ENERGY STAR Certified Homes

The Year Ahead

October 25th, 2016
Agenda

- The numbers
- Checking in on program requirements
- Revision 09?
- ENERGY STAR Certified Homes RaterPro app
- HERS credit for HVAC quality design & installation
- Updated & new resources
The Numbers
Annual ENERGY STAR Certified Homes Built

<table>
<thead>
<tr>
<th>Year</th>
<th>Homes Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>83,896</td>
</tr>
<tr>
<td>2014</td>
<td>87,813</td>
</tr>
<tr>
<td>2013</td>
<td>91,756</td>
</tr>
</tbody>
</table>
555 New Partners in 2016 to Date!
Checking in on Program Requirements: Version 3.1
What you need to know about Version 3.1

- Maintains meaningful savings in states that adopt the 2012 IECC or equivalent.
What you need to know about Version 3.1

- REM/Rate can run v3.1 compliance report today, even for states that have yet to adopt v3.1.
What you need to know about Version 3.1

• No new mandatory measures in v3.1!
• To hit the lower HERS index target, you’ll likely need to make incremental improvements to:
  – Infiltration,
  – Windows,
  – HVAC efficiency,
  – Lighting, and,
  – Either ducts in conditioned space or high-efficiency water heaters.
What you need to know about Version 3.1

- There are now 17 states, along with the District of Columbia, for which the implementation date has been defined for v3.1, plus regional v3.1 requirements for CA and FL:

<table>
<thead>
<tr>
<th>State</th>
<th>Applicable to Homes with the Following Permit Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA</td>
<td>On or after 01/01/2015</td>
</tr>
<tr>
<td>DC, IL, MD, RI</td>
<td>On or after 04/01/2015</td>
</tr>
<tr>
<td>IA</td>
<td>On or after 06/01/2015</td>
</tr>
<tr>
<td>DE</td>
<td>On or after 12/01/2015</td>
</tr>
<tr>
<td>MN, VT</td>
<td>On or after 04/01/2016</td>
</tr>
<tr>
<td>NV</td>
<td>On or after 10/01/2016</td>
</tr>
<tr>
<td>MI, NJ</td>
<td>On or after 04/01/2017</td>
</tr>
<tr>
<td>CT, NY, TX</td>
<td>On or after 10/01/2017</td>
</tr>
</tbody>
</table>
Quiz #1

• How many new mandatory checklist measures does v3.1 include?
  – 0
  – 1
  – 365
Quiz #2

• What’s the typical HERS range for a v3.1 home?
  – 65-75
  – 55-65
  – 0
Checking in on Program Requirements: Version 3.2
What you need to know about Version 3.2

• Not much, unless you live in California or Washington State.
• These two states now have the most stringent energy codes in the country.
• In response, we’re developing a brand-new Version 3.2.
• Same concept as Version 3.1 –
  – More aggressive performance target
  – Exact same mandatory requirements
What you need to know about Version 3.2

• To hit the new performance target, you’ll likely need to pursue:
  – More insulation
  – Very good windows
  – Ducts in conditioned space
  – Very high-efficiency HVAC and water heaters, and,
  – Efficient ventilation

• We plan to enforce v3.2 starting with homes permitted one year after the new codes go into effect:
  – WA: 07/01/2017
  – CA: 01/01/2018
Revision 09?
Recap of Revision 08

• Major improvements in Rev. 08:
  1. Greatly reduced paperwork
  2. Greatly improved workflow
  3. Reduced HVAC oversight role for Raters, for time-being
“Rev. 08 truly is an improvement and will make implementation better for Raters & builders.”

“Rev. 08 dramatically reduces the amount of paperwork Raters have to process. To their credit, the ENERGY STAR team listened to the industry and made much needed changes.”

“Our experience with Rev. 08 to date has proven that its goals have come to fruition. We are seeing the streamlined paperwork result in fewer delays which has ultimately lead to greater builder satisfaction.”
Partner Reaction

“What, you mean you actually like it now?”

“I don't believe it! They've managed the impossible! What an achievement! Bravo, bravo!”

“No, they've made it even worse!”
Revision 08.

It’s Great.
Revision 09?

- Since the release of Rev. 08 in July 2015, we’ve only made a handful of small policy adjustments.
- Eventually we’ll want to roll these improvements into the program documents, which will result in the creation of Rev. 09.
- No set timeline yet for when this will occur, but it’s not imminent.
- In summary, Rev. 09 is shaping up to be a very minor revision.
ENERGY STAR Certified Homes
RaterPRO App
Why are we developing an app?

• Raters are currently the only subcontractor who don’t leave an observable imprint on the house.
• Raters are the cheapest expense when building a house.
• Partners have called for technology to enhance QA, simplify and speed the process, and better demonstrate the value of verification.
What’s the goal of the app?

• Provide a tool that helps Raters collect high-quality field data during the pre-drywall and final inspection of a home.
• Meet the needs of our partners in a way that is also beneficial to both RESNET and the homebuilders they serve.
What key features will be included in the app?

• Developed in collaboration with stakeholders.
• Can be used for stand-alone HERS ratings and ENERGY STAR certification.
• Ability to collect robust data, such as geo-location, photos, & notes.
• Ability to communicate with rating software and other connected devices.
• Voluntary and freely available.
What key benefits will result from the app?

- Enhances the value of HERS ratings and other third-party verifications.
- Make it faster & easier to complete a high-quality rating.
- Provides both a foundation and a model for private-sector investments.
- Can eliminate the use of paper checklists.
HERS Credit for HVAC Quality Design & Installation
Ample evidence that HVAC systems are not properly installed

- Improper airflow:
  - Average airflow 14% below design (Proctor 1997)
  - Improper airflow in 44% of systems (Mowris et al. 2004)
  - Measured airflow ranging from 130 - 510 CFM / ton (Parker 1997)

- Incorrect refrigerant charge:
  - In 57% of systems (Downey/Proctor 2002)
  - In 62% of systems (Proctor 2004)
  - In 72% of systems (Mowris et al. 2004)
  - In 82% of systems (Proctor 1997)
Lessons Learned So Far on HVAC Commissioning

1. It deserves attention – it’s important and has been overlooked for too long.
2. Builders are starting to understand the rationale and value for it.
3. Commissioning requirements easily verified by Raters have taken hold.

But:
4. The industry, as a whole, still needs a lot of support to deliver it.
5. Lack of uniform, practical, standards leads to conflict and confusion.
6. No credit in the HERS index is a significant obstacle.
What’s Next?
HVAC Grading System Concept

• Follow the insulation quality-installation model:
  – **Grade III**:  
    • The default. No verification is done.  
    • No penalty and no credit.
  – **Grade II**:  
    • Rater verifies key design and installation parameters.  
    • Verification indicates that the system is good but not great.  
    • Partial credit awarded.
  – **Grade I**:  
    • Rater duplicates the tasks in Grade II.  
    • But, the verification indicates that the system is great.  
    • Full credit awarded.
What’s Next?
HERS Credit for HVAC Quality Installation

• EPA is leading a RESNET working group to turn this concept into a standard.
• Key benefits of such a standard include:
  – Ability to gain HERS points for proper HVAC design & installation.
  – Standardization of procedures for Raters and contractors.
  – Reward incremental improvement by the industry.
  – Better align ENERGY STAR with HERS ratings.
Updated & New Resources
Updated Cost & Savings Analysis

- Our Cost & Savings Estimates have been updated for both v3 and v3.1 to reflect Rev. 08 and changes in federal minimum equipment standards.
- The annual savings have decreased a bit because water heaters, AC’s, and heat pumps are more efficient now.
- However, the incremental costs have dropped even more, due to some lower component costs and the elimination of certain requirements with Rev. 08.
- The updated analyses will be posted on our website in the near future.
## Updated Cost & Savings Analysis for Version 3

<table>
<thead>
<tr>
<th>#</th>
<th>CZ</th>
<th>Location</th>
<th>Found.</th>
<th>HVAC Equipment Type</th>
<th>Original Values</th>
<th>Updated Values</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Annual Purchased Energy Savings</td>
<td>Total Upgrade Cost</td>
<td>Annual Purchased Energy Savings</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Miami, FL</td>
<td>Slab</td>
<td>Elec. Air-Source HP</td>
<td>$322</td>
<td>$2,187</td>
<td>$294</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Miami, FL</td>
<td>Slab</td>
<td>Gas Furnace / Elec. AC</td>
<td>$321</td>
<td>$2,124</td>
<td>$288</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Tampa, FL</td>
<td>Slab</td>
<td>Elec. Air-Source HP</td>
<td>$308</td>
<td>$2,187</td>
<td>$276</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Tampa, FL</td>
<td>Slab</td>
<td>Gas Furnace / Elec. AC</td>
<td>$315</td>
<td>$2,124</td>
<td>$285</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>Fort Worth, TX</td>
<td>Slab</td>
<td>Elec. Air-Source HP</td>
<td>$546</td>
<td>$2,421</td>
<td>$502</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>Fort Worth, TX</td>
<td>Slab</td>
<td>Gas Furnace / Elec. AC</td>
<td>$376</td>
<td>$2,358</td>
<td>$360</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>St. Louis, MO</td>
<td>Bsmnt</td>
<td>Elec. Air-Source HP</td>
<td>$574</td>
<td>$2,176</td>
<td>$464</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>St. Louis, MO</td>
<td>Bsmnt</td>
<td>Gas Furnace / Elec. AC</td>
<td>$366</td>
<td>$2,145</td>
<td>$362</td>
</tr>
<tr>
<td>9</td>
<td>5</td>
<td>Indianapolis, IN</td>
<td>Bsmnt</td>
<td>Elec. Air-Source HP</td>
<td>$720</td>
<td>$2,571</td>
<td>$732</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>Indianapolis, IN</td>
<td>Bsmnt</td>
<td>Gas Furnace / Elec. AC</td>
<td>$415</td>
<td>$2,350</td>
<td>$471</td>
</tr>
<tr>
<td>11</td>
<td>6</td>
<td>Burlington, VT</td>
<td>Bsmnt</td>
<td>Elec. Air-Source HP</td>
<td>$1,117</td>
<td>$2,667</td>
<td>$1,028</td>
</tr>
<tr>
<td>12</td>
<td>6</td>
<td>Burlington, VT</td>
<td>Bsmnt</td>
<td>Gas Furnace / Elec. AC</td>
<td>$547</td>
<td>$2,350</td>
<td>$535</td>
</tr>
<tr>
<td>13</td>
<td>7</td>
<td>Duluth, MN</td>
<td>Bsmnt</td>
<td>Gas Furnace / Elec. AC</td>
<td>$673</td>
<td>$2,350</td>
<td>$701</td>
</tr>
</tbody>
</table>
Updated Training Content

- The original Version 3 training content has been updated to reflect Rev. 08.
- Links to the Building America Solutions Center have been added for every checklist item, so trainers can get expanded content.
- This will be a great resource for RESNET training providers.
New ENERGY STAR vs Code Factsheets

• Perennial question – does an ENERGY STAR home meet code?
• New factsheets have been developed to better explain the overlap.
• We’ll be discussing this in more detail later this afternoon.
Overhaul of ENERGY STAR Technical Website

Version 2.5 and 3 Training Resources

Training Presentations
- Webinars — ENERGY STAR offers free webinars to help you get the most out of your partnership and prepare for Version 3.
- How to Measure Whole-House Ventilation Airflow (5 minutes each) — Watch these four short videos to see how to measure whole-house ventilation airflow — one critical commissioning task for ENERGY STAR certified homes.

Technical Guidance Documents
- Slab Edge Insulation Exemption Details (207KB) — This document provides explanations and illustrations of slab edge insulation exemptions.
- Kitchen Exhaust Guidelines (121KB) — This document provides guidance on alternative compliance options for meeting the kitchen mechanical exhaust requirements.
- Attic Hatch Details (139KB) — This document provides explanations and illustrations of insulation details for attic entrances.
- HVAC Design Temperatures (221KB) — This document lists the 1% and 99% ACCA Manual J outdoor design conditions that HVAC designers are required to use and Raters are required to verify per the Version 3 guidelines.

Inspection Checklist Technical Guides
Technical guides for the ENERGY STAR Inspection Checklists are available at the Building America Solutions Center, created by the U.S. Department of Energy. These free guides replace EPA’s Inspection Checklist Field Guidebooks and provide a wealth of building science and energy-efficiency information. They are intended to be aligned with, and used as a supplemental resource to, the Version 3 guidelines but do not represent the official policy of the ENERGY STAR Certified Homes Program. Where questions arise, please contact energystarhomes@energy.gov.
Overhaul of ENERGY STAR Technical Website
What’s Missing?