Residential Energy Efficiency: Home Performance with ENERGY STAR

Michigan Public Service Commission
Sept 1st, 2009
Perfect Energy/Environment Storm is Brewing

- Huge national WX goals
- Infrastructure will be hard pressed
- Market based HP needing huge ramp up
- Energy costs are rising
- Climate change is here
- New Leadership at top
- Utilities stepping up
- Time for action - NOW
Energy Efficiency – FIRST!

- Non-existent in 1970
- “NegaWatt before MegaWatt”

- Cost-Effective
- Climate Change Regulations coming
HPwES is Part of the Solution

- Focuses attention on **cost-effective** home improvement options
- **Big opportunity for savings** - many homes have performance problems
  - fixing problems improves comfort, health and safety, and energy efficiency
  - product standards increasing - less saving potential from product rebate strategy
- **Homeowners with high bills (and comfort problems) get real help**
  - **customer satisfaction**
  - energy audits **alone** don't improve homes
- **Helps your local economy**
  - local contractors deliver improvements
- **Good for environment**
  - improving energy efficiency reduces air pollution and greenhouse gas emissions
  - **start at home** - change a light - then improve your whole house
Home Performance with ENERGY STAR

- **More than contractor training and certification**
  - Training or certification is one step and only qualifies a contractor to participate
  - Improving homes is the goal

- **More than an energy audit**
  - A whole-house evaluation with diagnostic tests and recommendations is one step and only identifies where improvements are needed
  - Improving homes is the goal

- **More than installing energy efficient products**
  - Equipment and products need to be installed correctly to be effective.
  - Test-out is an important step at the end to verify that improvements to the home will be effective
  - Improving homes is the goal

- **No new label for existing homes**
  - Home that meet the ENERGY STAR homes criteria can be labeled
    - Difficult for most existing homes
  - Improving homes is the goal
HPwES Solves these Problems

- Noise
- High Humidity
- Excessive Dust
- Cold Air Drafts
- Smoky Fireplace
- High Energy Bills
- Hot and Cold Rooms

- Foggy Windows
- Stuffy Air
- Soot Deposits
- Rotting Roof
- Allergy Symptoms
- Lingering Odors
- Peeling Paint
- High Bills
Fixing Existing Homes Requires Controlling Air, Thermal and Moisture Flow

- Air Sealing
- Tight Ducts
- Advanced Windows
- Efficient Equipment
- Insulation Installation
- Complete Air Barrier
- Right Sizing
- Bulk Moisture
Whole-house Approach

- Visual and diagnostic inspection
  - Energy specialist trained in building science
- Diagnostic testing (before work)
  - i.e. air infiltration, HVAC air flow, duct leakage
- Summary report
  - Results
  - Recommendations
  - Estimated costs and savings
Diagnostics: House Leakage Test
Diagnostics: Duct Leakage and Air Flow Tests
Diagnostics: Infrared Imaging To Locate Thermal Bypasses
Discuss Results with Homeowner and Present Proposal and Sell Job
Common Improvements: Air Sealing
Common Improvements: Adding Insulation
Common Improvements: Duct Sealing and Repair
Common Improvements: New HVAC Equipment
Minimum requirements for installations under the program must meet the ANSI/ACCA HVAC Quality Installation Specification.

The QI Specification identifies consensus requirements associated with quality installations, acceptable procedures for measuring or verifying the attainment of those requirements, and acceptable forms of documentation to show compliance to the requirements.

8000 HVAC systems are being installed across the country today. ... Over 70% have at least one deficiency: sizing, air flow, charge and bad ducts. Houston – we have a problem!

What level of QI is DOE WX doing??
Contractor Tests After Improvements to Verify Results and Combustion Safety

- Diagnostic testing (after work)
  i.e. Air infiltration, HVAC air flow, duct leakage, combustion safety testing

- Feedback to
  ✓ the contractor
  ✓ the homeowner
  ✓ the program administrator

- **Verified improvements and persistent energy savings**
Over 50,000 homes improved
Program Elements

- Having the elements for a thriving energy efficiency retrofit “industry” requires different elements – “no one size fits all.”
However, there are pieces to the home energy retrofit “puzzle” which remain the same. States can play a variety of different roles.
Program Elements

Program Evaluation

Contractor Recruiting, Training & Certification

Incentives and Financing

Homeowner Education and Marketing

Quality Assurance
Begin your planning:

- Determine best sponsor
- “Contractor” or “Consultant” Model
- Pilot location and target market
- Schedule and budget
- Implementation Plan
- RFP development
- A Program Sponsor ensures all the elements of a Home Performance with ENERGY STAR program are in place.
  - Contractors test-in, recommend improvements, install improvements, and test-out.
  - A third party performs Quality Assurance - checking to make sure homes are safe and improved per industry best practices.
- As a Sponsor, you are responsible for overseeing the program’s implementation and the performance of participating contractors to ensure that quality standards are met.
- The sponsor can be a State or utility or a non-profit organization. Non profits generally do not have needed resources. Utilities once allowed to recover costs - generally are more successful in as sponsors.
- PSC or PUCs have obvious influence on promoting utilities as sponsors.
Current Home Performance with ENERGY STAR program models can be characterized by the delivery of audits and the installation of improvements.

As current programs mature, more emphasis is placed on certain program elements and models evolve.
Program Action

Establish Goals

Table 1 – Potential Per Home Energy Savings

<table>
<thead>
<tr>
<th>Census Region</th>
<th>Northeast</th>
<th>Midwest</th>
<th>South</th>
<th>West</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity (kWh)</td>
<td>1400</td>
<td>1700</td>
<td>4600</td>
<td>1400</td>
</tr>
<tr>
<td>Natural Gas (Therms)</td>
<td>400</td>
<td>400</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Typical Improvements</td>
<td>Increase attic insulation; insulating crawl spaces or rim joists; duct sealing, repair and insulation; air sealing; and installing programmable thermostat, energy-efficient heat pump, air conditioner, furnace, boiler, lighting or windows.</td>
<td></td>
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<td></td>
</tr>
</tbody>
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Number of contractors/jobs
Number of homes improved
Energy savings
Contractors

Recruit/Business Case
Train to standards
Certification
Participation Agreement
Sponsor
Mentor
Contractor Infrastructure – Good for All

- **Building Performance Institute**
  - **Certifications for contractor staff**
    - Building Analyst, Envelope Specialist, and HVAC Specialist
    - Written and field practical tests
  - **Accreditation for building performance companies**
    - Commitment to Whole House Approach
    - Use of certified staff
    - Quality management system and BPI QA program
  - **Affiliates that offer training, test proctoring, and mentoring of contractors**
  - **Working with RESNET on common standards for building analyst and home energy rater**
Homeowner Education

Program marketing is critical to generating demand.

Marketing includes educating homeowners through a variety of mediums such as the program website, brochures, public forums, etc.

Maryland HPwES web site includes benefits of home performance, incentives, Fed tax credit explained – how to find a contractor/energy auditor – benefits of quality assurance program
Homeowner Education

Your Home Contributes to the Quality of Our Environment

U.S. Environmental Protection Agency - U.S. Department of Energy

About ENERGY STAR • News Room • FAQs

Search

Home Improvement

Home Improvement

Common Home Problems
Home Energy Yardstick
Home Energy Audits
Air Seal & Insulate
Heat & Cool Efficiently
Home Performance with ENERGY STAR
Home Improvement FAQs

Home Energy Performance Results

Energy & Environmental Performance

Your score: 8.3 out of 10

Your score is excellent and your energy use is well below average. 83% of U.S. homes use more energy than you.

About Your Home & Energy Use

About Your Home

Zip Code: 22046
People Living in Home: 2
Square Footage of Home: 2200
Home Built: 1950s
Heating Degree Days: 4029
Cooling Degree Days: 1496
Components for a Successful HPwES Program

- Committed & trained contractors – without this, nada
- Program marketing – using multiple channels that are sustained
- Incentives – both big and understandable, must drive comprehensive work
- Financing – both attractive and easy, ratchet to promote comprehensive work
- Job reporting – without this, nada
- Quality Assurance – protects everyone and ES logo
Incentives are often necessary to develop both demand and supply.

Homeowners: financing, rebates, neighborhood competitions...

Contractors: training rebates, equipment rebates, rewards for jobs completed...

Post installation incentives? Reward once savings are confirmed?
Quality Assurance

Protect sponsor

Protect compliant contractors

Market high standards

Self-reinforcing once value is established

Confirms savings estimates
Reporting – without reporting, no program
Linked job test-out to incentives
Keep it simple/easy
Report to national program
Quality - Certificates

Send with Survey
Tied to reporting
Program Evaluation

Look at your data

Review assumptions, tweak as needed

Communicate with national program and other sponsors
ENERGY STAR Support

- Program Development Assistance
- Sponsor Guide
- Logo
- Marketing toolkit
- Promotional videos
- Graphics
- Sales Training for Contractors

- Contractor Business Development Guide – Home Energy magazine
- Case Studies
- National Campaigns
- Financing Guidebook
- National Symposium

www.energystar.gov/hpwessponsors
Typical Home Improvements:

A  Sealing Air Leaks and Adding Insulation
B  Improving Heating and Cooling Systems
C  Sealing Ductwork
D  Replacing Windows
E  Upgrading Lighting, Appliances, and Water Heating Equipment
F  Installing Renewable Energy Systems
The Michigan HPwES Challenge

- No DSM programs past 14 years
- Infrastructure not there, building required
- 65 utilities in state – some efficiency programs underway
- “Michigan Saves” and “Pay as you Save” options on table
- On bill financing – great tool to promote work, utilities softening on position
- Statewide uniformity – HPwES could be foundation
National Conferences for 2010

- RESNET – Raleigh, NC - Feb 22-24, 2010

- ACI National – Austin, TX - April 19 – 23, 2010

And continue your learning with Home Energy Magazine!
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