

Training Curriculum and Follow-Up Results: Greensburg, KS

Building America Report - 0805

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Abstract:

Following the almost complete destruction of Greensburg, Kansas by a tornado in May, 2007, Building Science Corporation (BSC) was contracted to provide example house plans, support for the reconstruction of energy efficient houses and training for builders and trades. This report describes the planning, execution, and results of BSC's builder training program in Greensburg.



SYSTEMS ENGINEERING APPROACH TO DEVELOPMENT OF ADVANCED RESIDENTIAL BUILDINGS

15.E.3 TRAINING CURRICULUM AND FOLLOW-UP RESULTS-GREENSBURG, KS

RE: TASK ORDER NO. **KAAX-3-32443-15**
UNDER
TASK ORDERING AGREEMENT NO. **KAAX-3-32443-00**

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DECEMBER 19, 2008

15.E.3 - Training Curriculum and Follow-Up Results – Greensburg, KS

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December 19, 2008

Abstract

Following the almost complete destruction of Greensburg, Kansas by a tornado in May, 2007, Building Science Corporation (BSC) was contracted to provide example house plans, support for the reconstruction of energy efficient houses and training for builders and trades. This report describes the planning, execution, and results of BSC's builder training program in Greensburg.

15.E.3 - Training Curriculum and Follow-Up Results

Executive Summary

1. Overview

Following the initial emergency response to the destruction of Greensburg, Kansas by a direct hit by a massive tornado, the Department of Energy joined other federal agencies, including FEMA and the EPA, in providing long-term recovery support for Greensburg residents. The DOE's effort included support for power generation and distribution planning, advice for energy efficient building construction, and assistance for builders and homeowners.

Building Science Corporation (BSC), a research team working with DOE's Building America program, was contracted to provide example house plans, support for the reconstruction of energy efficient houses and training for builders and trades. This report describes the planning, execution, and results of BSC's builder training program in Greensburg.

2. Key Results

The end result of BSC's efforts in co-operation with NREL, IBACOS and other organizations resulted in the exposure of dozens of builders and homeowners to energy efficient, affordable, durable and healthy construction techniques. Beyond this person-to-person contact, we have documentation of several thousand downloads of training information posted on our website (of which a good percentage may have been referrals from our efforts in Greensburg).

Concrete evidence of the success of the training efforts are the more than 20 houses built to the high performance technology specification outlined by the Demonstration Home Incentive Program. The construction of these houses involved many volunteers (many who were professional trades people in other areas of the country), as well as local trades people and residents, all of whom received information about the benefits of energy efficient housing.

3. Next Steps

BSC found that a slower than anticipated start to reconstruction limited the number of builders who could have been involved in the program. Some of the reasons for this slow start were outside of the control of BSC, NREL or the Department of Energy generally. However, some issues—such as the lack of interagency communication and co-ordination and the difficulty in packaging understandable and timely support—could be addressed in similar situations in the future.

BSC recommends that for matters relating to the re-construction of energy efficient, affordable and durable housing, DOE working groups prepare emergency response plans that incorporate lessons learned in the Greenburg experience and develop a “stock” technology approach that can be implemented in any area of the United States.

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15.E.3 – TRAINING CURRICULUM AND FOLLOW-UP RESULTS

1. INTRODUCTION

1.1 Task Description

This task provides technical support for energy efficient reconstruction of the residential areas affected in the aftermath of the recent natural disaster in Greensburg, Kansas. In coordination with NREL, the Subcontractor shall develop plans and other documents in support of the construction of new energy-efficient homes in this region. The subcontractor shall develop one example set of floor plans, and provide technical support for communications materials being prepared by NREL for upcoming events in Greensburg. In addition, five sets of standardized construction documents (adapted to various foundation types and lot characteristics) shall be developed for the community, and additional direct technical assistance shall be provided to ten residents or builders that act as early adopters of the standard floor plans. The subcontractor shall also develop and distribute overview booklets describing the energy efficiency features of the proposed plans, design and construct a sample wall section to illustrate the recommended building techniques, and conduct eight half-day training sessions in Greensburg to teach local builders and contractors about advanced energy efficient construction techniques, foundation details, and mechanical and electrical system details.

Deliverable:

The Subcontractor shall document the curriculum that will be used for the eight building science training sessions conducted in Greensburg. The report shall also include documentation of the attendance at each session, organizations represented, and actions known to be taken by participants as a result of the training.

1.2 Background

On May 4, 2007, the city of Greensburg, Kansas was almost completely destroyed by a large tornado.¹

Following the initial emergency response, the Department of Energy joined other federal agencies, including FEMA and the EPA, in providing long-term recovery support for Greensburg residents. The DOE's effort included support for power generation and distribution planning, advice for energy efficient building construction, and assistance for builders and homeowners.

¹ For more information on the Greensburg tornado event, see http://en.wikipedia.org/wiki/Greensburg,_Kansas



Figure 1.1: Aerial Photograph of Tornado Damage at Greensburg, KS (source: Jaime Oppenheimer/The Wichita Eagle)

Building Science Corporation (BSC), a research team working with DOE's Building America program, was contracted to provide example house plans, support for the reconstruction of energy efficient houses and training for builders and trades.

This report describes the planning, execution, and results of BSC's builder training program in Greensburg.

2. TRAINING CURRICULUM

2.1 Proposed Curriculum

Training for builders and trades was planned to correspond to the construction schedule of energy efficient housing projects supported by BSC and other DOE contractors. Topics chosen covered a full range of high performance building topics (see Table 2.1 below).

The intent was to provide builders with a complete understanding of changes to typical construction practices they would need to make in order to construct buildings to meet the specifications outlined by the BSC Demonstration Home Incentive Program and Specification (see Appendix 1). The Demonstration Home Incentive program was designed with the help of BSC Industry Partners to “jump start” the adoption of the technology package and provide physical examples of high performance house construction for the training.

A key parallel objective was to provide a competitive advantage to participating builders by providing them with information and skills that could be applied to all future building projects. For this reason, information about the benefits of high performance home ownership was included in the proposed schedule to encourage builders’ marketing efforts.

The training was planned as a series of workshops, each divided into classroom modules and on-site construction walkthroughs. From past experience training builders and trades, BSC has had success with a similar mix of classroom and “hands-on” field training.

Table 2.1: Proposed Training Curriculum

Date		Schedule	Speakers
Sept 8	Part 1	House Design and Foundation Systems Course Introduction Module 1: House Design for a Mixed-Humid Climate Module 3: Foundations and Site Work	Joseph Lstiburek Building Science Corporation Alex Lukachko Building Science Corporation
tba	Part 2	Framing Module 2: Building America Systems Engineering Module 4: Framing Walk-through 1: Foundation Walk-through 2: Framing	Joseph Lstiburek Building Science Corporation (or) Alex Lukachko Building Science Corporation
tba	Part 3	Mechanical Systems and Airtightness Module 5: Water Management Module 6: Airtightness Walk-through 2: Framing Walk-through 3: Airtightness	Kohta Ueno Building Science Corporation Alex Lukachko Building Science Corporation
tba	Part 4	Enclosure Module 7: Mechanical System Design and Selection Module 8: Insulation Module 9: Exterior Cladding Systems Walk-through 3: Airtightness Walk-through 4: Insulation	Peter Baker Building Science Corporation (or) Alex Lukachko Building Science Corporation

tba	Part 5	Finishes, Testing and Commissioning	Kohta Ueno
		Module 10: Measuring Building Performance	Building Science Corporation
		Module 11: Mechanical System Commissioning	
		Module 12: Owning an Energy-efficient Home	
		Walk-through 4: Insulation	
		Walk-through 5: Testing and Commissioning	

2.2 Changing Circumstances and Modifications to the Training Plan

As the training series progressed, the planned program of events was changed to better connect with other DOE support activities and general conditions in Greensburg. These changing conditions and BSC's adjustments to the planned curriculum are discussed below.

One unexpected circumstance was the lack of construction underway at the beginning of the training program. IBACOS estimated that approximately 14 houses were under construction at the beginning of September in 2007. Of these houses, most were not suitable examples for the on-site training session because they were either too far along in the construction process or a retrofit of a storm-damaged building. It seemed as though the Greensburg residents who had the funding to rebuild or repair their houses did so quickly and with little consideration for increasing the energy efficiency and durability of the buildings as they did so. This is, of course, an understandable response to the tragic loss of their homes and their immediate need to re-house their families. A short window of opportunity to work with builders involved in these projects was missed.

In the weeks following the first training event (discussed in Section 3.1 below), very few new construction projects were started.

- **Concern about jobs, other opportunities** – From the day after the tornado, Greensburg residents were faced with the possibility that their lives could best be rebuilt outside of the town. Although there was tremendous interest in restoring their community, Greensburg residents faced increasing pressure when the pace of reconstruction slowed in the commercial sector. Uncertainty about the future undoubtedly slowed the pace of new residential construction.
- **Waiting for government assistance** – FEMA and other federal and state agencies provided many forms of assistance for Greensburg residents. There was probably so much support, however, that residents were faced with the overwhelming task of sorting through the many programs, trying to determine which programs could help them rebuild and in which way. Government agencies increased their communication with each other as time went on but the lack of a concerted, clear approach likely stalled residents most in need of government assistance.
- **Difficulty in assembling needed financing for new construction** – a basic problem affected most residents that did not rebuild in the first few months after the tornado: the cost of reconstruction significantly exceeded the market value of the destroyed houses. FEMA identified this issue early on. BSC was told that the average market price of a house in Greensburg before the tornado was approximately \$50,000. NREL, BSC and IBACOS estimated that new code-compliant construction for a typical house would be in the neighborhood of \$100,000. FEMA and USDA worked to provide more information to homeowners about financing, including working with financial institutions and non-for-profit organizations, but the wide range of possible funding sources, combined with the relatively little information about the cost of new construction, created further stumbling blocks for those residents interested in rebuilding.

- **Confusion about how to rebuild in a “green” way** – The City of Greensburg made a commitment through a series of well-attended public meetings to pursue a policy of “green” or environmentally-appropriate reconstruction. This decision did not create mandatory requirements for residents, however, a large number of interested non-for-profit organizations, government agencies, private consultants and product manufacturers and distributors stepped in to provide free advice about “green” construction. While there was a high level of interest from Greensburg residents, they were exposed to the broader confusion in the homebuilding industry about what “counts” as green construction. The lack of a clear message from experts, combined with enthusiastic but hyperbolic marketing, further slowed residents decision-making.
- **Influence of outside organizations** – The well-publicized involvement of a national television production in documenting the “green” rebuilding of Greensburg took center stage in many conversations about the future of the town. The producers’ interests were well matched with the community’s commitment to environmentally-appropriate construction. However, slow organization of sponsors and donors to support the green production caused Greensburg residents to delay or reconsider reconstruction activity – promises of significant donations of sustainable technology and even cash payments were central to this delaying influence.

To respond to these conditions, BSC made the following changes to the training program:

- **Change training from scheduled events to “on demand” sessions** – The low attendance at the initial sessions and the low number of additional construction projects started prompted BSC to dispense with scheduled training events and instead work to identify the builders actively constructing houses and run events to suit their schedules and needs. These “on demand” sessions are described in Sections 3.3 to 3.7 below.
- **Create more visibility in the community** – In conversation with NREL and IBACOS project partners, it was decided that more visibility was needed for the combined efforts of the team in Greensburg. BSC proposed that a three-dimensional construction mock-up be built to provide this visual sign board, as well as, be a training aid in lieu of houses under construction for the on site component of the training. The construction of this mock-up is described in Sections 3.2 and 4.3 below.
- **Increase the usefulness of the website** – A need for information resources that could be studied at the builders’ convenience was addressed by increasing the amount of information posted on the www.buildingamerica-greensburg.com website. The “High Performance Housing Information Sheets for Greensburg, KS” were produced for this purpose. These are described in Sections 4.1 and 4.2 below.

3. TRAINING EVENTS

3.1 Training Event 1 - Saturday, September 8, 2007

3.1.1. Description

Joseph Lstiburek and Alex Lukachko held the first builder workshop in Greensburg at a public meeting room in the USDA portable building. The morning presentation included an overview of the training program and an introduction to the technology package included in the Incentive Plan. In the afternoon, BSC met with builders to further discuss the technology package and the training program.

The presentation slides are attached in Appendix 3 of this report.

3.1.2. Participants

Joseph Lstiburek, Building Science Corporation – Speaker
Alex Lukachko, Building Science Corporation – Speaker

John Holden, IBACOS
Tim Rogers, USDA Housing Program Director
Michael Morley, builder
Arrow Zanghi, builder
Brian Wendland, home energy rater
2 Greensburg residents

3.1.3. Results

This was a slow start. Few builders were present at the presentation. However, both builders expressed interest in the program. Michael Morley told BSC that he was interested in building a SIPs house. Connections were made with Tim Rogers at USDA that resulted in closer ties between the USDA's housing assistance programs and the support offered by the DOE.

3.2 Training Event 2 – Wednesday, September 19 to Saturday, September 22

3.2.1. Description

Alex Lukachko and Kohta Ueno from BSC constructed a mock-up wall to demonstrate the technology package recommended by the Incentive program and explained by the training program. The mock-up wall was built in a high traffic area between the temporary county administration building and the USDA offices on the FEMA block across from the county courthouse building. The construction took place over a three-day period, during which BSC employees were able to interact with builders and homeowners who stopped by to visit the construction site.

In addition to communication with Greensburg residents, the Discover Channel's production team filmed BSC employees discussing high performance housing techniques and the construction of the mock-up (see Figure 3.1 below).



Figure 3.1: Photograph of Alex Lukachko (BSC) speaking with the Discovery Channel

The mock-up construction was completed in time for the September 22 Greensburg Housing Fair. At the housing fair, BSC and IBACOS staff spoke with builders and homeowners about energy efficient housing and distributed information resources (see Figure 3.2 below).



Figure 3.2: Photograph of Joseph Lstiburek (BSC) at the second Greensburg Housing Fair

3.2.2. Participants

Joseph Lstiburek, Building Science Corporation – Speaker
Alex Lukachko, Building Science Corporation
Kohta Ueno, Building Science Corporation
Duncan Prael, IBACOS

Approximately 20 builders and homeowners spoke with BSC employees at the mock-up.

More than 150 builders and homeowners attended the Housing Fair.

3.2.3. Results

As a result of the mock-up construction and the housing fair, BSC established a connection with Wichita Habitat for Humanity. This group later assisted in the development of the United Way/USDA Self Help Housing program, which emphasized affordable, energy-efficient home construction.

3.3 Training Event 3 - Thursday, October 11, 2007

3.3.1. Description

Joseph Lstiburek made a presentation describing the technology package for the Greensburg Building Department. BSC also reviewed a sample set of drawings designed to incorporate the technology package with the building code officials and answered questions on the code compliance of the package. The objective of this educational session was to “pre-screen” the technology package with the building inspectors that would be inspecting built projects using the technology.

In the afternoon, BSC met with FEMA Long term Recovery staff and State Representative Ty Masterson to co-ordinate efforts on the Demonstration Home Incentive Program.

3.3.2. Participants

Joseph Lstiburek, Building Science Corporation
Alex Lukachko, Building Science Corporation
John Holten, IBACOS

Steve Castaner, FEMA
Erin Miles, FEMA
Ty Masterson, Kansas State Representative and builder

2 Greensburg Building Department officials

3.3.3. Results

The information session with the Greensburg Building Department was a successful connection that prepared the way for successful implementation of the technology package in over 20 houses in the USDA/United Way Self Help Housing development.

The afternoon meeting with State Representative Ty Masterson lead to the half-day information session with Don Klausmeyer Construction on November 9th.

3.4 Training Event 4 - Friday, November 9, 2007

3.4.1. Description

Joseph Lstiburek and Alex Lukachko from BSC, with Duncan Prahll from IBACOS, arranged a half-day information session with Don Klausmeyer Construction at their Wichita offices. The information session covered the technology specification linked to the Incentive Program and other high performance housing basics.

3.4.2. Participants

Joseph Lstiburek, Building Science Corporation
Alex Lukachko, Building Science Corporation
Duncan Prahll, IBACOS

Ty Masterson, Kansas State Representative and builder
Don Klausmeyer, builder
Bill Knowles, builder

3.4.3. Results

As a result of this session, BSC agreed to work with Don Klausmeyer Construction on the systems engineering of a stock plan to meet the technology specification laid out by the Demonstration Home Incentive Program. BSC agreed to a follow-up meeting to discuss the results and next steps. Ultimately Don Klausmeyer Construction did not build homes in the Incentive Program.

3.5 Training Event 5 - Friday, November 16, 2007

3.5.1. Description

At the USDA public meeting room in Greensburg, Joseph Lstiburek presented energy efficient building techniques aimed at reaching a 40% reduction in energy use over a code compliant house. Joe also introduced the “Demonstration House Incentive Program” to the builders present at the workshop.

3.5.2. Participants

Joseph Lstiburek, Building Science Corporation - Speaker

The following builders participated:

Jack Scott, Pyles Custom Homes
Doug Bruggeman, Construction Manager, Mennonite Housing
Lloyd Goossen, Goossen Woodwork
Sarah Goossen, Goossen Woodwork
Troy Williams, Owens / Willinger Construction
Robert Owens, Owens / Willinger Construction
Chuck Konrade, Konrade Construction
Randy Kelly, Randy Kelly Accounting

The following representatives also attended:

Tim Rogers, USDA Rural Development
Brandon Preng, USDA Rural Development

Brian Wendland, Performance Plus Homes
John Holden, IBACOS

3.5.3. Results

Several builders were interested in building houses to meet the specifications. BSC and IBACOS arranged to follow-up with these builders in the following weeks. Contacts made at this information session lead to the construction of more than 20 houses that met the Incentive Program specification with the USDA/United Way Self Help Housing Program.

3.6 Training Event 6 - Thursday, May 15, 2008

3.6.1. Description

Joseph Lstiburek from Building Science Corporation gave a volunteer trade training session on site in Greensburg for Mennonite Housing. The training session was followed by a site walk with construction supervision for the project.

For the first session, Joe focused on the advanced framing details. At the time of the site walk, two houses were at the framing stage and served as examples for the information session.



Figure 3.3: Photograph of advanced framing showing single top plate and insulating sheathing

3.6.2. Participants

Joseph Lstiburek, Building Science Corporation - Speaker

Doug Bruggeman, Construction Manager, Mennonite Housing
Project Superintendent, Mennonite Housing

3.6.3. Results

As a result of the training, Doug Bruggeman and the Project Superintendent trained 10 to 15 volunteers and additional trades people working on the houses. During the site walk, Joe was able to use examples on the first two houses to demonstrate improper construction and corrections were made to the remaining houses.

3.7 Training Event 7 - Tuesday, June 10, 2008

3.7.1. Description

Joseph Lstiburek from Building Science Corporation gave a second trade training session and site walk for Mennonite volunteers in Greensburg, Kansas.

The second session was focused on water management details, including: window flashing and installation, window to wall interface, garage wall to house wall interface, and gable ends of the building.



Figure 3.4: Photograph of partially complete window flashing

3.7.2. Participants

Joseph Lstiburek, Building Science Corporation - Speaker

Doug Bruggeman, Construction Manager, Mennonite Housing
Project Superintendent, Mennonite Housing

3.7.3. Results

As a result of the training, Doug Bruggeman and the Project Superintendent trained 10 to 15 volunteers and additional trades people working on the houses. On the housing project, improvements were made and were implemented on the remaining houses in the development.

4. OTHER TRAINING ACTIVITIES

4.1 Information Website – www.buildingamerica-greensburg.com

BSC was not able to contact as many builders in the Greensburg area as expected. As discussed above in Section 2.2: Changing Circumstances and Modifications to the Training Plan, slow progress at reconstruction by residents and the small number of builders in town contributed to this. As a result, BSC’s training effort shifted focus from scheduled sessions to “on-demand” sessions as builders were found.

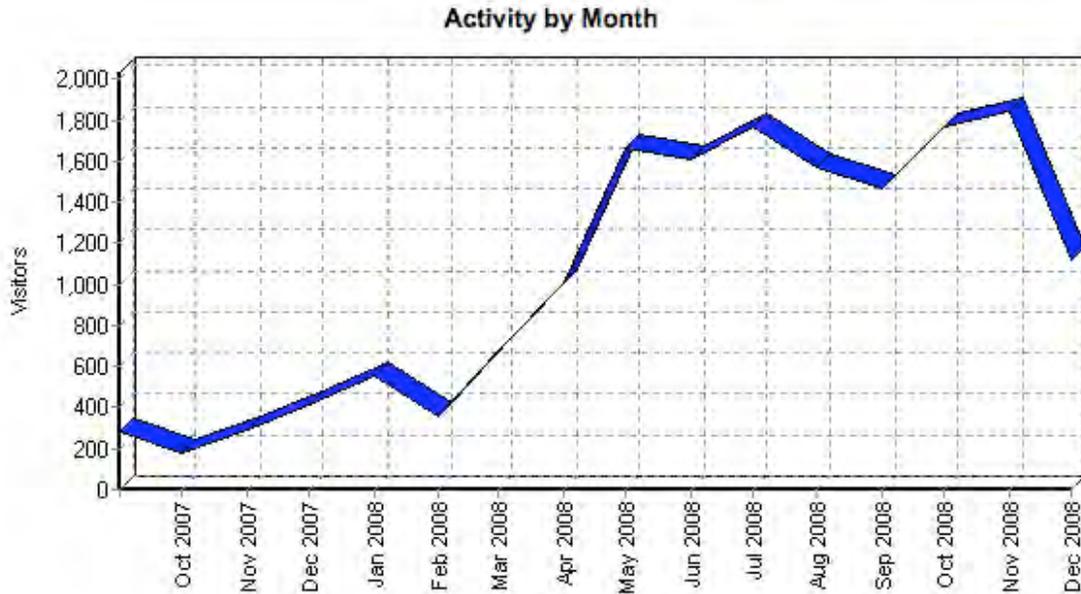
To complement this effort, BSC revised the “Building Greensburg” website (see Figure 4.1 below) to include additional resources intended for training builders. Based on feedback from builders, other stakeholders and our partners at IBACOS working in Greensburg, BSC also posted a number of responses to frequently asked questions. These resources are described in section 4.2 below.



Figure 4.1: Screen capture of Building Greensburg website (www.buildingamerica-greensburg.com)

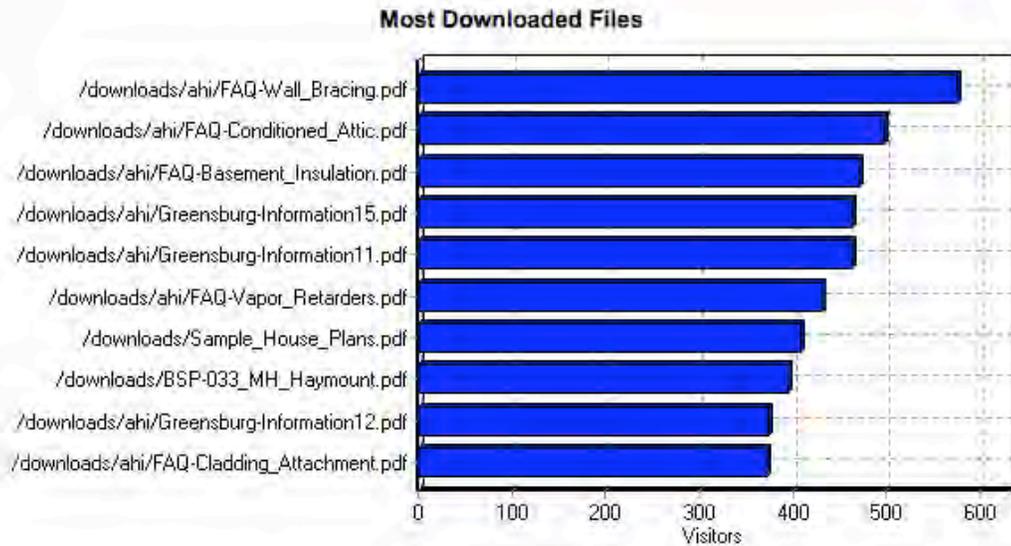
In the months following the change in strategy, the website visitor record shows an increase in traffic to the website after the additional information was uploaded (see Table 4.1 below).

Table 4.1: www.buildingamerica-greensburg.com visitors per month (Sept 2007 to Dec 2008)



Also, the records of downloaded files show that the information sheets and FAQs quickly became the most popular documents on the website. Looking at the “top 10” list below, the information sheets and FAQs were 8 of the top 10 documents. Together these eight documents were viewed by more than 3,500 times in less than a year.

Table 4.2: www.buildingamerica-greensburg.com "most downloaded files" list



Based on these measures, we consider the website to be an effective training resource that complements the efforts of BSC and IBACOS on site in Greensburg.

Pages from the website are included in an appendix to this report.

4.2 Resource Material: Information Sheets and FAQs

Two-page information sheets and responses to frequently asked questions were posted on the www.buildingamerica-greensburg.com website under the “Downloads” section. The series was entitled “High Performance Housing Information Sheets for Greensburg, KS.” The topics for the information sheets were chosen to address specific questions faced by IBACOS staff on site and to explain elements of the Incentive Program technology package.

The following “Information Sheets” were produced and posted:

- Information Sheet #1 - Foundations and Groundwater Control
- Information Sheet #10 - Passive Radon Mitigation System
- Information Sheet #11 - Controlled Ventilation System
- Information Sheet #12 - Ductwork in Conditioned Space
- Information Sheet #13 - Transfer Ducts and Grilles
- Information Sheet #15 - Duct Sealing
- Information Sheet #17 - Sealed Combustion Water Heaters

The following “FAQs” were produced and posted:

- FAQ - Filtration of Outdoor Air
- FAQ - Exposed Basement Insulation
- FAQ - Attaching Cladding over Insulated Sheathing
- FAQ - Conditioned Attics
- FAQ - Removing a Vapor Retarder with Insulated Sheathing
- FAQ - Braced Walls with Insulated Sheathing

The Information Sheets and FAQs are included in an appendix to this report.

4.3 Example Wall Construction Mock-up

The original training curriculum outlined in Section 2.1 above was developed assuming that at least one construction project would be running during the scheduled training sessions. We were unable to find a suitable project and BSC proposed to construct an example wall mock-up to demonstrate the technology package. The objective was twofold: first, the mock-up would be a physical example for training sessions; and second, the mock-up would provide a highly visible “sign board” for DOE/NREL efforts in Greensburg.

The location selected for the mock-up was diagonally opposite the County Courthouse building (one of the only major buildings still standing after the tornado) on the block occupied by the FEMA offices. Also nearby were the City and County temporary offices, ensuring that a large number of residents (and most residents interested in rebuilding) would see the mock-up



Figure 4.2: Photograph of completed wall mock-up with sign board near USDA office

The mock-up construction showed 2x6 advanced frame construction with 1.5” insulating sheathing detailed as the drainage plane (see Figure 4.2 above). A window was included to show proper flashing details and the siding and trim were installed as a “cut away” so that the installation and assembly could be seen without explanation. The construction of the mock-up was completed by BSC staff between Wednesday, September 19 and Saturday, September 22, 2007.

A signage board was designed to provide information about services and support provided by BSC and IBACOS, as well, as a description of the Building America program. The design also included an “inside” and “outside” rendered three dimensional model of the mock-up with labels to aid visitors understanding of the mock-up. The sign was printed at 4’ x 8’ on a vinyl banner and mounted next to the mock-up.

Based on feedback received during the three-day construction of the mock-up and from builders and other stakeholders in the months following, the mock-up and signage were an effective method of generating interest in the DOE/NREL/BSC/IBACOS support efforts and the www.buildingamerica-greensburg.com website.

5. PROJECT EVALUATION AND CONCLUSIONS

The training program planned and implemented by Building Science Corporation at request of the Department of Energy to support the reconstruction of Greensburg, Kansas was largely successful. The end result of BSC's efforts in co-operation with NREL, IBACOS and other organizations resulted in the exposure of dozens of builders and homeowners to energy efficient, affordable, durable and healthy construction techniques. Beyond this person-to-person contact, we have documentation of several thousand downloads of training information posted on our website (of which a good percentage may have been referrals from our efforts in Greensburg).

Concrete evidence of the success of the training efforts are the more than 20 houses built to the high performance technology specification outlined by the Demonstration Home Incentive Program. The construction of these houses involved many volunteers (many who were professional trades people in other areas of the country), as well as local trades people and residents, all of whom received information about the benefits of energy efficient housing.

BSC found that a slower than anticipated start to reconstruction limited the number of builders who could have been involved in the program. Some of the reasons for this slow start were outside of the control of BSC, NREL or the Department of Energy generally. However, some issues—such as the lack of interagency communication and co-ordination and the difficulty in packaging understandable and timely support—could be addressed in similar situations in the future.

BSC recommends that for matters relating to the re-construction of energy efficient, affordable and durable housing, DOE working groups prepare emergency response plans that incorporate lessons learned in the Greenburg experience and develop a “stock” technology approach that can be implemented in any area of the United States.

6. APPENDICES

6.1 Greensburg, KS Draft Building Training Curriculum

6.2 Description of Demonstration Home Incentive Program and Specification

6.3 Training Series Introductory Presentation

6.4 www.buildingamerica-greensburg.com Webpages

6.5 High Performance Housing Information Sheets and FAQs for Greensburg, KS

BA-0805: Training Curriculum and Follow-Up Results—Greensburg, KS

About this Report

This report was prepared with the cooperation of the U.S. Department of Energy's, Building America Program.

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