# Welcome...

We are excited that you have joined us for the **Houses That Work™** educational session. You are about to experience a remarkable opportunity to learn methods for improving the performance, efficiency and durability of the homes you build.

The Energy & Environmental Building Association (EEBA) has developed this course based on years of research from the U.S. Department of Energy's Building America Program.

Houses That Work is a fast-paced introduction to innovative building processes and technologies that achieve energy and cost savings for both builders and homeowners.

The Houses That Work educational series is your resource for the systems approach to designing and building healthy, comfortable, durable, energy efficient and environmentally responsible homes.

## Today's Outline

| | |
|---|---|
| 1 | **Houses that Work** |
| 2 | **Indoor Air Quality** |
| 3 | **Contaminants** |
| 4 | **HVAC Equipment** |
| 5 | **Combustion Safety** |
| 6 | **Ventilation** |
| 7 | **Case Studies** |

DEVELOPED AND PRESENTED BY: BUILDING KNOWLEDGE

BROUGHT TO YOU BY: EEBA Energy & Environmental Building Alliance

ANIMATIONS PROVIDED BY: Ci HD

## THE SYSTEMS APPROACH

The systems approach requires that you go beyond good workmanship and good materials.

The systems approach requires that you integrate the wall system design, window selection, types and levels of insulation, sealing of air leakage areas, and heating and cooling systems.

The systems approach requires your commitment to build **Houses That Work.**

Houses should be safe, healthy, comfortable and affordable.

Houses should be durable and easily maintained.

Houses should be constructed in a manner that reduces construction waste and function in a manner that is resource efficient.

Building houses is really about the health, safety and well-being of people, the durability of the building and the well being of the environment.

## National Education Partners

**For further Education Partner information, resources and building science publications, visit:**

# www.EEBA.org

In the last several years, a growing body of scientific evidence has indicated that the pollutant levels within homes can sometimes be higher than in outdoor air, even in large, industrialized cities. Other research indicates that people spend approximately 90 percent of their time indoors. The potential health effects from indoor air pollution vary greatly and range from allergies and asthma, to cancer.

**Use energy efficient construction.**
Building tight, well-insulated homes reduces heating and cooling costs. When combined with mechanical ventilation and pollutant source control, tight, energy- efficient homes are comfortable, economical, and promote good health. Indoor air quality and energy efficiency walk hand-in-hand.

**Control water and moisture.**
Controlling moisture in a home can help reduce mold, mildew, and other biological growth which are linked to a variety of health effects. Methods to control moisture include building an energy-efficient home with proper air-sealing, proper use of vapor barriers and vapor diffusion strategies. The entire building envelope, from the foundation to the roof, should be designed to not only prevent moisture entry, but also to allow any moisture which does enter a means to escape. Proper ventilation can help ensure that indoor humidity levels remain at acceptable levels.

**Eliminate, reduce, or control pollutant sources.**
Eliminating or controlling individual sources of pollution are important steps in providing good indoor air quality. By using appropriate materials, isolating materials which may cause problems, and providing adequate ventilation, the levels of pollutants indoors can be greatly reduced. Included among these pollutants is radon, for example. If you live in a high radon area, you should consider using techniques to reduce radon entry when building your addition.

**Provide mechanical ventilation**.
Proper ventilation removes or dilutes stale air from your home, and provides cleaner air from outdoors. There are many approaches to ventilation which achieve these goals. So, "build it tight, and ventilate right."

**Use combustion equipment wisely.**
The selection, installation, and integration of combustion equipment with other systems is an important part of building a home with healthy indoor air.If combustion appliances are not installed, maintained, and operated properly these appliances can produce combustion pollutants that can damage your health, or even kill you. In addition, improperly vented appliances can add large amounts of moisture to the air, potentially resulting in both biological growth, and damage to the house. Fortunately, builders can take steps to reduce the risks for combustion equipment.

**Understand how to properly operate and maintain the home.**
How a house is operated, maintained, and lived in is one of the most important factors affecting indoor air quality. Planning for this maintenance during the construction process, and learning what's important will not only promote good indoor air quality, but will also decrease problems with the physical structure of the house over time.

Source: *Remodeling Your Home?* http://www.epa.gov/iaq/homes/hip-addition.html

# REMODELING PROJECTS

## KITCHENS

Kitchens are often the most active and multi-purpose rooms in the home. This can mean that the kitchen provides the most opportunities for improvement. From lighting and appliances to plumbing fixtures and interior finishes, the kitchen is packed with ways to improve the indoor environment.

## BATHROOMS

Bathroom remodeling may be taken on for different reasons: a water leak or moisture intrusion problem that results in the need for structural repairs, a desire to make the bathroom more functional or convenient, the need to accommodate a growing family, a change in health or mobility of a family member, a desire to improve the bathroom appearance, or a desire to upgrade appliances and fixtures.

## BASEMENTS

For many existing homes, the finishing of a basement represents one of the easiest and least expensive ways to increase the living space. But the basement can also be one of the most difficult in terms of the building science involved and overall indoor air quality.

## ATTICS

Converting attic space to living space is popular and can be very economical. However, as you bring an attic into your living space, you should use care to ensure the attic is brought all the way into the living space to avoid comfort problems (too hot/too cold) and to prevent other conditions which could impact your health or the structure of your home.

## ADDITIONS

While remodeling or improving the energy efficiency of your home, steps should be taken to minimize pollution from sources inside the home. In addition, residents should be alert to signs of inadequate ventilation, such as stuffy air, moisture condensation on cold surfaces, or mold and mildew growth and use the remodeling project to correct underlying problems.

**PROJECT**_____

## IAQ ACTION PLAN:

*Identify the three most important issues with this remodel. Identify a strategy to address each issue. Identify a benefit to you customer for each strategy.*

1. Issue:

Strategy:

Benefit:

2. Issue:

Strategy:

Benefit:

3. Issue:

Strategy:

Benefit:

**PROJECT**_____

## IAQ ACTION PLAN:

*Identify the three most important issues with this remodel. Identify a strategy to address each issue. Identify a benefit to you customer for each strategy.*

1. Issue:

Strategy:

Benefit:

2. Issue:

Strategy:

Benefit:

3. Issue:

Strategy:

Benefit:

**Find More Building Science Resources at eeba.org**