

## ENERGY STAR Qualified Homes 2011 Fact Sheet May 04, 2009

The Environmental Protection Agency (EPA) is proposing, and soliciting feedback on, the third-generation guidelines for ENERGY STAR qualified homes. EPA believes that the next generation is an opportunity to:

- Add requirements that ensure a comprehensive approach to building science
- Ensure high-efficiency equipment and products in qualified homes
- Add new, high-value on-site inspections to ensure that ENERGY STAR qualified homes perform to expected levels
- Limit the carbon footprint of large homes earning the ENERGY STAR

These improvements will help EPA meet its broader goal to transform the housing industry to building homes with less environmental impact and increased homeowner benefits, including greater affordability through lower energy bills, along with improved comfort, indoor air quality, and durability.

### Why Change the ENERGY STAR Qualified Homes Guidelines Now?

EPA is revising the guidelines for ENERGY STAR qualified homes to ensure that qualified homes continue to represent a meaningful improvement in energy efficiency over homes that are built to code or standard builder business practices. The revision has been necessitated by the following:

- **Codes are ramping up:**  
Across the nation, increasingly-rigorous energy codes are being planned or implemented at the Federal, State, and local levels. When codes approach or exceed the ENERGY STAR Qualified Homes guidelines, it is critical that EPA increase the requirements for the ENERGY STAR program to assure meaningful above-code performance for homebuyers.
- **Standard business practices are ramping up:**  
In 2008, over 17 percent of all homes built were qualified as ENERGY STAR. As existing ENERGY STAR guidelines become standard practice in many markets, it is necessary to increase requirements to keep the label relevant.
- **New technologies and practices are available to increase the value proposition:**  
There are a number of market-ready technologies and construction practices beyond what is required in the current ENERGY STAR Qualified Homes guidelines that can cost-effectively improve the performance of homes that earn the label.

### Key Changes Proposed for the ENERGY STAR Qualified Homes 2011 Guidelines:

Building on the foundation of technologies and practices already embedded into the current ENERGY STAR Qualified Homes guidelines, the proposed 2011 guidelines include:

- **Additional Mandatory Measures Needed for Complete Building Science Requirements:**
  - Thermal flow – New mandatory requirements for proper installation of insulation, reduced thermal bridging, and increased duct insulation.
  - Air flow – New mandatory requirements for pressure-balancing and an additional Thermal Bypass Checklist requirement for sealing sheetrock at top plates.

- Moisture flow – New mandatory requirements for whole-house mechanical ventilation, spot local exhaust, and water-managed roofs, walls and foundations to address reduced tolerance to unmanaged moisture flow in tightly sealed and insulated homes.
- ***Inclusion of High-Efficiency Equipment and Products:***
  - A performance path method that helps ensure a consistent bundle of technologies, including high-efficiency heating, cooling, and water heating equipment.
  - New requirements for energy efficient lighting and appliances.
  - Requirements for efficient water distribution systems and low-flow shower heads.
- ***Simulated Performance Method Replaces Fixed HERS Index Performance Threshold:***  
ENERGY STAR Reference Design specifications are used for HERS software evaluations, which establishes a unique HERS Index Target threshold for each home as opposed to a fixed HERS Index threshold.
- ***Consideration of House Size:***  
Houses of all sizes will continue to be eligible to earn the ENERGY STAR. However, larger homes will be subject to a ‘size-adjustment factor’ that will reduce the HERS Index Target threshold and require additional energy efficiency measures. This is necessary to account for the larger environmental impact as home size increases.
- ***Consideration of State Energy Code Requirements:***  
State energy code requirements will be incorporated by reference into the new ENERGY STAR Qualified Homes guidelines. Any State energy code requirements will take precedence over ENERGY STAR Reference Design and mandatory elements and will replace those elements when the state code is more rigorous.
- ***Field Verification:***  
As in the current ENERGY STAR Qualified Homes guidelines, field verification will be required for homes to earn the label. In addition to the existing Thermal Bypass Checklist inspection, the following additional inspection checklists must be completed by the rater:
  - Quality Framing
  - HVAC Quality Installation (separate for contractor and verifier)
  - Indoor Air Quality
  - Water-Managed Construction

**Additional Process Changes Proposed for ENERGY STAR Qualified Homes 2011 Guidelines:**

- ***Benchmark Home:***  
Because home size is addressed, a reference point for the average home size is needed for making adjustments. EPA has introduced the concept of a ‘Benchmark Home’ for this purpose with a table listing average home sizes for a specified number of bedrooms.
- ***Prescriptive Path:***  
The prescriptive path for the 2011 guidelines is referred to as the ‘ENERGY STAR Reference Design’ and is similar to current National Builder Option Package. It incorporates technology and practices that EPA believes are highly cost effective and fully market-ready through existing suppliers and trades. However, the prescriptive path can only be used for homes that do not exceed the Benchmark Home size. A Home Energy Rater shall verify that the home meets all requirements of the ENERGY STAR Reference Design and other Mandatory Requirements.

- **Performance Path:**

Rather than relying on a fixed HERS Index Score to define a performance level for ENERGY STAR qualified homes, the new Performance Path will involve the Simulated Performance Method:

- The builder shall use an accredited home energy rating provider and rater. The rater and provider shall use software recognized by RESNET, and follow rating standards outlined in Chapter 3 of RESNET's Mortgage Industry National Home Energy Rating Standards.
- Using accredited Home Energy Rating software, the rater will apply all elements of the ENERGY STAR Reference Design (and any State energy coded elements that exceed ENERGY STAR requirements) to the home being modeled.
- Where home size is equal to or less than the Benchmark Home, the resulting HERS Index value will define the ENERGY STAR HERS Index Target value for that home to earn the ENERGY STAR.
- Where home size is greater than the Benchmark Home, a size-adjustment factor will have to be applied to the HERS Index value of the ENERGY STAR Reference Design that will decrease the final ENERGY STAR HERS Index Target value for that home.
- The rater and builder can then work together to change the energy efficiency features of the home – so long as the resulting HERS Index value for the home is equal to, or lower than, the final ENERGY STAR HERS Index Target; all Mandatory Requirements are included; and all state energy code requirements are maintained.
- Renewable energy systems shall not be used to achieve the HERS index value of the ENERGY STAR Reference Design. For homes larger than the Benchmark Home, renewable energy systems may be used to achieve the incremental difference in HERS Index value that results from the application of the size adjustment factor.
- A Home Energy Rater shall verify that the home includes all measures required to meet the final ENERGY STAR HERS Index Target value and all other Mandatory Requirements.

- **Quality Assurance for Performance Path**

With the new ENERGY STAR Qualified Homes guidelines, two sets of information – information for the ENERGY STAR Reference Design AND the characteristics of the rated home – will be required to qualify a home with the ENERGY STAR. These two sets of information can either be inputted manually into current existing software programs (e.g., REM/Rate or EnergyGauge USA), or the information may eventually be programmed (“hardwired”) into the software by the software developers.

- If the rater manually inputs the information of the rated home and the ENERGY STAR reference design home, the software program will be used to produce two separate documents for each house that is being qualified: one for the ENERGY STAR Reference Design home, and another for the rated home, which demonstrates the same or better value than the ENERGY STAR Reference Design home. Thus, each home being qualified will be associated with TWO documents to be maintained by the provider as part of the home's records.
- If the ENERGY STAR Reference Design is built in to existing accredited software modeling procedures, Providers would be required to maintain their current levels of quality assurance.

#### **Rationale for ENERGY STAR HERS Index Target Versus a Fixed HERS Index Threshold:**

**Technical difficulty setting one (or two) HERS Index thresholds that define ENERGY STAR nationally:** EPA has explored how to continue to specify a fixed HERS Index threshold for the national ENERGY STAR Qualified Homes 2011 guidelines. However, EPA has found that homes with the same energy efficiency features within the same climate zone can have significantly different HERS indices due to house size, aspect ratio, fuel type, adiabatic surfaces, foundation type, number of bedrooms, and number of stories. EPA has observed in the past that this variation within a climate zone has allowed some builders to trade off targeted

efficiency measures (e.g., high efficiency cooling in hot climates). Furthermore, when EPA looks across all eight climate zones, each requiring a different set of efficiency measures, EPA's ability to set one or two HERS Index thresholds that encourage important measures is hampered. The ENERGY STAR HERS Index Target developed through the Simulated Performance Method eliminates these problems

**Built-in automatic flexibility:** Above-code performance in states with rigorous energy codes is ensured automatically without complicated customized solutions because state energy code requirements that exceed ENERGY STAR Reference Design and Mandatory Requirements take precedence (except for Hawaii due to its uniquely mild climate).

***The HERS Index score does not currently represent true energy savings for ENERGY STAR Qualified Homes:***

The proposed guidelines require five new checklists that are not currently incorporated into the HERS standards. EPA is committed to working with the HERS community to develop standards and processes that incorporate these checklists into the HERS methodology. Until that time, a national HERS threshold understates the true energy savings. For example, savings for the current guidelines are most commonly cited as 15 percent greater than code based on the fixed HERS Index threshold of 85 used for most of country. However, actual savings are closer to 25 to 30 percent with contributions from the Thermal Bypass Checklist, which is not part of the HERS software calculations. The potential to understate savings with the 2011 guidelines linked to a fixed HERS Index value is even greater based on substantially increased Mandatory Requirements that are also not currently part of the HERS software modeling process. The simulated performance method provides the opportunity to more accurately associate the ENERGY STAR Qualified Homes 2011 threshold with homes that include comprehensive building science measures that are roughly equivalent to homes 35 percent more efficient than the 2006 IECC.

**Cost Effectiveness Policy**

A core element of the ENERGY STAR program is that only products that are cost-effective can be qualified. EPA policy for determining cost-effectiveness of ENERGY STAR Qualified Homes is that all program requirements must result in an incremental monthly mortgage cost that is the same or less than the projected monthly savings. By example, EPA cost analysis for ENERGY STAR Qualified Homes 2011 guidelines suggest an approximate incremental cost range from \$4,000 to \$5,000. For an average weighted incremental cost of about \$4,300, the incremental monthly mortgage is approximately \$23/month at currently published interest rates. This incremental monthly mortgage is lower than the expected monthly energy savings of approximately \$37/month, and thus meets EPA cost-effectiveness criteria.

Please forward all comments to: [energystarhomes@energystar.gov](mailto:energystarhomes@energystar.gov)

**Proposed Schedule for ENERGY STAR Qualified Homes 2011 Guidelines:**

May 1 – July 10, 2009:	Stakeholder comment period
January 1, 2011:	ENERGY STAR Qualified Homes 2011 Guidelines effective nationwide