efficiency implementation value chain. They also lack continuous learning channels to guide them as they seek to expand their knowledge of the energy efficiency implementation process. Without this transition path and continuous learning framework in place, they are left to decide for themselves what the most optimal path is to transition into a more traditional energy efficiency practitioner role.

15.2 Background Knowledge

There are several private industry resources for transitioning to a career in the energy efficiency industry. Building Science Energy Services offer services to contractors to help with their entry into the energy efficiency market. The Home Performance Resource Center recently published a guide for HVAC contractors wishing to transition into the home performance business.

15.3 Planned or Ongoing Research

The NAHB Research Center Industry Partnership is conducting research in 2011 in order to develop and assemble a set of operating and marketing guidelines and resources for remodelers

that is similar to a business startup kit. The IBACOS team is also conducting research in 2011 focusing on the transition of HVAC contractors to home performance contractors.

15.4 Closing the Gap

The strategy to close this gap will be to collaborate with NAHB, IBACOS, and others to identify any gaps in the research conducted in 2011. Once the gaps have been identified and addressed, transition guides could be developed combining the research from both projects. In addition, continuous learning mechanisms could be built into the guides to provide contractors with a continuous source of information about best practices and current research in the energy efficiency value chain. This gap will be closed when contractors have a clearly defined path for transitioning to a successful career in the energy efficiency upgrade market and have access to continuous learning resources to help grow their businesses. Metrics that could track the effectiveness of gap closure could include the number of contractors accessing a continuous learning site, the number of contractors downloading materials dealing with transition plans, etc.

15.5 Coordination and Timeline

Short term (two years or less)

16 What Affects Would the Documentation of Critical Failure Points in the Process of Implementing Energy Efficiency in Homes Have on the Speed at which Solutions to Problems were Developed?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	**X**
Existing	**X**
Single Family	**X**
Multi-Family	**X**
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

16.1 Problem Statement

There is a lack of documentation on the critical failure points in the energy efficiency implementation process. Without this knowledge, it is difficult to develop a set of best practices to guide contractors in incorporating simplicity, ease of replication, and scale into their business operations.

16.2 Background Knowledge

Extensive work has been performed by BA teams in the past to document the construction process and to identify areas where support is needed by energy professionals or outside organizations to help transition builders to energy efficiency. This work should be culled and evaluated.

16.3 Planned or Ongoing Research

While there is not specific research planned to document failure points, there have been discussions about developing a resource tool that could house certain types of information that might pertain to this gap, such as photos of improper installations.

16.4 Closing the Gap

The strategy to close this gap will be to work with industry stakeholders and develop a process for reporting critical failure points in the process in order for them to be analyzed. The process might include a repository on the Web for contractors to post information or other resources that would facilitate the collection of information for analysis. The gap will be closed when industry stakeholders have a resource to utilize for reporting critical failure points and receiving information about ways to avoid them in future implementation projects. Metrics could be developed to track the number of failure points documented, the number of contractors uploading information, etc.

16.5 Coordination and Timeline

Short term (18 months or less)

17 How Would the Development of Training Requirements and Training Materials Help Increase the Consistency with which Measures are Implemented in the Market?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	X
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	**X**
Existing	**X**
Single Family	**X**
Multi-Family	**X**
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

17.1 Problem Statement

Training requirements need to be defined for contractors, and training materials need to be developed to aid in their training. There are numerous certifications that exist in the building community and no shortage of training resources available to train contractors. What is lacking are requirements that provide consistency of information presented to contractors and a centralized method to manage what contractors should understand before implementing energy efficiency measures.

17.2 Background Knowledge

Organizations such as the Building Performance Institute (BPI) and the Residential Energy Services Network (RESNET) have developed training and certification resources in an effort to provide consistency to the industry. Also, the DOE is currently working on the Guidelines for Home Energy Professionals project that has a component that seeks to develop guidelines for effective training.

17.3 Planned or Ongoing Research

We are unaware of any official research being conducted into the development of training requirements for contractors in the BA program.

17.4 Closing the Gap

The strategy to close this gap will be to collaborate with DOE and other industry stakeholders who have training certification programs in place in an attempt to bring training certification practices into alignment. A requirements document can then be developed that all industry stakeholders can reference when developing training and certification requirements for their programs. Finally, training materials can be developed that can be used by industry stakeholders in their training efforts. This gap will be closed when any industry organization can develop an effective training program by accessing the universally recognized training requirements and can develop training materials based on those requirements. Metrics could be developed that tracked the number of training resources that used the requirements standards, the number of contractors receiving training based on the standards, etc.

17.5 Coordination and Timeline

Short term (less than two years)

18 How Would Implementing Point-of-Use Training and Bar Codes with Installation Instructions Affect the Number of Energy Efficiency Measures that are Implemented Correctly?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	X
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	
Analysis Tools		Other: __Software Development_	X
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	**X**
Single Family	**X**
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

18.1 Problem Statement

There is a lack of training or information available to contractors while out in the field installing energy efficiency measures. As a result, contractors are left to rely on their current understanding of installation practices for the various materials they work with. This has the potential to either increase the amount of measures that are installed incorrectly or increase the time necessary to install measures. Field guides that could be delivered to a mobile device via a QR or bar code at the point of installation could offer substantial benefits over existing practices.

18.2 Background Knowledge

Several examples of information being delivered via mobile device exist in other sectors. The Home Depot currently employs an application called ScanLife that allows customers to pull up product information directly in the aisle of their stores (http://mashable.com/2011/03/22/mobile-barcodes-home-depot). Similarly, Lowe's has recently purchased 42,000 iPhones to allow their employees to access training and sales information via a mobile platform http://techcrunch.com/2011/09/09/lowes-invests-in-42000-iphones-to-improve-your-shopping-experience).

18.3 Planned or Ongoing Research

The BARA team is currently researching mobile delivery methods to deploy content in a big-box retail setting. The team is also conducting research to take existing content and reproduce it into Web-enabled informational resources.

18.4 Closing the Gap

The strategy to close this gap will be to expand upon the knowledge gained and modify the software created as part of the big-box outreach efforts to develop a mobile delivery mechanism to deliver informational resources to contractors while in the field. The application would employ some type of quick response mechanism, such as a bar or QR code, in order to allow for the quick retrieval of information. This gap will be closed when contractors can use a mobile device while in the field to pull up installation instructions or other information to assist them during the installation process. Metrics could be developed similar to the metrics discussed for other electronic assets (number of times accessed by month/year, number of unique visitors, etc.).

18.5 Coordination and Timeline

Short term (one year or less)

19 How Would Information Regarding Whole House Practices for the Assessment Process Help Builders/Contractors in Communicating Information to Homeowners?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _ _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	**X**
Single Family	**X**
Multi-Family	**X**
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

19.1 Problem Statement

There is a lack of information and best practices on the entire process of performing whole house assessments. While the technical aspects of performing an assessment are well documented, little information exists related to other aspects of the assessment value chain. Information needs to be analyzed for steps in the process such as prepping for the assessment (the arrival process), conducting an effective customer interview prior to performing the assessment, etc. It is only after this information is gathered and analyzed can best practices be developed about the assessment process as a whole.

19.2 Background Knowledge

There are several examples of different organizations publishing standards on the technical aspects of performing house assessments. The BPI publishes a technical standard for building analyst professionals on their website. RESNET also publishes the Home Energy Rating Standards of Practices to guide HERS raters in their assessment activities. Little information exists on customer interaction, setting expectations, or other non-technical aspects of the assessment process.

19.3 Planned or Ongoing Research

The National Energy Leadership Corps is conducting research efforts in 2011 that seeks to train its student leaders to focus on having an ongoing relationship with the homeowner that appears to touch on assessment practices outside of the technical realm. Aside from this, we are unaware of any comprehensive analysis of the assessment process.

19.4 Closing the Gap

The strategy to close this gap will be to work with trade organizations or contractors to identify all steps in the assessment process in order to thoroughly analyze the process as a whole and develop a best practices guide for contractors to follow. This gap will be closed when contractors have access to best practices information and homeowners are receiving consistent assessments about their home's energy performance. Metrics that can track this gap include number of best practice guides downloaded, number of trade associations adopting the guides, homeowner satisfaction after going through the comprehensive whole house assessment process, etc.

19.5 Coordination and Timeline

Short term (one year or less)

20 How Would the Development of Avenues for Realtors and Appraisers to Learn about the Benefits of Energy Efficient Homes and a Standard Method of Presenting Information Help Drive Adoption in the Market?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	**X**
Existing	**X**
Single Family	**X**
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

20.1 Problem Statement

There are several groups that are indirectly related to the energy efficiency implementation value chain that don't have access to clear information on the benefits of energy efficient homes. Realtors and appraisers interact with homeowners on a daily basis and are viewed as a source of knowledge about the value of a house. If they had a clear path to access information that allowed them to learn more about the benefits of energy efficient homes, they would be able to relay this information to their clients and increase awareness of the benefits of energy efficiency measures on home values.

20.2 Background Knowledge

A presentation that was given at the 2011 RESNET Building Performance Conference highlighted the lack of training and education that realtors and appraisers typically receive surrounding the energy efficiency of homes (https://www1.resnet.us/conference/2011/presentations/Bloise-Appraising_Home.pdf). The report also documented efforts to provide appraisers with education as well as efforts in some parts of the country to incorporate energy efficiency information into local MLS listings.

20.3 Planned or Ongoing Research

No research has been identified at this time that is geared towards providing realtors or appraisers with avenues to learn about the benefits of energy efficient homes.

20.4 Closing the Gap

The strategy to close this gap will be to collaborate with realtor and appraisal associations to better understand the current state of outreach channels for these two audiences. Next, an analysis would be done in collaboration with NREL to determine the specific information that would need to be communicated to these two groups. Finally, the informational content would be created and an outreach channel established to disseminate the information in the most efficient manner possible. This gap will be closed when realtors, appraisers, or other indirect groups of people that have the potential to increase adoption of energy efficiency measures can access materials to learn more about the benefits of energy efficient homes. Metrics could be developed to monitor the amount of users that are accessing information, the impact that specific content is having, the impact that different content types have, etc.

20.5 Coordination and Timeline

Short term (less than one year)

21 What Impact Would the Development of Software That Can Rapidly Analyze Structures in the Field have on Increasing Adoption Rates of Energy Efficiency Measures?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools	X	Other: __Software Development	X
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	
Single Family	
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

21.1 Problem Statement

The Building Energy Software Tools Directory reveals numerous tools that can analyze residential buildings and output energy simulation data, performance data, etc. The vast majority of these tools were developed years ago as either desktop applications or rough internet applications. In addition, NREL has created BEopt. While we are starting to see examples of user-friendly building analysis tools in the private sector, there is a need for an open-source solution sponsored by the DOE that can analyze residential buildings in the field and provide information in near real-time to building analyst professionals.

21.2 Background Knowledge

There are tools, such as EnergyPlus (http://apps1.eere.energy.gov/buildings/energyplus), produced by the DOE that are text-based but do have graphical user interface add-ons. There are also private industry solutions such as Recurve (http://apps1.eere.energy.gov/buildings/tools_directory/software.cfm/ID=593/pagename=alpha_list_sub) that have a modern user interface and allow for the collection and reporting on information while onsite. The DOE is also developing the Home Energy Scoring Tool to provide quick feedback on a residential buildings energy performance (http://homeenergyscore.lbl.gov/).

21.3 Planned or Ongoing Research

We are unaware of any BA research centered on the creation of a software tool that can rapidly analyze residential buildings in the field at this time.

21.4 Closing the Gap

The strategy to close this gap will be to collaborate with NREL, DOE, and other industry stakeholders in identifying the specific needs of a software solution that could rapidly analyze residential buildings in the field. After this analysis has taken place, a detailed specification would be written to guide the initial development process. Finally the software would be developed in phases and would be piloted with users throughout the process to ensure it was meeting the needs of the industry. This gap will be closed when a contractor has access to a software application that allows them to collect, analyze, and report on energy efficiency information of a home while performing the assessment. Metrics that can track this gap could include number of contractors using the tool, number of downloads, number/type of residential buildings that are analyzed, etc.

21.5 Coordination and Timeline

Mid term (three years or more)

22 How Would Developing a Process for Producing Field Guides as Core Documents and Constant Works in Progress Help Builders/Contractors in the Energy Efficiency Measure Implementation Process?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	
Single Family	
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

22.1 Problem Statement

A disconnect exists between the ENERGY STAR program and the ongoing research efforts of the BA program. The opportunity exists to create additional ENERGY STAR field guides containing current BA research information and to develop a continuous updating process to ensure that the field guides always contain current information. The ENERGY STAR program could be a great avenue to disseminate certain research topics of the BA program.

22.2 Background Knowledge

The ENERGY STAR program does contain select field guides aimed at certain topics. The Building Science Introduction Field Guide contains introductory information on air, heat, and moisture flow (http://www.energystar.gov/ia/partners/bldrs_lenders_raters/downloads/ENERGY_STAR_V3_Building_Science.pdf). Another example of an existing field guide is the Thermal Enclosure System Rater Checklist guidebook (http://www.energystar.gov/ia/partners/bldrs_lenders_raters/downloads/Energy_Star_v3_TERC_Guidebook.pdf). There are several other guides listed on the ENERGY STAR Training

Resources webpage (http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_v2_v3_training_resources#checklist).

22.3 Planned or Ongoing Research

The DOE is collaborating with the EPA on the integration of the two programs in 2011.

22.4 Closing the Gap

The strategy to close this gap will be to collaborate with the DOE and EPA and develop a seamless process for transitioning current BA research into ENERGY STAR field guides. This gap will be closed when a process is implemented for the creation of additional field guides that were continuously updated with the latest BA research results. Metrics could be developed to track the impact the guides have and also the speed at which research results were transitioned from BA into the field guides.

22.5 Coordination and Timeline

Short term (two years or less)

23 What Affects Would Consistent Messaging, Standards, and Requirements Across Programs Have on Increasing Awareness and Adoption of Energy Efficiency Measures in the Market?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	X
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	
Single Family	
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	X
Large Scale Retrofit (Better Buildings)	

23.1 Problem Statement

There are numerous DOE and EPA programs aimed at increasing the efficiency of homes in the U.S. While each program shares somewhat similar goals and messages, the performance standards, messaging, and requirements of each program vary. This variation leads to difficulties in communicating to various members of the energy efficiency value chain and significant difficulty in differentiating the programs in the eyes of those making funding decisions. Creating consistent messaging, standards, and requirements would ensure that all programs have a similar foundation and are aligning themselves in the most efficient manner possible in order to achieve overall energy reduction goals.

23.2 Background Knowledge

One example of the lack of standards lies in the way that energy efficiency of houses is communicated to homeowners at various stages in the home ownership process. When purchasing a home, builders can use the EnergySmart Scale as part of the Builders Challenge program to display a home's energy efficiency rating. If the same homeowner engaged a member of the retrofit community sometime after purchase, they would likely be presented with a HERS rating system that is endorsed by other DOE programs. This is one example of the ways that

messaging or standards can vary by program. A frequent question when discussing BA with stakeholders for the first time is “How is this different than ENERGY STAR?” There is simply no consistent message to use as an answer.

23.3 Planned or Ongoing Research

There is no known research planned for 2011/12 that seeks to analyze or address this issue.

23.4 Closing the Gap

The strategy to close this gap will be to work with DOE, NREL, and the various DOE programs to identify all aspects of messaging, standards, and requirements that can and should be consistent. Next, the information would be analyzed to determine priority by which items would be addressed. Then a plan would be put in place to systematically create consistency in each identified area. This gap will be closed when messaging, standards, and requirements are consistent across programs in areas that were deemed appropriate to address. Metrics could be developed to track expected savings of the standardization efforts, the amount of resources saved, the expected impact that standardization would have in the market, etc.

23.5 Coordination and Timeline

Mid term (three to five years)

24 How Would Guidelines for HVAC Replacement and Design in a SIP Nailbase Energy Retrofit Scenario Help Ensure that Systems were Designed Properly?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _ _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	**X**
Single Family	**X**
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

24.1 Problem Statement

There are currently no guidelines in place for contractors to follow when contemplating HVAC replacement and design in a SIP nailbase energy retrofit scenario. This is problematic in that it has the potential to lead to HVAC designs that are not in line with the new building performance requirements that are in place with the SIP nailbase retrofit. Homeowners could be left paying more for a larger system that is not needed based on the total retrofit that takes place.

24.2 Background Knowledge

A SIP nailbase retrofit produces air leakage rates and insulation levels nearly as good as a SIP structure. As a result, HVAC systems have the potential to be significantly oversized for the new configuration.

24.3 Planned or Ongoing Research

There is no known planned or ongoing research that would seek to address the development of guidelines for HVAC replacement and design in a SIP nailbase scenario.

24.4 Closing the Gap

The strategy to close this gap will be to work with key industry stakeholders on the identification of guidelines to follow when replacing an HVAC system during a SIP nailbase retrofit scenario. Next, guidelines would be produced and then reviewed by a committee to ensure that they adhered to proper design principles. The guidelines would then be tested in the field and finally published after incorporating any feedback received during the testing process. This gap will be closed when contractors can access guidelines that allow them to properly size HVAC systems when replacing them in a SIP nailbase retrofit scenario. Metrics that can track this gap include the number of times HVAC systems need to be designed in this specific scenario, the amount of guidelines downloaded for use in the field (impact of the guidelines), etc.

24.5 Coordination and Timeline

Mid term (two to three years to align all interests and so on)

25 What Impact Would Developing Simple Educational and Marketing Campaigns/Materials Aimed at Consumers Have on Increasing Energy Efficiency Measure Adoption?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	X
Analysis Methods/Tools		Needs Evaluation / Identification	
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	**X**
Single Family	**X**
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

25.1 Problem Statement

The energy efficiency implementation value chain is currently disconnected at the consumer level. Target audiences within the value chain are left to devise their own materials and strategies for educating or marketing to consumers. As a result, contractors and other members of the value chain are often times dependent on successful marketing efforts for the success of their business rather than on delivering exceptional service during the implementation process. The market needs to have simple, straightforward educational and marketing materials that can be used by all members of the value chain to interact with customers.

25.2 Background Knowledge

Every state, city, or utility company that runs an energy efficiency upgrade program is tasked with developing their own educational and marketing materials aimed at consumers. Contractors are also forced to create their own print and electronic materials and devise their own delivery mechanisms to ensure that consumers are aware of their services. While there are certain to be similarities between materials, it is also highly likely that effective techniques for presenting information to consumers could be incorporated into these efforts in a much more efficient manner.

25.3 Planned or Ongoing Research

No known research has been identified at this time that is geared towards developing simple marketing materials for homeowners.

25.4 Closing the Gap

The strategy to close this gap will be to collaborate with NREL and other industry stakeholders on identifying the key components necessary to communicate in an educational or marketing program aimed at consumers. Next, an analysis would be done to determine the best mix of formats to produce the material in. Various delivery mechanisms would also be explored to ensure that members of the implementation value chain had a wide selection of material to choose from. Finally, the educational/marketing assets would be produced. This gap will be closed when any member of the implementation value chain has access to marketing and educational materials aimed at consumers that could be incorporated into their individual outreach efforts. Metrics could track impact by content type, by marketing material asset, by delivery mechanism, etc.

25.5 Coordination and Timeline

Short term (less than two years)

26 How Would a Better Understanding of Key Disconnects Between the Heat Pump Industry and Homeowners Perceptions of Issues, Terminology, and Metrics Help Increase Adoption of Heat Pump Products in the Market?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	
Existing	**X**
Single Family	**X**
Multi-Family	
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	
Standards	
Large Scale Retrofit (Better Buildings)	

26.1 Problem Statement

Not enough is known about homeowners' perceptions of the key issues, terminology, and metrics in the heat pump industry. Without this knowledge, it is extremely difficult for members of the industry to effectively engage in communications with homeowners on the various benefits that can be obtained by using a heat pump. Key disconnects between the heat pump industry and homeowners' perceptions need to be identified and documented in order for the heat pump industry to maximize its potential to reduce energy consumption in the U.S. market.

26.2 Background Knowledge

A survey conducted in Europe in 2008 by the European Council for an Energy Efficient Economy (ECEEE) found that homeowner perceptions of innovative heating systems were largely unchanged between 2004-2008 (http://www.eceee.org/conference_proceedings/eceee/2009/Panel_8/8.008/paper).

26.3 Planned or Ongoing Research

There is no known planned or ongoing research that seeks to address the identification of key disconnects between homeowners and the heat pump industry at this time.

26.4 Closing the Gap

The strategy to close this gap will be to collaborate with NREL and other industry stakeholders and develop an effective evaluation methodology with which to engage homeowners. Next, an evaluation would be conducted that sought to identify homeowner perceptions of key issues, terminology, and metrics in the heat pump industry. The information would be analyzed to determine the most common homeowner perceptions. Finally, a report would be written that documented the evaluation findings and published so that all members of the industry had access to the information. This gap will be closed when members of the heat pump industry have access to research-based information on homeowner perceptions of the heat pump industry and can more effectively develop educational and outreach materials to address these perceptions. Metrics could be developed to track the number of respondents by region, the increase in heat pump installations in the years after the study has been published, etc.

26.5 Coordination and Timeline

Short term (less than one year)

27 What Impact Would Developing a Process to Integrate Building America Research into the Codes and Standards Development Process Have on the Energy Efficiency Market?

BA Enclosures		BA Hot Water	
Walls		Test Standards	
Roof/Ceiling		Distribution	
Foundations		Condensing/Tankless	
Moisture		Heat Pump Water Heater	
Windows		Combined Space and DHW Heating	
Other: _____		Other:_____	
BA Space Conditioning		**BA Miscellaneous Loads**	
Heating		Home Energy Management	
Cooling		Lighting	
Dehumidification		Large MELs (pools, etc.)	
Distribution		Small MELs (TVs, VCRs, etc.)	
Ventilation		Other: _____	
Other: _____			
Testing Methods/Protocols		**BA Implementation**	
House Simulation Protocol		Quality Control / Quality Assurance	
Lab Test Methods		Training	
Field Test Methods		Documentation / Resources	
Analysis Methods/Tools		Needs Evaluation / Identification	X
Analysis Tools		Other: _____	
Strategic Analysis			
Other: _____			

House Type	
New	**X**
Existing	**X**
Single Family	**X**
Multi-Family	**X**
DOE Emerging Technologies	
Walls and Windows	
Efficient Appliances	
Advanced Heating and Cooling Fluids	
Solar Heating and Cooling	
Geothermal Heat Pumps	
Solid State Lighting	
Bulk Purchase	
Onsite Renewables (Building-Integrated Photovoltaic, onsite cogen)	
DOE Deployment	
Labeling/Rating	
Codes	X
Standards	X
Large Scale Retrofit (Better Buildings)	

27.1 Problem Statement

There is a lack of information on the process for how the most recent BA research results are incorporated into the codes and standards development process. Without information into the link between BA and the codes/standards process, it is difficult to determine how efficiently BA research is being implemented or the total impact that BA could be having in the U.S. residential market. This leads to a scenario where current research could take many years longer than needed to actually be implemented in the residential market. The delay could potentially cost U.S. homeowners hundreds of millions of dollars in lost energy savings.

27.2 Background Knowledge

The various codes and standards development entities all have processes by which they periodically update their codes/standards to reflect changes in building science or technology. As an example, the International Code Council has a code development process that is crucial to their efforts to update ICC codes in an efficient manner (http://www.iccsafe.org/cs/AHC-CDR/Pages/default.aspx).

27.3 Planned or Ongoing Research

There is no known planned or ongoing research that seeks to identify and analyze the process of how BA research is incorporated into the codes/standards development process.

27.4 Closing the Gap

The strategy to close this gap will be to first seek to identify the current process for how BA research is presented for inclusion into the codes/standards development process of various entities in the United States. Next, an analysis of the process would be conducted to determine if process efficiencies can be created that would make BA research information more readily available to codes/standards-making bodies. Finally, a report would be written documenting the new process with the goal to maximize the speed at which current research is implemented into codes/standards and detailing the expected results of the new process on the residential market. This gap will be closed when a clear process for incorporating BA research results into the codes/standards development process is documented and visibility into this process is available for numerous stakeholders. Metrics could be developed to track the efficiency (speed) with which BA research results are incorporated into the process.

27.5 Coordination and Timeline

Short term (less than one year)

Appendix A: Change Log

Record of additions and modifications to the summary sheets.

Date	Version of Plan (updated version #)	Title of Gap/Barrier/Need	Description of Change
1/10/2012	011012	Multiple	Updated Preface section Changed title of Summary section to "Introduction:" and expanded content to include description of top seven gaps Added 2012 management plan section Reprioritized gap rank based on additional STC committee evaluation Removed 2 gaps from list based on meeting feedback (Impact Study of BA Program and Incremental Benefits of Energy Saving Measures) Moved 1 gap from Implementation to Analysis Methods and Tools (Certification Procedures for Energy Efficiency Software Tools) Incorporated Oct meeting feedback into "Ongoing Research" section of various gaps Changed gap titles to question format based on NREL's STC guidelines Removed Cost/Value matrix and Key Customers and Stakeholders sections from gaps based on NREL's STC guidelines Inserted revised table into top 7 gaps based on NREL's STC guidelines Added a gap (#27 dealing w/ exploring integration of BA research and the codes/standards process)

Appendix B: Past Research – Resolved Gaps, Barriers, and Needs

No gaps have been resolved to date.

Appendix C: Contributors

Contributors to this draft of the I-STC Strategic Plan include:

- National Renewable Energy Laboratory
- Building America Retrofit Alliance
- Attendees from past I-STC meetings who chose to respond to the initial draft evaluation sent to begin this process in September of 2011