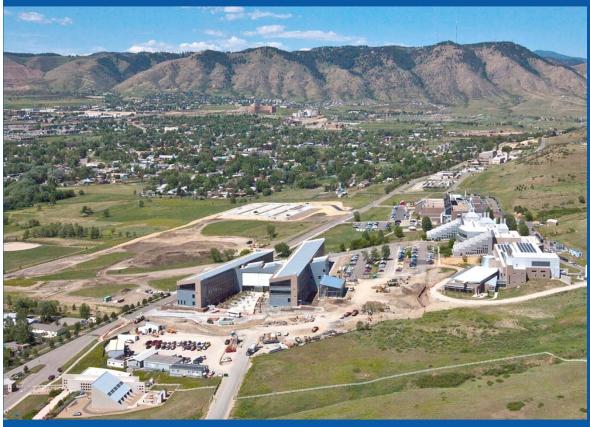


# Technical Barriers, Gaps, and Opportunities Related to Home Energy Upgrade Business Models



Residential Energy Efficiency Technical Update Meeting

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#### Goals

Associated with home energy upgrade business models, write a report:

- To identify technical barriers, gaps, and opportunities.
  - To identify current business models.
  - To document the available literature and research work.

## Why Home Energy Upgrades?

- Buildings sector is the single largest contributor to global greenhouse gas emissions (30%).
- Construction sector is responsible for more than a third of global resource consumption (12% of all fresh water use, generates 40% of the total volume of solid waste).
- US residential energy use is very large (22%).

## **Benefits of Home Energy Upgrades**

- Energy use in existing buildings can be cost effectively reduced by 20-50% through energy upgrades.
- Home energy upgrades can improve:
  - Comfort
  - Health
  - Durability
  - Property value
- Home energy upgrades can also create jobs.
  - In the EU, €1 million of investment creates 8-14 personyears of direct and 9-40 person-years of indirect employment.

## **Building America Efforts**

- BA-PIRC: Evaluation of Public and Private Market Retrofit Delivery Systems
- Dow Habitat: Market Realities and Change Management to Accelerate Adoption of Cost Effective Energy Efficiency Retrofits
- IBACOS: Transitioning HVAC Contractors to Home Performance Contractors
- NAHBRC-IP: Evaluation of Retrofit Delivery Practices

#### **Related Efforts**

- Home Performance Resource Center
- Financing Mechanisms
- Home Performance with ENERGY STAR
- Better Buildings
- SEE Action
- Workforce Guidelines for Home Energy Upgrades

# **Approach**

- Literature review
- Interviews with subject-matter experts

#### **Business Models**

- How a company makes money
- Programs involving incentives are not considered business models, but enablers

#### **Current Business Models**

- 1. Consultant or Independent Auditor
- 2. Trade Contractor
- 3. General Contractor
- 4. Whole-House Energy Upgrade Contractor

and hybrids and variations on these themes

# Knowledge

Gap or Barrier	Opportunities
Whole-house building science is complex	<ul> <li>Develop simple and clear educational campaigns targeting homeowners</li> <li>Create permanent or itinerant science museum exhibits</li> </ul>
Specialization results in unfamiliarity with the full potential of energy efficiency technologies	<ul><li>Develop continuous learning opportunities to contractors</li><li>Mentoring</li></ul>
Professionals believe they know their field and do not need new information	<ul><li>Develop continuous learning opportunities to contractors</li><li>Mentoring</li></ul>
Individuals after a week training start a whole-house energy upgrade contracting business with absolutely no experience	<ul> <li>Develop continuous learning opportunities to contractors</li> <li>Create apprenticeship for contractors</li> <li>Mentoring</li> </ul>

# **Energy Assessment**

Gap or Barrier	Opportunities
There is mistrust in software predictions of energy use in inefficient existing homes	<ul> <li>Address software inaccuracy issues</li> <li>Develop certification procedures for building energy simulation tools</li> <li>Obtain data from very well instrumented houses</li> </ul>
Building characteristics and utility billing data are not available for testing software tools	<ul> <li>Expand the Field Data Repository</li> <li>Create open data repositories where homeowners can add information</li> <li>Work with utilities to create energy use averages available by specific territories</li> </ul>
Non-energy benefits are not monetized	Investigate ways to monetize non- energy benefits

# **Energy Assessment (cont.)**

Gap or Barrier	Opportunities
Initial house assessment is time consuming	<ul> <li>Focus on larger neighborhoods with small number of house models</li> <li>Investigate the minimum requirements of the initial energy assessment</li> </ul>
Information transfer from initial house assessment to the staff performing the work is difficult	Create a hand-off process from the assessment to the implementation of energy upgrades
Lack of good statistical analysis to verify the quality of collected data	Develop such tools

# **Upgrade**

Gap or Barrier	Opportunities
Comprehensive energy efficiency upgrades may be expensive	Create plans for staged energy upgrades
Specific housing types in certain areas are challenging for upgrade solutions	Develop technical solutions for the issues
Recently installed mechanical equipment prior to a deep energy upgrade	Investigate best practices to adopt
No standard practices to install additional insulating sheathing when re-siding a house	Develop documented field guides for different climates
Air sealing enclosure in existing homes	Research solutions and document them in field guides
Reducing miscellaneous electric loads is challenging	Discuss the occupant behavior in energy use

## **General**

Gap or Barrier	Opportunities
Good contractors compete against bad ones	Identify good certifications for contractors and inform homeowners and other stakeholders that they exist
Programs may create barriers to contractors	
Contractors have to work with multiple programs in a territory	Work with program developers in a territory to coordinate
Contractors do not treat utilities as potential customers	

### **Next steps**

- Feedback from stakeholders is being collected
- Report will be sent for peer review shortly (weeks).
- Results will provide input to Residential Strategic Plan.
- Report will be published in FY11.