



U.S. DEPARTMENT OF ENERGY  
**SOLAR DECATHLON**

2011

# Home Energy Score

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U.S. Department of Energy

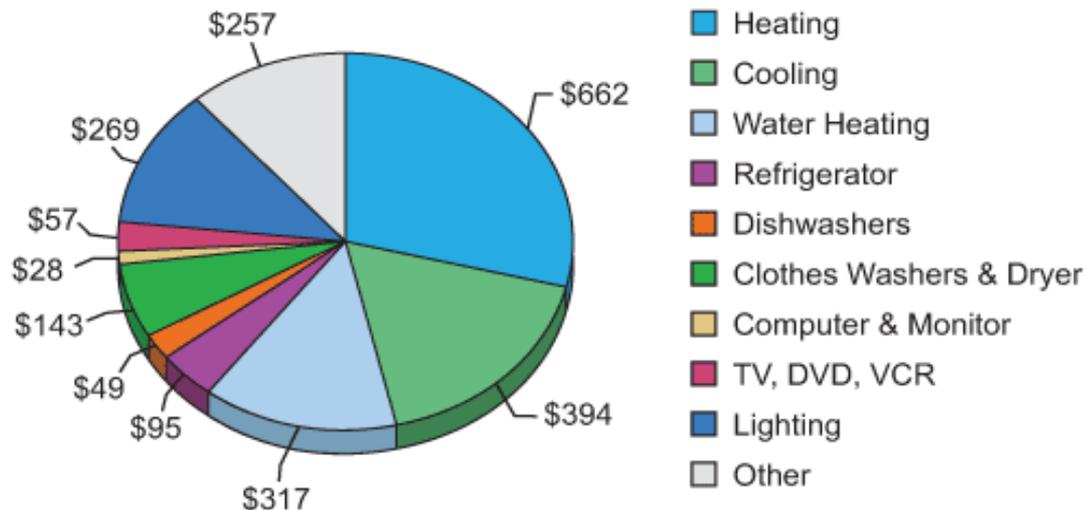
Senior Advisor



# Residential Energy Use

- 110+ million households
  - 69% built before 1980
- Average energy cost \$2200/year
- Heating and cooling account for almost 50 percent

Typical House's Annual Utility Bill





# Objectives

- Strengthen the home energy retrofit market
- Provide an affordable and credible means for --
  - Homeowners to understand their home's energy performance, how their home compares to others in their area, and how to take action to improve its efficiency
- Build on and complement existing home energy improvement efforts
- Facilitate the ability of trained workers to enter the private sector retrofit market as Weatherization work funded by the Recovery Act ramps down

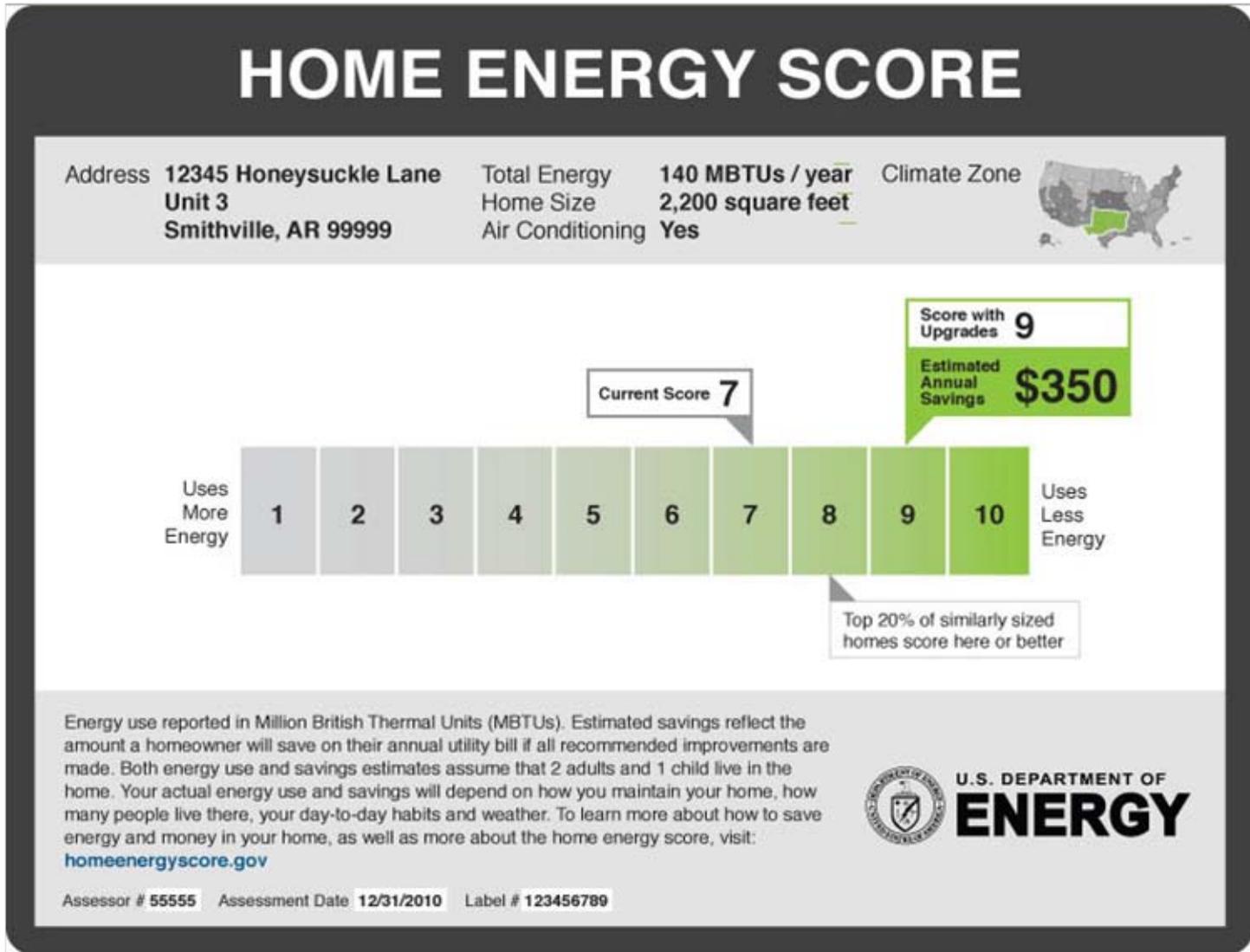


# Key Findings from Focus Groups and Social Science Review

- Homeowners appreciate straightforward, simple information...at least initially
  - Clear, simple, colorful graphics that make sense at a glance
- Homeowners want customized recommendations with information on costs and savings
- People are influenced by how they compare to their peers, neighbors
  - Reference points matter
- Consumers ultimately care most about the bottom line
  - However, many are misinformed about what investments will pay off most quickly and save the most energy
  - Many don't realize that energy improvements can also improve the comfort of their homes as well as health and safety
- Consumers like to see government seal on information provided
  - Co-branding with local provider can be effective



# Home Energy Score





# Tool Output: Page 2

## TIPS TO SAVE ENERGY AT HOME

Home Energy Score | HES Session # **XXXXXXXX** | Page 2

Most home owners can reduce their energy bills and increase the comfort and safety of their home by changing some basic habits and doing more routine maintenance. Here are some easy ways to save energy and money. Savings from these measures are not included in the Home Energy Score.

### Refrigerator/Freezer

- If your extra refrigerator is only used once in a while, unplug it and prop the door open when it's empty.
- If your extra refrigerator doesn't have much in it, consider replacing it with a smaller Energy Star model.

### Laundry

- Use cold water to wash your clothes. Most detergents clean just as effectively and clothes don't fade as fast.
- Hang your clothes on a line to dry, when appropriate.
- If you use a clothes dryer, set the timer to Autodry so the dryer stops when your clothes are dry. This saves energy and is better for your clothes.
- Clean the dryer lint trap before each use. Clean the dryer vent hose every 6 months, more if you dry a lot of clothes. Be sure your vent hose is free of kinks.

### Buying and Replacing Appliances, Windows and Other Equipment

When you buy or replace appliances, windows or other equipment, be sure to pick ones that have an ENERGY STAR label. If there are no ENERGY STAR choices, compare the products' energy use specifications and pick one that is more energy efficient.

### Heating and Cooling

- Install a programmable thermostat.
- During the winter, lower the thermostat setting at night and when the house is empty.
- During the summer, raise the thermostat setting at night and when the house is empty.
- Avoid the desire to turn the thermostat temperature way up or way down to make the house warmer or colder. It doesn't heat or cool the house any faster but it uses more energy.
- Use ceiling fans alone or with air conditioning. Remember to turn them off when you leave.
- Change your furnace filter every two months (during summer too, if you have central air conditioning). Do it more frequently if you have pets or see that the filters are more than a little dirty.
- Bleed the air out of the radiators within a month of turning the boiler on each winter. Don't block vents and radiators with furniture.
- Install reflectors behind the radiators on outside walls.
- Keep about 2 feet of space cleared around your outside air conditioner/heat pump compressor.

### Curtains and Blinds

- On summer days, close window shades and curtains on the south and west side of the house. On winter days, open them.
- On winter nights, close all window shades and curtains.

### Lights

- When you leave a room, turn lights off.
- Replace incandescent bulbs with compact fluorescent lights (CFLs).

### Computers and Other Electronics

- Use the energy saver settings on computers and other electronics so they go to sleep when you are not using them.
- Plug groups of electronics together into one power strip. Turn off the whole powerstrip off when they are not in use.

### Water

- Fix leaky faucets and running toilets right away.
- Install low-flow showerheads and faucet aerators.

**Whole House upgrades save energy and money and can make your home more healthy, comfortable and safe to live in.**

For even bigger savings, ask a certified energy professional about "whole house" energy upgrades. Qualified professionals can help you pick the right kind and size of equipment and make sure it is installed correctly. They also help you understand the health, comfort and safety considerations of your decisions when planning improvements.



# Tool Output: Page 3

## HOME UPGRADE RECOMMENDATIONS

Address **2121036** | Minneapolis, MN 55419

### Improvements recommended now

These upgrades can help you save energy right away.

Air tightness: Have a professional seal the gaps and cracks that leak air into your home.

Ducts: Have your ducts professionally sealed to reduce leakage.

**Estimated Utility Bill Savings**  
(\$/year)

**Simple Payback Period**  
(years)

**Greenhouse Gas Reductions**  
(lbs CO<sub>2</sub>/year)

	Estimated Utility Bill Savings (\$/year)	Simple Payback Period (years)	Greenhouse Gas Reductions (lbs CO <sub>2</sub> /year)
Air tightness: Have a professional seal the gaps and cracks that leak air into your home.	\$510	2	5,300
Ducts: Have your ducts professionally sealed to reduce leakage.	\$470	2	4,990

### Recommendations for when you need to replace equipment

These recommendations will help you save energy when it's time to replace or upgrade.

Water heater: Pick one with an ENERGY STAR label.

Furnace: Pick one with an ENERGY STAR label.

\$50

\$430

3

4

530

4,550

**It is important to consult a certified energy professional to ensure improvements are made properly and take into account health, comfort, and safety. Proper installation, including details such as complete coverage of rigid insulation and taping the seams, is critical to achieving energy savings. As with any major purchase, you should seek more than one cost estimate before making a buying decision.**

#### How are savings calculated?

These estimates are based on standard energy use patterns of 2 adults and 1 child. Actual energy bills and projected savings will vary according to the number and type of appliances, the number of occupants and their behavior, and weather.

#### What do lbs of CO<sub>2</sub> mean in my everyday life?

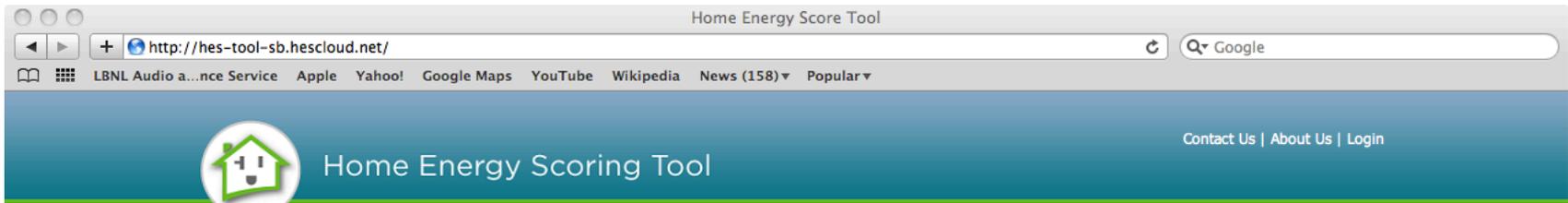
On average, a car generates about 11,000 lbs of CO<sub>2</sub> each year.

#### What does payback period mean?

For improvements recommended now, simple payback reflects the number of years it will take to cover your upfront costs. For recommendations concerning future equipment replacement, payback time is the number of years it will take for your savings to add up to your upfront cost if you buy an Energy Star, or high-efficiency unit, instead of a lower-efficiency one. Payback periods will vary depending upon local energy costs and the costs of improvements in your area. Only measures with paybacks of 10 years or less are included. If you take into account the opportunity cost of money, the payback time is longer.



# Scoring Tool



**HOME ENERGY SCORE**

Address: 12345 Honeysuckle Lane  
Unit 3  
Smithville, AR 99999

Energy Use: 140 MBTUs / year  
Home Size: 2,200 square feet  
Air Conditioning: Yes

Climate: [Map of US]

Current Score: 7

Score with Upgrades: 10  
Estimated Upgrade Cost: \$350

30% of similarly sized homes score here or better.

U.S. DEPARTMENT OF ENERGY

The Department of Energy's Home Energy Scoring Tool allows qualified assessors to:

- Generate clear, credible home energy assessments at a reasonable cost;
- Recommend customized upgrades and other cost saving tips; and,
- Help consumers compare the energy use of different homes.

The Home Energy Scoring Tool is quick and easy to use. Qualified assessors can gather the information needed to assess a home in one short site visit. This low-cost, high value assessment can be provided as a stand-alone service or as an add-on to a home inspection or comprehensive energy audit.

For more information on how to become a qualified assessor or receive a home energy score, visit [www.homenenergyscore.gov](http://www.homenenergyscore.gov).

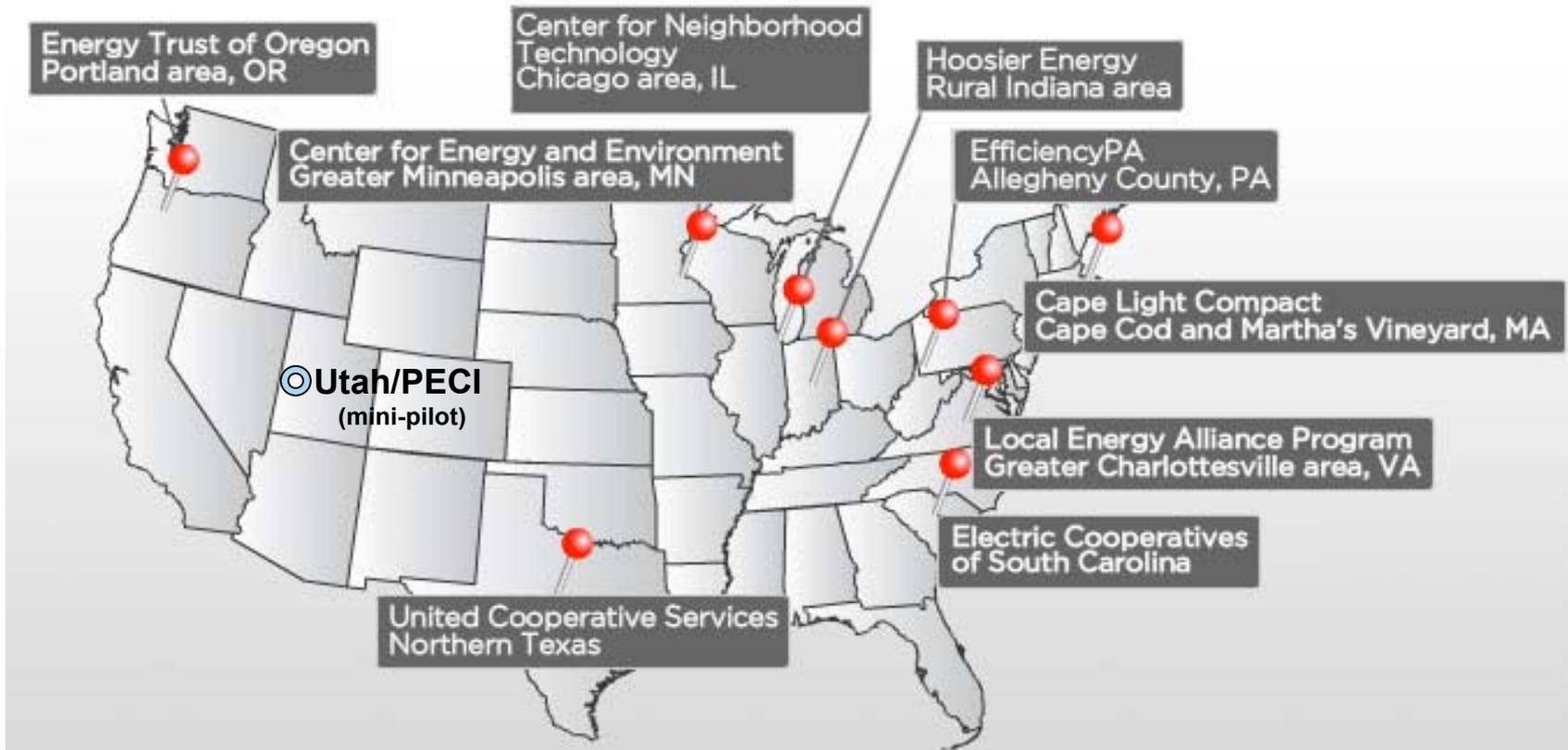


The Home Energy Saver Tool was developed by the Lawrence Berkeley National Laboratory in collaboration with the U.S Department of Energy under the American Recovery and Reinvestment Act (ARRA). The Modeling Engine for Home Energy Saver can be licensed as an API through the Lawrence Berkeley National Laboratory.

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# Home Energy Score Pilots



Home Energy Score Testing Locations



## Pilot Overview

- Nine pilots completed program
  - All but VA & PA assessed more than 100 homes
  - Minimal data provided by CO
  - Utah completed assessments using previously collected data
- 1,000+ homes assessed in total
- 31 assessors produced more than 1 score
  - 24 responded to assessor questionnaires
- In most cases, the scores reflected relatively “normal” distributions
  - Need to reconsider bin values in some climates
- DOE/LBNL ran home assessment data through multiple scoring methods for comparison purposes



# Summary of Pilot Feedback

- Assessor information and education
  - Improve tool tips and training
  - Provide technical support for assessors in the field
  - Develop handheld application
  - Require mentoring of new assessors
- Homeowner information and education
  - Provide hotline and additional materials to leave behind
  - Provide best practices for homes in different climates
  - Provide additional information regarding the existing conditions of the home
- Label
  - Keep it simple
  - Keep it the same across all markets
    - Allow some customization of information
  - Show cumulative savings for more than one year (e.g., 5 years)



## Pilot Feedback (continued)

- Energy improvement recommendations
  - Allow assessors to tailor recommendations
  - Present dollar savings as a range or percent of utility bill
  - Prioritize recommendations by best value
- Address bin mobility issues
  - Find ways to shrink “the zone of unattainability”
  - Group similar home types along different scales (e.g., vintage)
- Partnering
  - Develop regional and local partnerships to implement and market the Home Energy Score



# Convincing Homeowners Isn't Always Easy

- Tens of millions of homes could benefit from cost effective energy improvements but...
  - Home energy is a minor cost for middle and upper income households (3-5% of household income)
  - Energy improvements lack cache and are largely invisible (exception: windows)
  - Home improvements are generally perceived as a hassle

## So, what can we do to encourage investments in energy efficiency?

- Make it easy
- Make it reliable (workforce standards)
- Encourage energy improvements as part of home maintenance
  - Home maintenance needs to be as easy as car maintenance
- Seize the moment by integrating improvements with other work (e.g., home renovations; appliance purchases)
- Emphasize other benefits: comfort, improved value
  - Highlight these improvements at time of sale
- Advertise your investment
  - Similar to home renovations, improvements can “spread” if visible to neighbors



# Home Improvement Investments in 2009

	# Projects (millions)	Total Cost (\$ billions)	Average Cost (\$)
<b>Room Additions, Alterations, &amp; Remodeling</b>			
Kitchen	1.1	16.1	14,500
Bathroom	1.4	12.1	8,626
Bedroom	0.3	8.7	34,165
<b>Envelope Additions &amp; Replacements</b>			
Roof	2.7	15.1	5,605
Siding	0.8	4.2	5,360
Windows/Doors	2.7	9.4	3,494
<b>Systems and Equipment</b>			
HVAC	2.8	11.8	4,161
Insulation	1.3		1,900
Water Heater	7.5		800
<b>Total</b>	<b>21</b>	<b>86</b>	<b>4200</b>

**Sources:**

(1) 2010 Buildings Energy Data Book, Table 2.6.3

(2) Foundations for Future Growth in the Remodeling Industry: Improving America's Housing 2007, Joint Center for Housing Studies of Harvard University, Table A-1-Homeowner Improvement Expenditures: 1994-2005

(3) Water Heaters: High end based on # of residential water Heaters shipped in 2006 from GAMA. Low end based on # of water heaters less than 4 years old reported in 2005 RECS.



# Home Energy Score Contact Information

- Visit [homeenergyscore.gov](http://homeenergyscore.gov) for more information.
- If you have additional questions or comments, please contact us at [homeenergyscore@sra.com](mailto:homeenergyscore@sra.com).