



## Energy Out West

June 5<sup>th</sup>, 2008 – Scottsdale, AZ




### Home Performance with ENERGY STAR A Comprehensive Solution






Chandler von Schrader

## Agenda

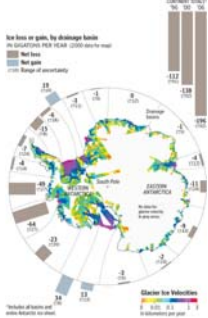


- Climate Change and Cost of Energy Efficiency
- Why/What is Home Performance with ENERGY STAR?
- Where are new programs starting?
- What are requirements for a Home Performance program?
- What is the process for developing a plan?
- What support does ENERGY STAR provide?
- What are different home performance business models?
- What lessons have we learned?
- How can Home Performance expand nationally?
- How to properly use the logo and messages?

## Climate Change



- One to two degree warming since 1850 and three to seven degree warming expected by 2100
- Temperature in North America has been rising since 1900
- Ice loss in on the Antarctic peninsula has increased by 140% in the last decade. 60 billion metric tons lost a year (Escalating Ice Loss Found in Antarctica *Washington Post*, Mark Kaufman)



Sea level rise, the challenge looms

Sea level rise by 2100 (2000 sea level)

1000 feet rise

500 feet rise

250 feet rise

100 feet rise

50 feet rise

25 feet rise

10 feet rise

5 feet rise

2 feet rise

1 foot rise

Sea level rise by 2100 (2000 sea level)

1000 feet rise

500 feet rise

250 feet rise

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25 feet rise


10 feet rise

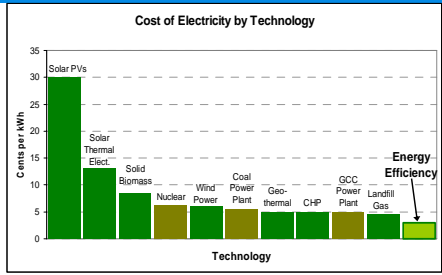
5 feet rise

2 feet rise

1 foot rise

## Energy Efficiency







Technology	Approximate Cost (Cents per kWh)
Solar PVs	30
Solar Thermal	15
Nuclear	10
Wind	8
Coal	7
Geothermal	6
CHP	5
GFC, Power Plant	4
Landfill Gas	3
Energy Efficiency	2

- Non-existent in 1970
- \*NegaWatt before MegaWatt
- •Cost-Effective
- •Climate Change Regulations coming


## 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



## Why Existing Homes?



- Average utility bill for single-family home is \$1,900
- Average age of the home is 30 Years
- Over half of all single-family homes in the U.S. were built before 1970

## Why Home Performance?



Total US Energy Consumption 2004: 99.7 Quads



- HVAC, water heating, and lighting make up two thirds of home energy consumption, with building envelope and windows contributing to HVAC use.
- Average HPwES savings is 22% which is
  - ✓ 4.2 Quads,
  - ✓ 720 million barrels of oil,
  - ✓ or 492 coal power plants (400 MW)

## Perfect Storm is Brewing



- Energy Efficiency is no longer boutique
- “Green” = High Quality
- Global Climate Change is here
- Utilities capacity challenges are strained
- Energy costs are rising
- Can America weather this storm?



## Common Homeowner Complaint–

“The electric bills from air-conditioning my house were **outrageously high**, and the house just **wasn’t staying cool** enough. Something had to be done for both the sake of our family’s bank account and comfort.”

## Common Solution for Homeowners



### Replace with an energy efficient product

- Good recommendation, but product specific solutions may be only one part of the system problem
- Some home problems need a custom solution

### Energy audit

- Recommendations but no delivery
  - ✓ “Who can fix my problem home?”

## A Better Solution

Start with a **whole-house assessment** and provide an infrastructure of **qualified contractors** and **quality assurance** to allow homeowners to follow through and complete **comprehensive improvements**.



**Home Performance with ENERGY STAR**  
A whole-house program with contractor participation and quality assurance.



## Why Home Performance is the Answer



- 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

## Why is a whole-house approach necessary?

## Symptoms A Whole-house Approach can Diagnose



- 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
- Other

## Whole-house Approach

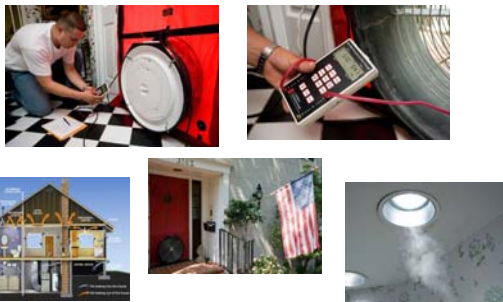


- Visual and diagnostic inspection
  - ✓ Energy specialist trained in building science
- Diagnostic testing (before work)
  - i.e. air infiltration, HVAC air flow, duct leakage
- Summary report
  - ✓ Results
  - ✓ Recommendations
  - ✓ Estimated costs and savings

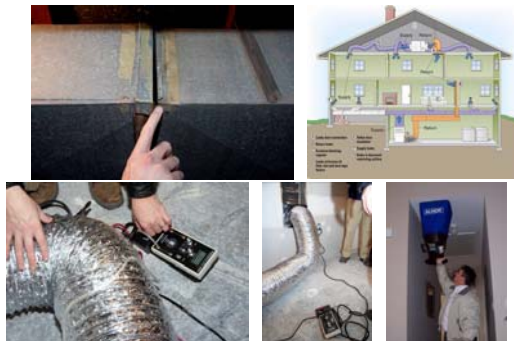


RECOMMENDED IMPROVEMENTS				
Item	Priority	Estimated Cost	Estimated Savings	Payback Period
Replace the 20 Year Old Furnace	High	\$10,000	\$1,000	10 Years
Seal the Attic	Medium	\$2,000	\$200	10 Years
Seal the Ductwork	Medium	\$1,500	\$150	10 Years
Replace the 15 Year Old Water Heater	Medium	\$800	\$80	10 Years
Install a Programmable Thermostat	Low	\$100	\$10	10 Years
Replace the 10 Year Old Air Filter	Low	\$20	\$2	10 Years

## 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



## Common Improvements: Air Sealing



## Common Improvements: Adding Insulation

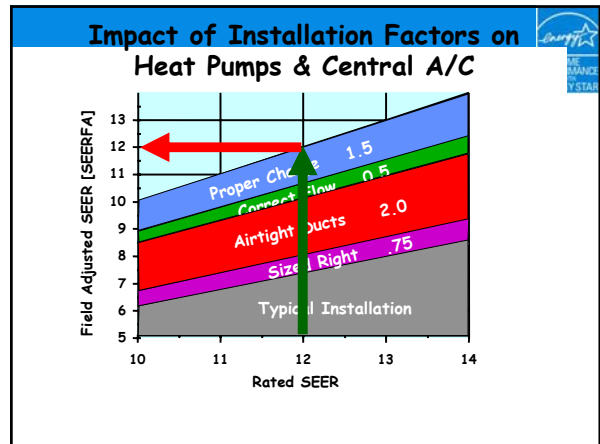
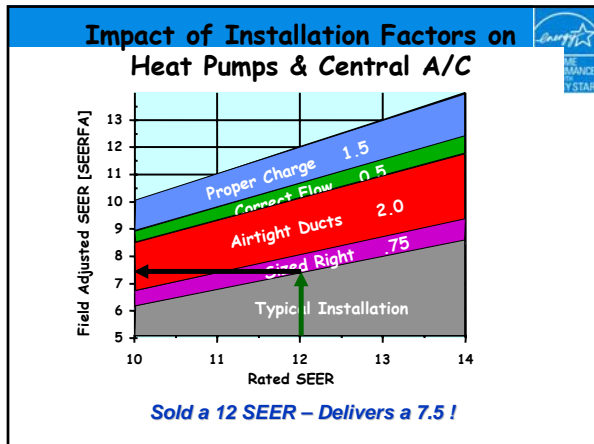


## Common Improvements: Duct Sealing and Repair



## Common Improvements: New HVAC Equipment





### ENERGY STAR HVAC OI Guidelines

- Minimum requirements for installations under the program must meet the ANSI/ACCA HVAC Quality Installation Specification
- The OI 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.



### 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

### Why A Whole-house Approach?

- Identify which improvements save the most energy
  - ✓ Avoid one size fits all solutions
- Whole-house solutions can save substantial energy in homes

Potential Per Home Energy Savings by Climate*				
	NORTHWEST	MIDWEST	SOUTH	WEST
kWh	1400	1700	4600	1400
Therms	400	400	200	200
Typical Improvements	Increasing attic insulation; insulating a crawl space and rim joist; duct sealing, repair and insulation; air sealing; and installing programmable thermostat, energy-efficient heat pump, air conditioner, furnace, boiler, lighting or windows.			

\*Estimates based on modeling.

- Deliver additional customer benefits
  - ✓ Affordability
  - ✓ Comfort
  - ✓ Health and safety,
  - ✓ Improved durability of the home
- Make sure improvements don't cause new problems

*When presented with a good, truthful explanation of the problem, and offered a chance to fix the problem many homeowners are jumping at the chance to improve their homes.*

*Narrowly defined "cost-effectiveness" isn't the lynch pin.*



## Home Performance is More Than a Whole-House Approach



- Evaluating a home's performance
- Recommending home improvements  
Quality assurance to ensure unbiased recommendations
- Completing energy saving improvements  
Quality assurance to ensure installation best practices  
Facilitate installation of recommended measures via incentives and mentoring
- Testing out to demonstrate performance improvements (and to do no harm)

## Quality Assurance



- Essential to ensure recommendations are unbiased and installed to best practices
- High confidence in utility savings
- Certification and Accreditation
  - ✓ As rigorous as Building Performance Institute (BPI) Technician certification
  - Contractor accreditation (that includes job review and inspection)
- Or, Job Review and Inspection Oversight
  - ✓ 100% file review – 5% site inspection

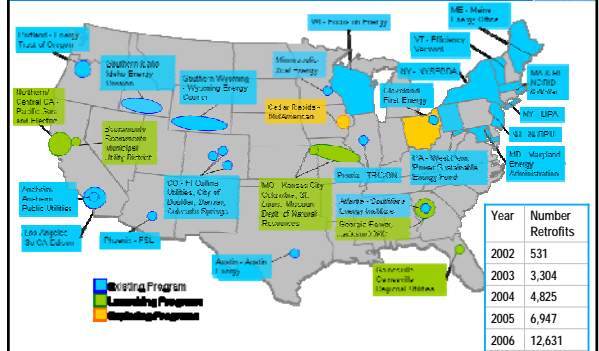
## HP Consultants and Contractors are Key



- Home Performance is not an energy audit
- Participating contractors/consultants have a business goal of **completing recommended improvements not just** making recommendations
- The goal is to **improve home performance**
- Program design should facilitate the installation of recommended improvements
  - ✓ Incentives
  - ✓ Contractor participation

Where are new programs starting?

## Where is National HPwES Activity?



What are the requirements for a Home Performance with ENERGY STAR program?

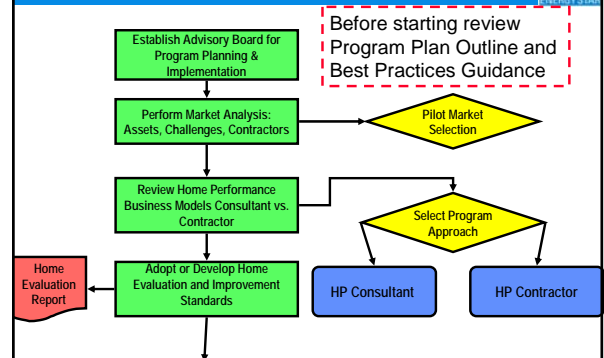
## HPwES Program Requirements



- Develop a program plan
  - ✓ A bona fide whole-house approach
  - ✓ Facilitate installation of recommended home improvement
  - ✓ Quality Assurance
- Sign a partnership agreement
- Recruit participating contractors
- Promote program to homeowners
- Recommended
  - ✓ Financial incentives to encourage comprehensive improvements
  - ✓ Training for contractors

What is the process for developing a home performance program plan?

## Program Development Process

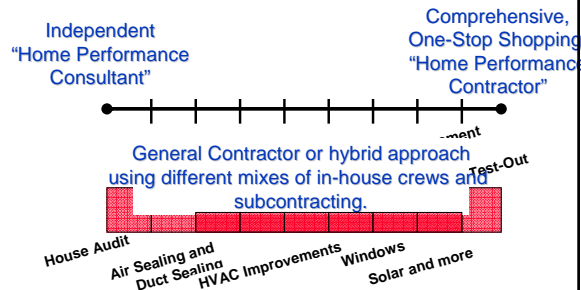


## Program Development Process



What are different Home Performance business models?

## Different Business Models



## The HP Consultant Model



- Part of a team that delivers home performance improvements
  - Post-Evaluation Question: "Can you do the work?"
- Leads directly from homeowners / word-of-mouth
  - Provides full scope of work descriptions for all recommended improvements and a list of qualified contractors
- Leads from trade contractors (HVAC, insulation, remodeling and window contractors)
  - Pre and post testing costs included in contractors bid
- Low business overhead
- Need program design that facilitates completion of improvements

## The HP Contractor Model



- Total solution for homeowners
  - Post-Evaluation Question: "Can you do the work?"
- Provides evaluation and improvements
  - Assessment establishes trust with the homeowner
  - Testing out is part of the standard job
  - Greater control of final product
  - Comprehensive home improvements
- Challenges managing a business
- QA is important to maintain program integrity

## New York Example



- Program Design
  - Home Performance Contractor
- Participating Contractors
  - 100+ accredited contractor firms
- Work completed 2006
  - 4000+ (2000+ Assisted HP)
- Average job size
  - Over \$7,900
- Average house annual savings
  - 380 therms and 860 kwh



## What lessons have we learned?

## Lesson 1: Contractor Participation Is Key



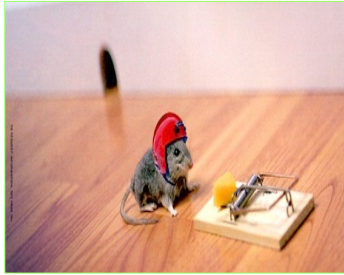
- A participation agreement is your contract with the contractor
  - Be clear about what you will do and what they will do
    - Example: We will reimburse training costs after completing X verified jobs. You need to report X jobs per quarter to remain eligible for incentives.
  - Keep it simple, but include things like eligibility criteria, conditions, standards, goals, reporting, and logo use
- Clear and easy process for reporting
- Make program benefits contingent on reaching goals
  - Benefits may include training, use of logo, incentives, financing, etc.
  - Training is too valuable to give away
  - Track web and phone leads

Listing Contractors on sponsor website may backfire!

## Brave New World for HVAC Contractors....



Who moved my cheese!



## Lesson 2: Contractors Need to "own" It



- Program marketing raises contractor awareness
- Contractors are **key** to program's success – recruitment and mentoring very important
- Program must offer value to contractor – switching core business to HP is big leap
- Contractor incentives and training are sweet – but biggest contractor carrot is steady leads!
- Keep contractor programmatic hurdles low

## Lesson 3: Incentives and Financing Help Sales (and reporting)



- Incentives help raise awareness
- Easy access to financing is critical
  - ✓ Simple, quick, and hassle free
  - ✓ Low rates are not the most important feature
- Access to multiple financing options is a big plus
- Need ways to reach hard-to-qualify homeowners
- You can train a contractor in home performance, but they are unlikely to report results without some incentive

## Lesson 4: Program Sponsors Must Take Leadership Role



- It's one thing to draft up a plan and sign our Partnership Agreement – quite another to start & grow program
- Serve as a trusted third party messenger to increase market awareness
- Secure preferred financing
  - ✓ Interest rate buy-downs may be more effective than rebates in some cases
- Provide quality training and mentoring
- Provide **Quality Assurance!**

What support does  
ENERGY STAR provide?

## EPA and DOE Support



- Consumer recognized brand
- Program start-up and contractor recruitment assistance
  - ✓ Program Development Fact Sheets
  - ✓ Program Plan Best Practices Guide
  - ✓ Contractor Business Development Guide
  - ✓ Successful Contractor Profiles
  - ✓ Meeting to Help Develop Program
- Sales and marketing training for contractors
- Marketing materials
  - ✓ Marketing Toolkit (for both sponsors and contractors)
  - ✓ Recommendations for Planning a Home Energy Makeover Contest
  - ✓ Consumer Brochure
- [WWW.ENERGYSTAR.GOV/HPWESSPONSORS](http://WWW.ENERGYSTAR.GOV/HPWESSPONSORS)

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## ENERGY STAR Awareness

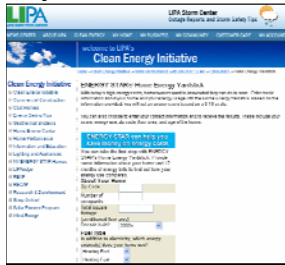
- More than 60% of households recognize the ENERGY STAR label at the national level.
  - More than 70%--in areas with sustained promotions of ENERGY STAR by local energy efficiency programs.
- Approximately, one in four households knowingly purchased an ENERGY STAR qualifying product in 2005 with
  - more than 60% of them reporting the label as influential in their purchasing decision
  - more than 75% of them reporting they are likely to recommend ENERGY STAR products to friends.

## Home Performance with ENERGY STAR Marketing Toolkit



## Home Energy Yardstick

- Host Home Energy Yardstick on your web site



ENERGY STAR can help you save money on energy costs.

You can take the first step with ENERGY STAR's Home Energy Yardstick. Provide some information about your home and 12 months of energy bills to find out how your energy use compares.

**About Your Home**

Zip Code:

Number of occupants:

Total square footage (conditioned floor area):

Decade built? (2000s)

**Fuel Type**

In addition to electricity, which energy source(s) does your home use?

Heating Fuel:

Heating Fuel:

ENERGY STAR is the government-backed symbol for energy efficiency. The ENERGY STAR Program has tools to help homeowners improve energy efficiency. For more information visit [www.energystar.gov](http://www.energystar.gov)

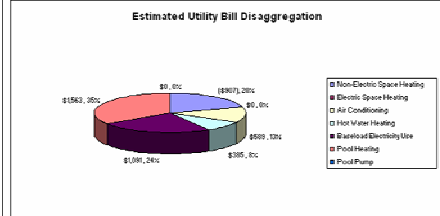
## Home Energy Makeover Contests

- "Good News" publicity for awarding free improvements
- Community benchmarks for:
  - Homes that are high energy users
  - Most cost-effective home improvements
  - Value-added non-energy benefits (comfort, home value, health)
- Publicity for home performance program
- Happy contest runner-ups motivated to make home performance improvements

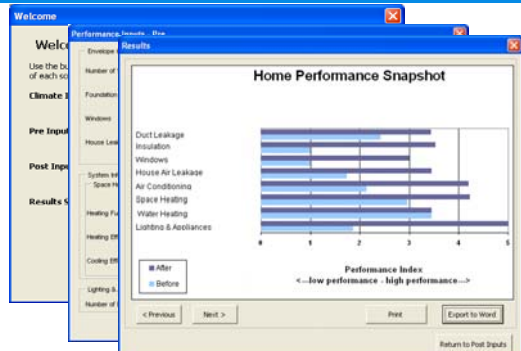


## Energy Bill Analysis Tool



Annual Consumption by End Use	Fuel Type	Amount	Cost	% of Cost
Non-Electric Space Heating	Natural Gas	-518 CCF	(\$907)	-35%
Electric Space Heating	Electricity	0 kWh	\$0	0%
Air Conditioning	Electricity	4908 kWh	\$598	22%
Hot Water Heating	Natural Gas	200 CCF	\$385	14%
Base-load Electricity Use	Electricity	3695 kWh	\$1,091	40%
Pool Heating	Natural Gas	993 CCF	\$1,863	57%
Pool Pump	Electricity	0 kWh	\$0	0%
			\$2,722	100%



## Home Performance Snapshot




## Home Performance Illustration





- House Illustration
- Video
- Banner Stands


## Home Performance Illustration



**Before Improvement**

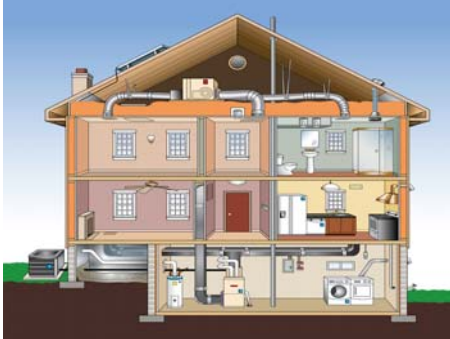


## Home Performance Illustration




**After Improvement**


- Air leaks
- Insulation
- Duct Repair
- Airflow
- Furnace
- A/C
- Hot Water
- Venting
- Appliances
- Lighting
- Windows
- Solar




## Home Performance Illustration




**Envelope Before Improvement**




## Home Performance Illustration




**Envelope Before Improvement:**  
Air leaks and Low Insulation




## Home Performance Illustration



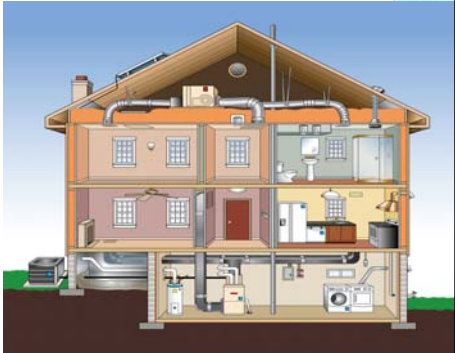
**Envelope After Improvement:**  
Air leaks Sealed and Proper Insulation




Home Performance Illustration




Envelope After Improvement




Home Performance Illustration




HVAC Before Improvement




Home Performance Illustration




HVAC Before Improvement: Duct Leaks and Poor Air Airflow




Home Performance Illustration




HVAC After Improvement: Sealed Ducts and Good Airflow




Home Performance Illustration




HVAC After Improvement: New Equipment and Vent Fans

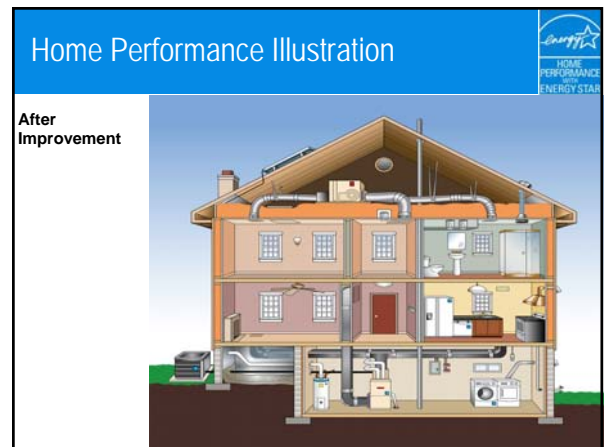
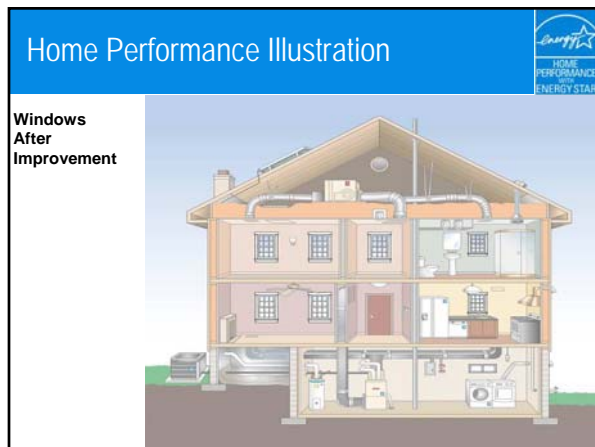
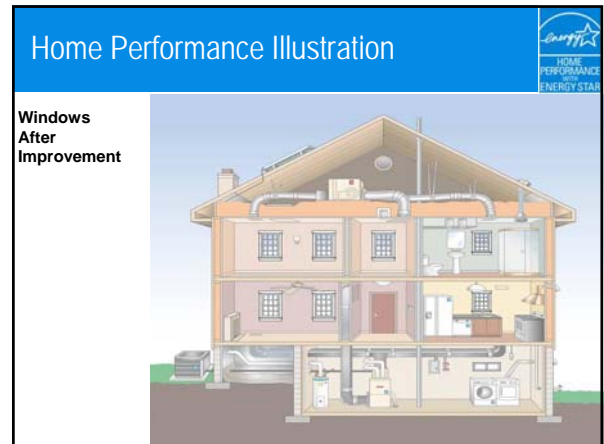
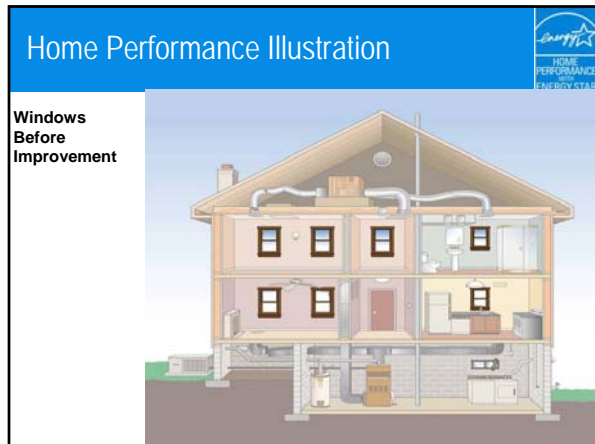


Home Performance Illustration



HVAC After Improvement





How to properly use the logo and messages?

Logo Use Guidelines

HOME PERFORMANCE WITH ENERGY STAR



- ✓ Proper and consistent use of logo builds value and reinforces Sponsor's connection to a larger national program
- ✓ Remember ENERGY STAR is a "trust" mark, it must be protected
- ✓ EPA tracks all logo use and we actively work to protect the trademark and words "ENERGY STAR"
- ✓ Logo Use Guidelines on our web site [www.energystar.gov/hpwebsitesponsors](http://www.energystar.gov/hpwebsitesponsors)  
Click on "Marketing Resources"

## Available Marks

For Participating Contractors:



For Home Performance Program Sponsors:


On or next to Qualified Products Only:



## Newspaper ad using the Home Performance Marketing Graphic


**SAVE MONEY AND ENERGY YEAR AFTER YEAR**

Have your home's energy use evaluated and improved by qualified energy professionals.

**CONTRACTING COMPANY INC.**

Contracting Company, Inc uses state-of-the-art equipment to test and remedy energy-wasting problem areas in your home - including heating/cooling equipment, insulation, air leakage, as well as windows, lighting and appliances.

Street Address, Any Town, ST 000-555-1234  
www.webaddress.com




Working to deliver whole-house energy savings to improve comfort and help protect the environment.

## Using Logo Right

For Contractors/Consultants Participating in Home Performance with ENERGY STAR:

**DO**

- Use the graphic to show that you are participating in a new whole-house energy efficiency service connected to ENERGY STAR
- To help clarify what Home Performance with ENERGY STAR is we recommend this language next to the graphic:




Working to deliver whole-house energy savings to improve comfort and help protect the environment.

## Using Logo Wrong

**Don't**

- Use the graphic without an agreement with the program sponsor
- Use to imply endorsement of a firm or product
- Use more than one ENERGY STAR mark in the same ad



Certification Mark for a qualified window

Marketing Graphic for Home Performance

## How to Obtain ENERGY STAR Marks

Program Sponsors sign Home Performance Partnership Agreement, submits program plan, then EPA sends email with username and password to access marks.

**Program Sponsor Duties:**

- Distributes marketing graphic to participating contractors
- Monitors correct use, with eye for non participants using logo
- Informs EPA of participating contractors on quarterly basis – or has participating contractors listed on sponsor's web site
- If improper use of the graphic arises, EPA will work with the Program Sponsor and participating contractor to resolve.

Thanks for helping keep our logo trustworthy!

## How can Home Performance expand nationally?

## Infrastructure Development



- Working with organizations to establish standards
- 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



## Training & Certification



- ✓ Affordable Comfort Conference  
[www.affordablecomfort.org](http://www.affordablecomfort.org)
- ✓ Home Energy Rater Training  
[www.natresnet.org](http://www.natresnet.org)
- ✓ Weatherization Training Organizations  
[www.eere.energy.gov/weatherization/training\\_centers.html](http://www.eere.energy.gov/weatherization/training_centers.html)
- ✓ Building Performance Institute  
[www.bpi.org](http://www.bpi.org)
- ✓ North American Technician Excellence  
[www.natex.org](http://www.natex.org)

## For More Information Contact:



**Chandler von Schrader**  
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202.343.9096

**Patricia Plympton**  
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[patricia.plympton@navigantconsulting.com](mailto:patricia.plympton@navigantconsulting.com)  
202.481.7397

## After saving the world - follow the Rainbow!



## Slide 86

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**DH1** I would delete this info. I would list the Home Energy Article as a resource instead.

Could we find a contact in different organizations who would establish a list of training resources or a path for their members? Start with ACCA, RESNET, and NARI.

Dale Hoffmeyer, 4/4/2006