

Advanced Houses That Work – New Construction

In this full day session, participants learn that complex changes in home design, building materials, mechanical systems, appliances, code compliance and consumer lifestyles and expectations make every builder, supplier, and trade contractor's job more demanding. We will cover the basics of building science and how it is applied to create high performance homes.

The session will address critical home performance elements that exist as a system and are part of energy efficient homes. The fundamentals of building science - air, heat and moisture flow – will be outlined and applied to help participants make better choices with respect to construction materials and methods. Participants will also learn important information about indoor air quality, including the basics of mold and other pollutant sources, and cost-effective strategies to be able to offer healthier indoor environments.

At the end of the session, attendees will have a thorough understanding of how to build better attics, walls and foundations and how to choose HVAC systems that integrate properly into their homes. This session will also cover how building science principles improve the marketing position for building professionals, providing case studies of builders who have changed their building processes and gained return through communicating the value of high performance homes.

Who Should Attend

- New home builders and remodelers and their site supervision staff
- Designers and architects
- Estimators and contract managers of builders
- Building industry suppliers and manufacturers representatives of building products
- Trade contractors who want to know more about how their work affects performance
- Utility and housing program officials
- Government housing officials
- New home sales agents
- Energy Raters

Relevance to Attendees

- Learn the elements of high performance homes and how they help respond to code compliance and the many changes in the residential construction industry and consumer expectations
- Understand the fundamentals of air, heat and moisture flow and see how they can be applied to make better material and methods decisions
- Apply the building science to attics, walls, windows, foundations and HVAC decisions to create high performance homes
- Identify the building process changes needed to cost-effectively implement high performance homes

- Explore the successes of other builders who have benefited from implementing high performance home strategies.

Note:

The workshop will be adapted to the climate zone, building practices and codes of the local area where it is being presented to ensure it is relevant to participants.

Agenda

| Session Segment | Activity Plan Notes/Requests | Timing |
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| <p><u>Introduction to EEBA and its Sponsors</u></p> <ul style="list-style-type: none"> • What EEBA does • Relevance of the Houses that Work Program • EEBA publications, education and national conference • Introduction of speaker and sponsors | | 15 minutes |
| <p><u>Building Science Principles</u></p> <p>In this segment, participants learn how the many complex changes in home design, building materials, mechanical systems, appliances, consumer lifestyles and expectations over the last 30 years makes every builders, suppliers and trade contractors job more complex and demanding. The segment outlines the basic building science physics of air, heat and moisture flow that every builder should know so they can understand why some buildings work and others don't.</p> <p>1. Why we need to change the way we build</p> <ul style="list-style-type: none"> • Designs and Materials • Methods and Techniques • Customer expectations • The complicated business of building | | 15 minutes |
| <p>2. A House is an Integrated System and a "High Performance Home" is:</p> <ul style="list-style-type: none"> • Safer • More comfortable • More efficient • Healthier • More Durable | | 5 minutes |
| <p>3. The elements of a "High Performance Home" are:</p> <ul style="list-style-type: none"> • Tight Construction • Improved Insulation Systems • High Performance Windows | | 10 minutes |

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| <ul style="list-style-type: none"> • Efficient Heating & Cooling Equipment • Tight Ducts • Efficient Water Heating • Intentional Ventilation • Effective Lighting & Energy Efficient Appliances • High Performance Homes Meet the Definition of “Green Buildings” | | |
| <p>4. Getting started with Building Science</p> <ul style="list-style-type: none"> • Local Issues and our complicated Business • Looking to Building Codes as the Answer • The Forces of Nature • The Definition of Durability • What Rules Must Be Followed? | | 10 minutes |
| <p>5. Building Science Fundamentals</p> <p>Heat Flow</p> <ul style="list-style-type: none"> • Conduction, Convection, Radiation <p>Air Flow...</p> <ul style="list-style-type: none"> • Wind, stack, mechanical <p>Moisture Flow</p> <p>Moisture Forms – Liquid, solid, vapor</p> <p>Moisture Flows</p> <ul style="list-style-type: none"> • Liquid Water – Bulk, rain, gravity • Capillary Flow • Air Transport of Water Vapor • Diffusion <p>Air Tightness & Moisture Flow</p> <p>Air flow can assist drying</p> | | 30 minutes |
| <p><u>Window & Door Systems</u></p> <p>Windows constitute one of the highest dollar components of a home and have become a primary design feature. It is important for builders to understand how to accommodate more and bigger windows without compromising comfort and energy efficiency. This segment will help builders choose appropriate windows that avoid condensation and help manage both heating and cooling loads.</p> <p>Elements of High Performance Windows</p> <ul style="list-style-type: none"> • Low E coatings • Insulated spacers • Argon filled • Better frame technologies • Proper installation techniques | | 15 minutes |
| <p><u>Protecting Building Systems</u></p> | | 10 minutes |

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| <p>The segment outlines important, cost-effective strategies that protect building envelopes over the life of the building. Topics discussed will include proper flashing details, applying rain screen principles and managing interior moisture.</p> <p>1. Proper grading and drainage</p> | | |
| <p>2. Draining wall and roof assemblies</p> <ul style="list-style-type: none"> • Rain Penetration Control • Drainage Plane • The interface between walls & roofs • Installing Windows – they need careful attention • Venting our Cladding • Creating a Continuous Drainage Plane | | 40 minutes |
| <p>Foundations</p> <p>This segment will cover a thorough review of the physics of foundations and how to make them work better. Given homeowners' expectations for more livable basements it is important for builders to turn those cold, dark, damp storage spaces into warm, dry living space. Appropriate water management strategies, insulation alternatives and advanced foundation alternatives will be explored.</p> <p>1. Foundation Design and Construction from the Basics to Advanced</p> <ul style="list-style-type: none"> • Basements • Crawl Spaces • Slabs • Insulated Concrete Forms | | 20 minutes |
| <p>Mechanical Systems - Conditioning the Indoors</p> <p>This segment provides participants with important information about properly sizing and selecting heating, cooling, ventilation and hot water heating systems. With better envelope insulation and air sealing and better windows, furnaces and AC units can get smaller. Equipment options and advancements will be shown that will allow builders to optimize system performance at potentially lower overall costs. Understanding the basics of HVAC design can lower utility bills, make for quieter, healthier and more comfortable homes.</p> <p>1. Combustion Safety</p> <ul style="list-style-type: none"> • Direct Vent Furnaces & fireplaces • Power Vent Water Heaters • Tankless Water Heaters | | 10 minutes |
| <p>2. Right Sizing of HVAC systems</p> <ul style="list-style-type: none"> • Heat Loss / Gain and Comfort Factors and who can do proper sizing • Providing HVAC contractors with good information • The benefits of avoiding over sizing | | 20 minutes |
| <p>3. High performance heating & cooling system features</p> | | 10 minutes |

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| <ul style="list-style-type: none"> • ECM Fan Motors • Heat pumps | | |
| <p>4. Distribution systems</p> <ul style="list-style-type: none"> • Sizing & installing properly • Keeping ducts in conditioned spaces • Conditioned attics | | 10 minutes |
| <p>5. Verify Performance</p> <ul style="list-style-type: none"> • Air tightness, duct leakage and thermographics | | 5 minutes |
| <p>Indoor Air Quality & Other Mechanical Opportunities</p> <p>This segment covers all aspects of the ever more important topic of indoor air quality. Participants will learn the basics of mold and other pollutant sources and cost-effective strategies to solve indoor air quality concerns and how they will be able to offer healthier indoor environments for their customers. In addition, this segment will cover other mechanical systems that can impact comfort, water use and electrical consumption.</p> <p>1. Indoor air quality introduction</p> <ul style="list-style-type: none"> • Changes that impacts IAQ • Who is affected? • Pollutant Sources • IAQ Control Strategies <ul style="list-style-type: none"> ○ Remove, seal, ventilate, filter • Radon Control | | 20 minutes |
| <p>2. Mechanical Ventilation</p> <ul style="list-style-type: none"> • How Much Ventilation? • Types of Mechanical Ventilation <ul style="list-style-type: none"> ○ Exhaust Only Ventilation ○ Supply Only Ventilation ○ Balanced ventilation with heat or energy recovery | | 20 minutes |
| <p>3. Other Mechanical Opportunities</p> <ul style="list-style-type: none"> • ENERGY STAR appliances and how they can make a big difference • Lighting • In-home water use • Alternates to Traditional HVAC - High Performance Dehumidification, Solar | | 15 minutes |
| <p>The Case for Green Building</p> <p>This segment will show how building science principles fit into the growing trend toward green building. Participants will learn that the same measures taken to improve energy efficiency and building durability are recognized by the leading green building programs.</p> <p>1. Applying Building Science to Green Building Programs</p> <ul style="list-style-type: none"> • Green Building Programs • Engineered and sustainable building products • Construction waste reduction | | 10 minutes |

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| <p>Changing the Building Process</p> <p>This segment of the Houses That Work program will show participants how to take advantage of building science principles to find more cost effective methods of building – including alternative building systems. Success stories of builders who have implemented building science will be reviewed.</p> <p>1. Changing the Building Process</p> <ul style="list-style-type: none"> · Who will be responsible for change · Who needs training · Creating a plan to move forward | | 15 minutes |
| <p>Marketing for Performance</p> <p>This final segment will focus on improving the marketing position for innovative builders. Case studies will be shown and available marketing support resources will be reviewed.</p> <p>1. Marketing Tips for Innovative Builders</p> <ul style="list-style-type: none"> • Opportunities for Differentiation • The Bottom Line – cost effectiveness • The Energy Investment Opportunity • The Real Cost of Home Ownership • A Review of National Programs | | 15 minutes |
| <p>End of Workshop</p> | | |

Training Time and CEUs/Professional Development Credits

6.5-7 Hours of Educational and Training Time

This Seminar qualifies for CEUs/Professional Development Credits from the following accrediting organizations:



This session has also been approved in several states for continuing education for licensed contractors.

Pricing

The hosting fee for this seminar is \$5000

The registration fee for this seminar is \$125 (up until one week prior) or \$140 (on-site registration)*

* The registration fee includes lunch

Reading Material and Online Resources

The reading material for the course consists of documents, publications and online resources relating to each educational and training seminar. You are welcome to order, view or print the resources if you choose. You can find them by following the links below to the EEBA, Department of Energy and EPA/IAQ websites.

Link / Purchase / Download

Climate Specific Builders Guides

[Builder's Guide to Cold Climates](#)

[Builder's Guide to Hot-Dry / Mixed-Dry Climates](#)

[Builder's Guide to Hot-Humid Climates](#)

[Builder's Guide to Mixed-Humid Climates](#)

[Online bookstore with EEBA Publications, issue-specific guides, software and tools](#)

Software Resources

[Building Better Homes DVD](#)

Online Resources

[National Residential Efficiency Measures Database](#)

[DOE Building Technologies Program](#)

[Building Energy Optimization Software](#)

[EEBA National Education Partner Resources & Information](#)