Resolving Code and Standard Barriers to Building America Innovations
2014 Building Technologies Office Peer Review

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PNNL-SA-101915
Project Summary

Timeline:
Start date: October 1, 2013
Planned end date: September 30, 2014

Key Milestones:
1. Update Codes and Standards Innovation (CSI) Process Roadmap to include any feedback received from summit participants, October 2013
2. Guidance completed for addition to the Building America Solution Center (BASC) providing guidance on codes and standards barriers to builders, remodelers, and code officials. March 2014

Budget:
Total DOE $ to date: $231K (2013-2014)
Total future DOE $: TBD

Target Market/Audience:
• Building America research teams
• Residential builders, designers, contractors, and code officials

Key Partners:
- DOE National Laboratories: NREL, LBNL, ORNL, PNNL
- Advanced Residential Integrated Energy Solutions (ARIES)
- Alliance for Residential Building Innovation (ARBI)
- Building America Research Alliance (BARA)
- Building America Partnership for Improved Residential Construction (BA-PIRC)
- Building Science Corporation (BSC)
- Consortium for Advanced Residential Buildings (CARB)
- IBACOS
- Partnership for Home Innovation (PHI)
- NorthernSTAR Building America Partnership
- Partnership for Advanced Residential Retrofit (PARR)

Project Goal:
To speed the market adoption of residential high performance innovations and technologies facing code and standard barriers by utilizing tools and resources developed by CSI and others to address barriers.
Purpose and Objectives

**Problem Statement:** One of the most difficult challenges for high performance home research involves industry codes and standards where certain requirements may prevent or slow the innovation process or have otherwise unintended consequences. Although these challenges are widely recognized by the diverse array of housing industry stakeholders, *a coordinated effort is needed* that can affect codes and standards changes to favor innovation.

**Target Market and Audience:** Residential buildings account for 53% of building energy use. The audiences for the work include:
- Research teams – to assist with identifying and overcoming code and standard barriers to allow innovations to reach the market.
- Builders, remodelers, and code officials – to provide guidance to overcome code and standard issues in the field.
The Building America Program is designed to compliment and support the work done by other BTO programs. It supports codes and standards by identifying and filling gaps in building science and system knowledge that may limit effective implementation of new and existing standards.
Purpose and Objectives (continued)

Impact of Project
Overall $15 million annual investment of the Building America program is optimized through effective strategies to overcome or avoid potential code and standard barriers.

1. Project Endpoints
   - Building America process for identifying, organizing, collaborating, and prioritizing code and standard research gaps and barriers to innovations
   - Strategies to overcome code and standard barriers for researchers and builders
   - Assist builders, industry, and Building America teams in diagnosing and solving code and standard barriers successfully and inexpensively
   - Process for informing the code and standard setting organizations through a collaborated effort
   - Research findings readily available in an organized format to help builders, remodelers, and code officials better understand innovative measures with potential barriers and how the measure can be deemed acceptance with the code and/or standard
2. Project Impact Path
   a. Near-term (1 yr.)
      – Develop CSI Process Roadmap
        • Creates an organized, collaborative method to identify, prioritize, and efficiently apply BA resources to accelerate the deployment of high-performance innovations
        • Identifies goals and activities required to ensure project endpoint
        • Includes innovations facing code and standard barriers
        • Describes approaches that work and don’t work
        • Clarifies barriers that hinder or prevent innovation acceptance
2. Project Impact Path

b. Intermediate-term (1-3 yrs.)
- Develop Guidance for Identifying and Overcoming Code, Standard, and Rating Method Barriers to BA Innovations
- Develop CSI criteria for additional content on existing and new measure guides in the BASC
  - Includes strategy for identifying measures with potential barriers
  - Describes format and content required to accelerate the review, installation and final acceptance of the measure for compliance
2. **Project Impact Path**
   c. **Long-term (3 yrs. +)**
      - Establish a process to continuously improve codes and standards related content
      - Include code development needs as part of the BA research agenda
      - Identify and prioritize code related research activities
Approach

Near-term: Development of CSI Process Roadmap

1. conducted CSI planning meetings/summits with teams, national labs, other BTO residential program representatives, and outside code and standard experts
2. assessed code and standard challenges
3. build upon past successes of BA innovations
   In 2012, 4 Top Innovations directly related to overcoming code and standard barriers:
   - Thermal Bypass Air-Barrier Requirements
   - Unvented Crawlspaces Allowed
   - Vapor Retarder Classification
   - Climate Map Inform Best Practices
4. developed an understanding of code and standard issues with high-performance homes

1. used input from team meetings
2. worked with BECP staff (code experts)
3. developed methods to identify and characterize barriers

Method 1
Leverage Existing Knowledge

Method 2
Structured review of existing codes

Method 3
Structured review of a series of questions

4. developed approaches to overcome barriers

Approach 1
Search existing materials (Short Term)

Approach 2
Use alternative materials and methods (Short Term)

Approach 3
Reference newer version of code, standard or rating method (Short Term)

Approach 4
Obtain favorable interpretation (Medium Term)

Approach 5
Change the code, standard, or rating method (Long Term)

5. included example innovations for each method and approach
6. piloted the document with research teams
Approach (continued)

Long-term:
1. coordinating BA research activities with other residential BTO Programs and national labs
2. tracking and updating the prioritized list of CSI issues/barriers
3. identifying current available resources, and gaps/needs
4. developing tools and resources to address gaps and needs
5. testing/vetting resources within and outside BA research teams (e.g., builders, code officials)
6. using CSI process to address top issues and overcome barriers
7. promoting BA Solution Center content.
Approach (continued)

Key Issues:

• Creating an organized, collaborative method to identify, prioritize, and efficiently apply BA resources to accelerate the deployment of high-performance innovations
• Short window to submit code changes (3 yr. code cycle)
• New code changes may affect current innovations (unintended consequence)

Distinctive Characteristics:

• Coordinate and leverage work with Building Energy Codes and Appliance Standards programs
• Coordinate with teams and national labs to provide technical validation of innovations facing code or standard barriers
• Use BASC to provide guidance to target audiences to overcome barriers to innovations
Progress and Accomplishments

Lessons Learned: Coordination across DOE’s Building America, Appliance Standards, Codes Program, and Emerging Technologies is key

Accomplishments:
• Developed CSI Process Roadmap
• Developed a list of code and standard challenges confronting high-performance homes
• Developed Guidance on Identifying and Overcoming Code, Standard, and Rating Method Barriers and piloted with three research teams
• Developed CSI criteria for additional content on existing and new measure guides in the BASC

Market Impact:
The goal of Building America is to demonstrate how cost-effective strategies can reduce home energy use by up to 50%, for both new and existing homes, in all climate regions by 2017.
Awards/Recognition:

- “You did a great job on both documents (CSI Process Roadmap and CSI Guidance Document)”, Brett Singer, LBNL
- “Overall I think that the document (CSI Guidance Document) does provide a logical means to review the potential code implications for whatever innovation that you are studying or trying to employ.” Peter Baker, BSC
- “It (CSI Guidance Document) was useful in that it made me consider some areas I had not thought about. Overall, I guess I would say this is a useful document to help organize thoughts and identifying barriers and point out areas that may not have been considered.”, Thomas Kulp, Birch Point Consulting
Project Integration and Collaboration

**Project Integration**: CSI Team Planning Meetings, BA Technical meetings, conference calls, webinars, and peer sharing.

**Partners, Subcontractors, and Collaborators:**

- ARIES Collaborative
- Home Innovation Research Labs
- CARB Consortium for Advanced Residential Buildings
- PARR The Partnership for Advanced Residential Retrofit
- IBACOS Home Quality + Performance
- Pacific Northwest National Laboratory
- NREL National Renewable Energy Laboratory
- ORNL
- Alliance for Residential Building Innovation
- Research Alliance
- Northern STAR
- Lawrence Berkeley National Laboratory
- BA-PIRC
- BSC Building Science Corporation

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Communications:

• BA Events:
  – 1st CSI Working Group Meeting, D.C.
  – Building America Spring Technical Meeting, Denver
  – 2nd Working Group Meeting, D.C.

• BECP Events:
  – ICC Education Summit, Las Vegas, NV
  – National Codes Collaborative (REEO’s, BCAP, NASEO), monthly conference calls
  – Idaho Codes Collaborative, Boise
  – Nevada Codes Collaborative, Las Vegas
Next Steps and Future Plans:

- Continue to identify code and standard related barriers
- Coordinate data collection efforts with BECP to identify potential code changes needed to remove barriers and increase building performance
  - Work with BECP to identify the nature of the data to be collected through BA teams for targeted energy measures which can be used to develop code change proposals for future versions of the IECC and IRC
- Leverage industry code and standard experts to:
  - Identify existing resource materials
  - Develop new resource materials
- Continue to create content for BA measures in the Solution Center with codes and standards barriers
- Stakeholder outreach
  - Work with national organizations to disseminate innovations (e.g., NASEO, AIA, BOMA, ICC, NGA)
REFERENCE SLIDES
Project Budget

**Project Budget**: Total budget FY2013-FY2014 $231K

**Variances**: No Variances

**Cost to Date**: $81K spent in FY2013, $46K spent as of March 14, 2014 in FY2014

**Additional Funding**: industry collaboration but no other funding sources

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**Budget History**

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<th>FY2015 – TBD (planned)</th>
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# Project Plan and Schedule

## Project Schedule

| Project Start: October 1, 2013 | Completed Work |
| Projected End: September 30, 2014 | Active Task (in progress work) |
| **Milestone/Deliverable (Originally Planned)** | |
| **Milestone/Deliverable (Actual)** | |

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<th>Task</th>
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<th>FY2015</th>
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<td>Q4 (Jul-Sep)</td>
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## Past Work

| Q1 Milestone: Establish CSI Team and conduct initial planning meeting | |
| Q2 Milestone: Initiate development of CSI Process Roadmap and CSI Guidance Document | |
| Q3 Milestone: Continue development of CSI Process Roadmap and CSI Guidance Document | |
| Q4 Milestone: Develop Draft CSI Process Roadmap and Guidance Document | |
| Q1 Milestone: Updated CSI Process Roadmap to include any feedback received from summit participants | |
| Q2 Milestone: Guidance completed for addition to the BASC providing guidance on codes and standards barriers to builders, remodelers, and code officials. | |

## Current/Future Work

| Q3 Milestone: Updated CSI Guidance Document | |
| Q4 Milestone: Update on CSI coordination activities | |