

## **Houses That Work for Existing Homes Workshop:** **HVAC System Replacement**

This workshop will teach participants essential information about HVAC System Replacement as it applies to single family residences. When homeowners purchase a new high-efficiency HVAC system, they expect it to perform at the advertised capacity and efficiency. Unfortunately, more than half of all HVAC systems in U.S. homes are believed to perform poorly due to one or more installation issues, which wastes energy and can increase peak load. By purchasing high efficiency equipment and having it properly installed and tested, a homeowner can lower their energy bills, increase comfort and extend the useful life of the equipment. Participants will learn the basics about HVAC system replacement and the details and techniques for a quality installation. They will also gain practical strategies they can use to help their clients make better decisions. Participants will be equipped to avoid potential risks and identify new opportunities for marketing their services. The information presented in this session will build on the basics of building science covered in the popular EEBA full day Houses That Work session. Participants for this HVAC Systems Replacement session are encouraged to attend an HTW I session before taking this workshop.

An important element of the workshop will be to introduce the EPA Energy Star HVAC Quality Installation Program.

### **Relevance to Attendees**

The workshop is targeted to at least the following groups:

- General contractors who focus their business on the residential remodeling sector
- HVAC contractors
- Real estate agents
- Building supply and manufacturers representatives
- Utility and housing program officials who promote weatherization programs
- Designers and architects

### **Learning Objectives**

- Identify how HVAC systems are related to building science and high performance homes
- Relate the potential impact of HVAC replacement on the building and the occupants
- Apply cost-effective strategies to HVAC system replacement strategies
- Demonstrate energy savings and return on investment to customers

# HVAC System Replacement

## Curriculum Outline & Activity Plan

### 3.50 Hours of Teaching Time

Segment	Activity Plan	Timing
<p><b><u>Introduction to EEBA and its Sponsors</u></b></p> <ul style="list-style-type: none"> <li>• The relationship between EEBA, DOE, ENERGY STAR, EPA</li> <li>• Relevance of the “Houses That Work” Program</li> <li>• EEBA publications and education</li> <li>• Introduction of speaker and sponsors</li> </ul>	<p>Facilitator has sponsors and participants introduce themselves and asks participants what prompted their interest in today’s session.</p>	<p>10 min.</p>
<p><b><u>Building Science Fundamentals</u></b></p> <ul style="list-style-type: none"> <li>• Overview of current market opportunities</li> <li>• Review basics of Heat, Air and Moisture flow</li> </ul>	<p><b><u>Question and Answer:</u></b> Facilitator shows a series of slides demonstrating building physics. Participants are asked for their insights and experiences.</p>	<p>15 min.</p>
<p><b><u>Home Assessments</u></b></p> <p>Achieving the goals of healthy, safe, durable, comfortable and energy efficient housing are key points for selling HVAC replacement to homeowners and starts with an assessment.</p> <ul style="list-style-type: none"> <li>• Visual inspections are enhanced once a contractor understands how the house works as a system.</li> <li>• Proactively address occupant concerns regarding health and comfort</li> <li>• Review performance testing</li> </ul>	<p><b><u>Small Group Exercise:</u></b> Participants work together to list issues regarding assessments</p> <p><b><u>Demonstration:</u></b> Facilitator outlines a method for participants to address key factors of home assessments</p>	<p>15 min.</p>
<p><b><u>Safety and Health Concerns</u></b></p> <p>A discussion of the potential safety and health issues related to HVAC system replacement, including:</p> <ul style="list-style-type: none"> <li>• Combustion safety risks</li> <li>• Radon testing</li> <li>• The roles and responsibilities contractors have in providing healthy indoor air.</li> </ul>	<p><b><u>Short Lecture:</u></b> Facilitator reviews risk assessment factors</p> <p><b><u>Small Group Exercise:</u></b> Participants work together to develop strategies on the major risk factors</p>	<p>15 min</p>

<p><b><u>Mechanical System Design</u></b>  Developing priorities and strategies for mechanical system selection</p> <ul style="list-style-type: none"> <li>• Equipment and control options</li> <li>• Sizing guidelines</li> <li>• Equipment efficiencies</li> </ul>	<p><b><u>Question and Answer:</u></b>  Facilitator shows a series of slides demonstrating system types, controls and efficiency guidelines. Participants are asked for their feedback on their experience.</p>	<p>35 min</p>
<p><b><u>Distribution Systems</u></b>  Developing priorities and strategies for effective distribution systems</p> <ul style="list-style-type: none"> <li>• Seal and insulate</li> <li>• Optimize air flow</li> </ul>	<p><b><u>Question and Answer:</u></b>  Facilitator shows a series of slides demonstrating duct sealing. Participants are asked for their feedback on their experience with duct sealing strategies.</p>	<p>25 min</p>
<p><b><u>Ventilation Guidelines</u></b>  Developing priorities and strategies to control moisture and pollutants</p> <ul style="list-style-type: none"> <li>• Fresh air ventilation</li> <li>• Kitchen &amp; bath ventilation</li> <li>• Dehumidification</li> <li>• Filtration</li> </ul>	<p><b><u>Question and Answer:</u></b>  Facilitator shows a series of slides demonstrating ventilation strategies. Participants are asked for their feedback on their experience with these strategies.</p>	<p>30 min</p>
<p><b><u>Verifying Performance</u></b>  Key quality installation practices for a successful HVAC system</p> <ul style="list-style-type: none"> <li>• Testing</li> <li>• Pressure balance of rooms</li> <li>• Proper refrigerant charge</li> </ul>	<p><b><u>Question and Answer:</u></b>  Facilitator shows a series of slides demonstrating quality installation practices. Participants are asked for their feedback on their experience with these practices.</p>	<p>30 min</p>

<p><b><u>Demonstrating Energy Savings</u></b></p> <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Features, advantages and benefits of HVAC system replacement</li> <li>• Return on investment</li> </ul>	<p><b><u>Short Lecture:</u></b> Facilitator reviews case studies and demonstrates return on investment calculations</p> <p><b><u>Small Group Exercise:</u></b> Participants work together to develop features, advantages and benefit statements</p>	<p>25 min.</p>
<p><b><u>Summary and End of Workshop</u></b></p>	<p><b><u>Question and Answer:</u></b> Facilitator asks participants: - new things they have seen that will be asy to implement - things that will take more time to implement</p>	<p>10 min.</p>