

Building America Summer 2012 Technical Update Meeting



July 24 – 26, 2012
Denver, Colorado

DRAFT AGENDA – May 14, 2012

*For more information about this meeting or to register,
please visit the Building America Meetings page at
http://www1.eere.energy.gov/buildings/building_america/meetings.html*

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Day 1 - July 24, 2012

Objective:

The Building America program strives to be the catalyst that accelerates the transformation of the residential building market – creating innovative residential energy system solutions required to enable 50% energy savings in existing and new homes for all U.S. climate regions. Building America works to identify critical barriers in system-level and whole house energy improvements and participate in cost-shared research partnerships to enable and accelerate development of robust and innovative solutions.

As part of this effort, Building America Standing Technical Committees (STCs) capture and address specific research challenges, gaps in understanding, and new research opportunities identified by the Building America program and our stakeholders. Committees include experts from DOE, the Building America research teams, national laboratories, and industry organizations that offer specialized knowledge in the topic areas.

The goal of the Standing Technical Committee (STC) meetings on July 24th is to further develop the “critical path” milestones necessary to support Building America’s 2015 goals and to define/prioritize whole house, systems-level and component gaps in each committee.

Building America welcomes public participation in these important planning meetings.

Standing Technical Committee Meetings - Schedule

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| 8:00am – 8:30am: | About Building America Standing Technical Committees (NREL) |
| 8:30am – 9:30am: | Automated Home Energy Management |
| 9:40am – 10:40am: | Analysis Methods and Tools |
| 10:50am – 11:50am: | Enclosures |
| 11:50am – 1:00pm: | Lunch |
| 1:00pm – 2:00pm: | Hot Water |
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| 4:20pm – 5:20pm: | Test Methods and Protocols |

Days 2 and 3 – July 25-26, 2012

Purpose:

Building America teams represent world-class building science expertise for high-performance homes. Program customers including builders, contractors, HERS raters, designers, and consultants face significant challenges implementing a number of controversial issues where it is hard to pin down consistent recommendations. This *Technical Update Meeting* presents a diverse array of expert perspectives on each of these key issues followed by facilitated discussion to narrow down the best Building America guidance that can be provided at this time. The intent of the panel format of the *Technical Update Meeting* is to evaluate the status of solutions to key questions currently limiting implementation of high performance homes.

Desired Outcome:

A set of expert recommendations for nine key issues based on facilitated discussion.

Day 2 – July 25, 2012

8:00am – 8:30am: Key Questions - U.S. Department of Energy Building Technologies Program Update – David Lee, DOE

8:30am – 10:00am: Issue 1 - How Do We First Do No Harm with High-R Enclosures?

What materials and approaches provide the “perfect.” cost-effective, production-level, high-R enclosures for all major US climate regions that ensure no moisture damage?

Desirable characteristics for high performance enclosure solutions include:

- Elements can be easily adapted for different climates, allowing for standardized construction approaches across all climates
- Minimizes possibility of condensation within wall
- Can be easily adapted to allow use of a broad range of cladding systems
- Minimizes increase of labor and material cost compared to current reference production wall systems defined by IECC 2012.
- Reliably integrates window installation and flashing, drainage plane, air barrier, and shear strength requirements
- Controls groundwater and soil gas entry into the conditioned space
- Dries within an acceptable period of time after water intrusion events via a combination of vapor diffusion and/or convection
- Durability and performance of enclosure can be reliably predicted by advanced analytical and experimental hygrothermal test protocols

Proposed Solutions:

- NAHB Research Center, Amber Wood
Moisture Performance through Field Testing for High Performing Homes
- BSC, Joseph Lstiburek
How Do We First Do No Harm with High-R Enclosures?
- IBACOS, Anthony Grisolia and Duncan Prahll
Exterior Wall Retrofit Strategies with Exterior Insulating Sheathing

10:15am – 11:45am: Issue 2 - What Emerging Innovations are the Key to Future Homes?

What are the most critical emerging innovations that will solve critical problems and capture new performance opportunities for future homes?

Desirable characteristics for emerging solutions include:

- Provides whole house savings at neutral cost compared to current solutions
- Increases home durability and comfort
- Reduces warranty and call back costs
- Reduces the cost or increases the performance of other systems

Potential examples include high-R windows, heat pump clothes dryers, heat pump water heaters, “next gen” home automation systems, “next gen” home entertainment and home office products, Energy Star rated power supplies, air handlers with integrated ventilation and hydronic coils, etc.

Proposed Solutions:

- ARBI, David Springer
Ductless Hydronic Distribution Systems
- IBACOS, Duncan Prah
Home Energy Management Systems and Reduced Consumption
- NorthernSTAR, Garrett Mosiman
Excavationless Foundation Insulation for Existing Homes
- PNNL, Sarah Widder/Terry Mapes
Role of Highly-Insulating Windows in Achieving 50% Energy Savings in Residential Retrofits

12:45pm – 2:15pm: Issue 3 - HVAC Proper Installation Energy Savings: Over-Promising or Under-Delivering?

What energy savings are realistically achievable by following quality installation standards for installation, operation, and maintenance of residential HVAC?

Desirable characteristics for installation and maintenance solutions include:

- Simple checklists, inspection and diagnostics installers can apply to verify correct installation and maintenance
- Simple consumer operation and maintenance guides
- Equipment sensing and self-diagnostics
- Contractor certification
- Clear documentation of the value and savings that result from proper installation and maintenance
- Minimizes increase in component and labor cost compared to equivalent systems

Proposed Solutions:

- ARBI, David Springer
Guidelines on Airflow and Charge Verification
- PARR, Midwest Energy Efficiency Alliance, J. Will Baker
Improving Installed Furnace Performance – a 48 House Case Study
- LBNL, Iain Walker
A PDI for your HVAC System

2:30pm - 4:00pm: Issue 4 - Are High-Efficiency Hot Water Heating Systems Worth the Cost?

What are realistic energy savings associated with the latest advanced and forthcoming water heating technologies and are they cost-effective?

Desirable characteristics for a high-efficiency water heating system include:

- Long life-time
- Reliable operation
- Dependable energy savings
- Ensured combustion safety
- Cost effectiveness

Proposed Solutions:

- NorthernSTAR, Dan Cautley/Ben Schoenbauer
Water Heater Replacement Field Study Leading to Tankless Water Heater Option
- ARBI, Mark Hoeschele
Cost Effective Water Heating Solutions

4:15pm – 5:30pm: Issue 5 - How Much Insulation is Too Much?

How do we define the cost-effective limit for improvements in enclosure efficiency?

Desirable characteristics for solutions for determining the cost effectiveness of efficient enclosure systems include:

- Comparison of cost savings to cost of grid-supplied energy
- Comparison of cost to finance energy upgrades to reductions in operating cost
- Comparison of cost of efficiency savings to the cost of savings from renewable generation.

Proposed Solutions:

- BSC, John Straube
Decision-Making Approaches for Enclosure Insulation Levels
- NREL, Ren Anderson
Optimizing High Levels of Insulation
- PNNL, Pam Cole
Cost Analysis Approach for Codes

Day 3 – July 26, 2012

8:00am – 8:30am: General Session - Building America Technical Update Meeting: What We Know, and What We Don't Know– Sam Rashkin, DOE

8:30am – 10:00am: Issue 6 - Do Codes and Standards Get in the Way of High-Performance?

What gaps and barriers in codes, standards, and rating systems limit achievement of 50% Homes?

Desirable characteristics for solutions resolving gaps and barriers in codes, standards, and rating systems include:

- Identification and documentation of building science driven risks and associated costs
- Solution description in a form that can be adopted by consensus technical committee
- Documentation of solution benefits

Proposed Solutions:

- BA-PIRC, Janet McIlvaine
Challenges with Existing Home Mechanical Systems Codes: Examples from Florida
- NorthernSTAR, Pat Huelman
Prescriptive Codes: A Cure or a Curse?
- IBACOS, Duncan Prahl
Impact of Codes on Potential PVC Duct System Solution

10:30am – 12:00pm: Issue 7 - What are the Best HVAC Solutions for Low-Load, High Performance Homes?

What components and controls are required to implement the “perfect,” cost-effective, production-level low-load space conditioning systems for all major US climate regions?

Desirable characteristics for space conditioning system solutions include:

- Capable of uniform distribution of comfort and ventilation air
- System components can be easily adapted for different climates, allowing for standardized system design approaches across all climates
- Can be designed to meet the capacity requirements for 50% homes
- Limits occurrences of lengthy episodes of high indoor RH during periods with low sensible loads
- Meets current mechanical code.
- Minimizes increase in labor and material cost compared to standard systems
- Ducts and air handlers in conditioned space
- Based on actual vs. rated performance characteristics
- Is flexible enough to meet a broad range of individual comfort preferences

Proposed Solutions:

- BA-PIRC, James Cummings
Sensible and latent load control with centrally ducted variable capacity space conditioning systems in low sensible load environments
- BSC, John Straube
HVAC for Low-Load Homes
- NorthernSTAR, Ben Schoenbauer
Dual Integrated Appliances (Combi Systems)
- IBACOS, Dave Stecher and Nick Mittereder
Minimized Space Conditioning Distribution Strategies for Low-load Homes

1:00pm – 2:30pm: Issue 8 - Better Technology Doesn't Always Win – How Can We Ensure That Doesn't Happen to High-Performance Homes?

What market delivery solutions are most effective communicating and validating the value of high-performance home innovations?

Desirable characteristics that document market value include:

- Value to key participants in the value chain
- Acceptance of innovation by experts and market leaders
- Incremental whole house benefits exceed incremental costs
- Innovation meets code and warranty requirements
- Implementation guidelines compatible with production builder construction practices
- Program participation enhances builders' business metrics

Proposed Solutions:

- ARIES, Emanuel Levy
Winning with Co-opetition
- BARA, Darren Harris
Communicating the Value of EE Research Results
- BA-PIRC, Stephanie Thomas-Rees
Successful Marketing Practices of 30% Community Scale Builders

3:00pm – 4:30pm: Issue 9 - What are the Best Ventilation Techniques?

How do we address ventilation in all climates? What is the best compromise between occupant health and safety and energy efficiency?

- What is the most cost effective approach?
- How much to ventilate?
- When to ventilate?
- What about ASHRAE 62.2? Do we agree?

Proposed Solutions:

- LBNL, Max Sherman and Iain Walker
Emerging Innovations for IEQ
- BSC, Joe Lstiburek
Thoughts on ASHRAE 62.2
- TBD

4:30pm – 5:00pm: Meeting Wrap-up

ABOUT THE U.S. DEPARTMENT OF ENERGY'S BUILDING AMERICA PROGRAM

The U.S. Department of Energy's (DOE) Building America program is engineering the American home for energy performance, durability, quality, affordability, and comfort.

Building America is an industry-driven research program working with national laboratories and building science research teams to accelerate the development and adoption of advanced building energy technologies and practices in new and existing homes. The program works closely with industry partners to develop innovative, real-world solutions that achieve significant energy and cost savings for homeowners and builders.

Building America acts as a national residential test bed where different building system options are evaluated, designed, built, retrofitted, and vetted to ensure that requirements for energy efficiency, quality, sustainability, risk mitigation, and comfort are met. Research is conducted on individual measures and systems, test houses, and community-scale housing in order to validate the reliability, cost-effectiveness, and marketability of technologies when integrated into existing and new homes.

ABOUT THE BUILDING AMERICA TEAMS

ADVANCED RESIDENTIAL INTEGRATED ENERGY SOLUTIONS (ARIES)

Lead: The Levy Partnership, Inc. New York, NY
Focus: Accelerate the development and commercialization of innovative and cost-effective approaches for dramatically reducing energy use of the nation's affordable housing, both existing and new. The team is broadly representative, including more than 50 organizations drawing from all stakeholders in the affordable housing community.

ALLIANCE FOR RESIDENTIAL BUILDING INNOVATION (ARBI)

Lead: Davis Energy Group, Davis, CA
Focus: Evaluate and demonstrate innovative technologies and residential construction techniques. ARBI focuses on research to motivate homeowners to invest in home energy upgrades, and develops and tests alternative marketing approaches to achieve large-scale implementation of energy improvements in targeted communities.

BUILDING AMERICA RETROFIT ALLIANCE (BARA)

Lead: Building Media, Inc, Kent, WA
Focus: Combines technical expertise and real-world construction experience with communications and outreach expertise to bridge the gap between research and market integration. BARA focuses exclusively on the home renovation and retrofit market, with emphasis on developing, deploying and promoting technically sound, cost-effective measures to radically improve home performance.

BUILDING AMERICA PARTNERSHIP FOR IMPROVED RESIDENTIAL CONSTRUCTION (BA-PIRC)

Lead: Florida Solar Energy Center (FSEC), University of Central Florida, Orlando, FL
Focus: Cost-effective efficiency solutions for new and existing homes in hot-humid and marine climates. FSEC manages residential energy research facilities including the Manufactured Housing Laboratory, the Flexible Roof Facility, the Building Science Lab, the Hot Water Systems Laboratory, and the Climate-Controlled Air Conditioning Laboratory. The Flexible Research Test Facility, currently under construction, will provide two side-by-side lab homes for controlled retrofit experiments.

BUILDING SCIENCE CORPORATION (BSC)

Lead: BSC, Somerville, MA
Focus: Leading developer of energy efficient enclosure, ventilation and dehumidification systems for durable, high performance homes. BSC has worked with dozens of industry partners during the past decade and is responsible for the construction of more than 10,000 Building America houses and 100,000 ENERGY STAR houses (through its partner MASCO and the Environments for Living® program). BSC provides advanced solutions to technical challenges, code barriers and market requirements for new and existing homes.

CONSORTIUM FOR ADVANCED RESIDENTIAL BUILDINGS (CARB)

Lead: Steven Winter Associates, Inc., Norwalk, CT
Focus: Improving new and existing homes (specializing in multifamily and affordable housing) by leveraging new technologies, underutilized technologies, and innovative market delivery strategies. Researching advanced building systems and whole house performance, and transferring that knowledge to the marketplace in order to elevate home performance industry-wide.

IBACOS

Lead: IBACOS, Pittsburgh, PA

Focus: Develop and demonstrate integrated systems of design, procurement, construction, quality assurance and marketing needed to transform residential building retrofits and new construction.

NAHB RESEARCH CENTER INDUSTRY PARTNERSHIP FOR HIGH PERFORMING HOMES (NAHBRC PARTNERSHIP)

Lead: NAHB Research Center, Upper Marlboro, MD

Focus: Integrated, system-based technology advancement center with the primary mission of removing technological, regulatory, and cost barriers to building innovation by leveraging its access to remodelers and home builders.

NORTHERNSTAR BUILDING AMERICA PARTNERSHIP

Lead: University of Minnesota, St. Paul, MN

Focus: High-performance, energy-efficient solutions for new and existing homes in cold and severe cold climates, using a holistic integration of information and technologies across three key systems: the building system, the construction/delivery system, and the market/user system.

PARTNERSHIP FOR ADVANCED RESIDENTIAL RETROFIT (PARR)

Lead: Gas Technology Institute, Des Plaines, IL

Focus: Apply strong experience in design, development, integration, and testing of advanced building energy equipment, components and systems in laboratory and test house settings to improve performance, quality and market acceptance of whole-house residential energy efficiency retrofits in cold climates.

ABOUT THE NATIONAL LABORATORIES

LAWRENCE BERKELEY NATIONAL LABORATORY

Lawrence Berkeley National Laboratory's Environmental Energy Technologies Division (EETD) performs analysis, research, and development leading to improved energy technologies and reduction of adverse energy-related environmental impacts. EETD conducts research in advanced energy technologies, atmospheric sciences, energy-efficient building technologies; energy analysis; and indoor environmental quality.

NATIONAL RENEWABLE ENERGY LABORATORY

National Renewable Energy Laboratory (NREL) is the nation's only national lab devoted entirely to energy efficiency and renewable energy. To address the nation's energy and environmental goals, NREL develops revolutionary technologies and practices, advances science and engineering, and transfers knowledge and innovations. The lab's Electricity, Resources and Building Systems Integration Center was formed to lead integration of renewable energy and energy efficiency technologies into the electricity grid. Serving the country as technology lead for residential and commercial building efficiency, including the Building America Program, NREL has developed strong partnerships with industry, universities, utilities and non-profit companies.

OAK RIDGE NATIONAL LABORATORY

Oak Ridge National Laboratory's (ORNL) Buildings Technology Center (BTC) supports the development of technologies that improve the energy efficiency and environmental compatibility of buildings. ORNL partners with universities and private industry to develop and deploy energy-efficient buildings system technologies. A major focus of the BTC is Building America, including the development of manuals for builders and homeowners to guide them toward energy-efficient homes. The BTC is also home to a Building America research team.

PACIFIC NORTHWEST NATIONAL LABORATORY

Pacific Northwest National Laboratory (PNNL) develops multi-disciplinary solutions that enhance the energy efficiency of the nation's buildings. PNNL is the lead national laboratory for DOE's energy codes and standards, including support of the International Energy Conservation Code. PNNL's market transformation activities help to develop markets for emerging technologies such as solid-state lighting and highly insulating windows. PNNL supports Building America through documentation and resource development.



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