ENERGY STAR for Homes

The Transition with Version 2.5

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Agenda

- Audience background
- Version 2.5
- Revision 02 overview
- Version 3
- What to expect for 2011
- Lessons learned
- Discussion

Audience background

Who are you?

- Training Providers?
- Rating Providers?
- Independent Raters?
- Energy efficiency programs?
- Builders?
- HVAC contractors?

Experience

- Attended Version 2.5 webinar?
- Worked on a home under Version 2.5 or 3?

Version 2.5

Motivation for Version 3

- **Challenges to continued program success**
  - Energy codes are becoming more stringent, particularly with the adoption of the 2009 IECC.
  - Energy codes are increasing more rapidly, and updates will be adopted more regularly by many states.
  - Market penetration is increasing, and ENERGY STAR is becoming the standard for new home construction in some markets.
  - Increased use of thermography reduces tolerance for defects.

- **Continually improve value proposition**
  - To protect its value to consumers, partners, and other stakeholders, ENERGY STAR must continue to be a mark of distinction that represents significant efficiency above standard construction practices.
  - Additionally, the guidelines needed to be augmented with building science practices that can help improve comfort, indoor air quality, and durability in qualified homes.

Version 2.5 transition

- **Version 2.5 is the Version 3 guidelines with allowances for transition**

  Version 2.5 applies to:
  - Single-family homes that are permitted before Apr. 1, 2011 and completed between July 1, 2011 and Dec. 31, 2011; and
  - All homes that are both permitted and completed between Apr. 1, 2011 and December 31, 2011.

  Homes that can be qualified under Version 2 can, at the builder's discretion, be qualified under Version 2.5.

- **Version 2.5 will help partners succeed with Version 3**

  By completing all mandatory checklists, but providing an allowance for deficiencies during this transitional period, Version 2.5 allows partners to identify what parts of the full Version 3 guidelines require further preparation and assistance.

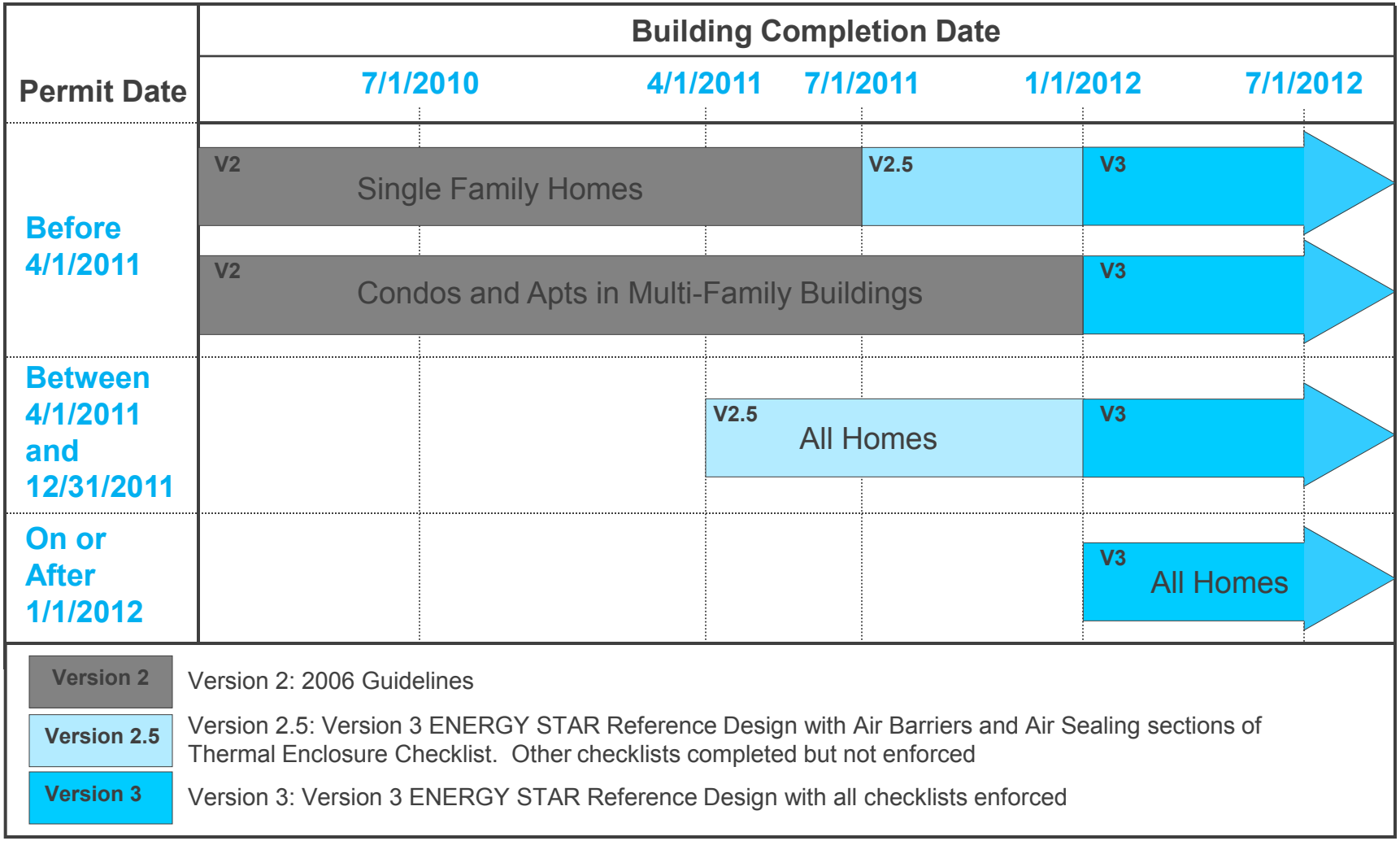
Key changes in Version 3

- **Variable vs. Fixed HERS Index Threshold**
  A custom ENERGY STAR HERS Index Target is calculated for each home following the Performance Path.

- **Size Adjustment Factor**
  Homes of all sizes may be labeled. However, homes larger than a benchmark size for a specified number of bedrooms (called the „Benchmark Home Size“) must apply a Size Adjustment Factor. This will result in reduced HERS Index Target Scores and increased requirements for larger homes.

- **New inspection checklists**
  The current Thermal Bypass Checklist has been expanded into the Thermal Enclosure Checklist (TEC). New HVAC Quality Installation and Water Management Checklists have been added.

Implementation timeline



Qualifying homes under Version 2.5

- **Verify eligibility**
  - Single family homes;
  - Units in multifamily buildings with 3 stories or less; and
  - Units in four- or five-story multi-family buildings, including mixed-use buildings, that have their own heating, cooling, and hot water systems, separate from other units.

Qualifying homes under Version 2.5

- **Select energy efficiency measures**
  Homes qualified under Version 2.5 must include the core Version 3 energy efficiency measures. These specifications can be met in one of two ways:
  - Select a predefined package of improvements under the Prescriptive Path; OR
  - Create a customized set of upgrades through the Performance Path.

  Homes that are larger than their Benchmark Home Size must use the Performance Path so that the Size Adjustment Factor can be applied. They cannot use the Prescriptive Path.

Benchmark Home Size

Bedrooms	1	2	3	4	5	6	7	8
CFA	1,000	1,600	2,200	2,800	3,400	4,000	4,600	5,200

Benchmark Home Size

- **Picking a compliance path**
  - To determine if a home must use the Performance Path because of its size, first count the number of bedrooms in the home and calculate the conditioned floor area.
  - Then, subtract any bedrooms and floor area in basements that have at least 50% of their exterior wall area below grade.
  - Now use the resulting number of bedrooms to compare the Benchmark Home Size against the comparison area of the home to be built.
  - If the comparison area of the home to be built is larger than the Benchmark Home Size, the home must follow the Performance Path so that the Size Adjustment Factor can be applied.

Benchmark Home Size

- **Use of conditioned floor area**
  - Note that EPA relies upon RESNET's definition of conditioned floor area. The RESNET Standards define conditioned floor area as:

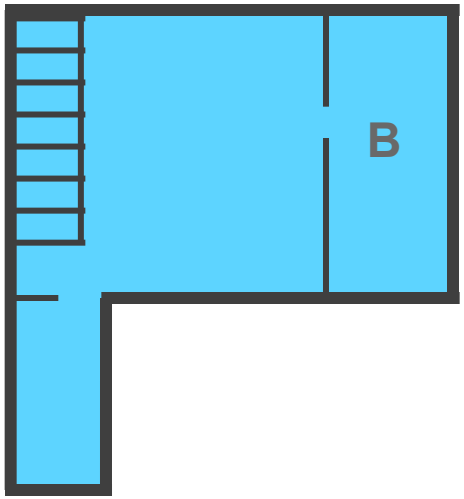
    "The finished floor area in square feet of a home that is conditioned by heating or cooling systems, measured in accordance with ANSI Standard Z765-2003 with exceptions as specified in Appendix A of this Standard."
  - The full conditioned floor area should be used when rating the home and determining compliance with duct leakage requirements. However, conditioned floor area and bedrooms in basements with at least 50% of exterior wall area below grade should be subtracted from the total conditioned floor area for the purpose of determining the Benchmark Home Size and assessing eligibility to use the Prescriptive Path.
  - For the purpose of determining whether at least at least half of the basement wall area is below grade, use the exterior wall area from the basement floor to the bottom of the basement ceiling framing (e.g., the bottom of the joists for the floor above). Exclude the area of all common walls in the basement.

Benchmark Home Size

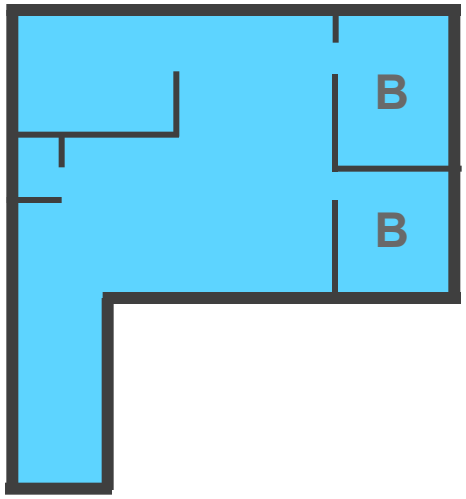
- **Definition of bedroom**
  - ENERGY STAR refers to the RESNET definition of a bedroom per footnote 2 of the National Program Requirements (p. 4):
  - A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater in size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.
    - An egress window, as defined in IRC section R310, refers to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window shall:
      - “have a sill height of not more than 44 inches above the floor; AND
      - “have a minimum net clear opening of 5.7 sq. ft.; AND
      - “have a minimum net clear opening height of 24 in.; AND
      - “have a minimum net clear opening width of 20 in.; AND
      - “be operational from the inside of the room without the use of keys, tools or special knowledge.”

Benchmark Home Size

- **Example #1**
  - This home has a slab-on-grade foundation.



1st Floor



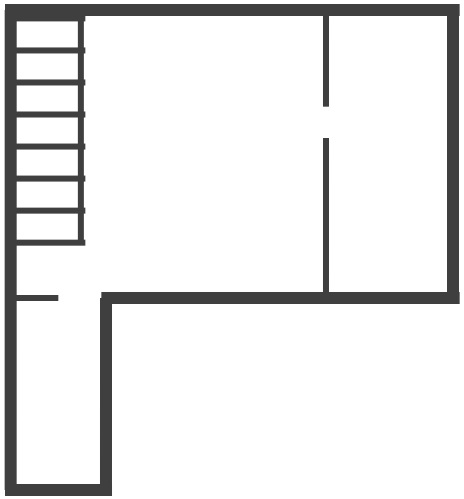
2nd Floor

B = Bedroom
= Comparison Area

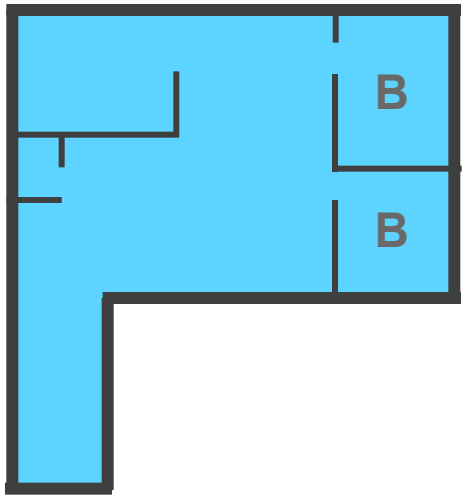
Bedrooms Comparison Area	3 2,400 ft^2	**Benchmark Home Size Verification Path**	2,200 ft^2 Performance Path only

Benchmark Home Size

- **Example #2**
  - This home has a basement. 60% of the basement wall area is below grade. The area of the basement and any bedrooms in it are not counted when comparing the home against the Benchmark Home Size.



Basement



1st Floor

B = Bedroom
= Comparison Area

Bedrooms Comparison Area	2 1,200 ft^2	**Benchmark Home Size Verification Path**	1,600 ft^2 Either path

Qualifying homes under Version 2.5

- **Complete inspection checklists**
  - In addition to the core Version 3 energy efficiency measures, homes must include additional measures enforced with inspection checklists. These measures help ensure comprehensive systems and energy efficiency with every qualified home under Version 3.
  - In Version 2.5, all inspection checklists must be completed. Homes must pass all requirements of the Air Barriers and Air Sealing section of the Thermal Enclosure Checklist. Noncompliance with other items will not prevent homes from earning the label under Version 2.5.
  - Compliance with all checklist items will be required under Version 3.

Version 2.5 Prescriptive Path

- **ENERGY STAR Reference Design**
  - The ENERGY STAR Reference Design is a pre-defined set of specifications that must be met for all homes under the Prescriptive Path.
  - National and county-level specifications are available.

- **Key specification categories**

  Cooling Equipment (where provided); Heating Equipment; Envelope, Windows, & Doors; Water Heater; Thermostat; Ductwork; and Lighting & Appliances

- **Compliance**
  - Only homes the same size or smaller than their Benchmark Home Size may use this path.
  - No trade-offs are allowed.
  - The home must be designed and constructed to specifications and pass all required inspections and testing.

Version 2.5 Performance Path

- **ENERGY STAR HERS Index Target**
  - The ENERGY STAR HERS Index Target is the customized threshold that each home following the Performance Path must meet to earn the ENERGY STAR.
  - The ENERGY STAR HERS Index Target is based on the ENERGY STAR Reference Design used in the Prescriptive Path and, for homes larger than their Benchmark Home Size, includes the Size Adjustment Factor.

- **Automatic software configuration**
  - Rating software automatically determines the ENERGY STAR HERS Index Target for each home.
  - For Raters who want to understand how the software determines the ENERGY STAR HERS Index Target, refer to the ENERGY STAR HERS Index Target Procedure at www.energystar.gov/newhomesguidelines.

Version 2.5 Performance Path

- **Select upgrades**
  - Just like in Version 2, the Rater and builder have flexibility to select a custom set of energy efficiency specifications, so long as the resulting HERS Index meets or exceeds the ENERGY STAR HERS Index Target.
  - Builders and Raters may mix and match any component, including:
    - Insulation levels;
    - Window efficiency;
    - Infiltration levels;
    - HVAC efficiency;
    - Water heating efficiency; or
    - Lighting & appliances.

- **Verification**

  The home must be designed and constructed to the customized specifications and pass all required inspections and testing.

Qualifying homes under Version 2.5

1. Check eligibility.
2. Check Benchmark Home Size.
3. Select Version 3 energy efficiency measures.

Prescriptive Path

1. Build the home using the ENERGY STAR Reference Design.
2. Complete the inspection checklists.

Performance Path

1. Model the home and find the ENERGY STAR HERS Index Target.
2. Select upgrades that achieve a HERS Index ≤ ENERGY STAR HERS Index Target and meet other program requirements.
3. Complete the inspection checklists.

Example #1

Verification Path **Bedrooms**	Performance Path 4 bedrooms	**CFA** **Benchmark Home Size**	2,500 ft^2 2,800 ft^2

- The home to be built is smaller than the Benchmark Home Size, so it can be qualified under either path.
- The builder wants to use the Performance Path. The Rater models the home to find the ENERGY STAR HERS Index Target. For this home, it turns out to be 76.
- The builder and Rater can select any set of upgrades that achieves a HERS Index ≤ 76 and meets other program requirements.
- The Rater verifies that the home is built with the selected upgrades and completes the inspection checklists.

Example #2

Verification Path **Bedrooms**	Prescriptive Path 3 bedrooms	**CFA** **Benchmark Home Size**	2,100 ft^2 2,200 ft^2

- The home to be built is smaller than the Benchmark Home Size, so it can be qualified under either path.
- The builder wants to use the Prescriptive Path. The necessary upgrades are based on the ENERGY STAR Reference Design.
- The Rater verifies that the home is built to the ENERGY STAR Reference Design and completes the inspection checklists.

Example #3

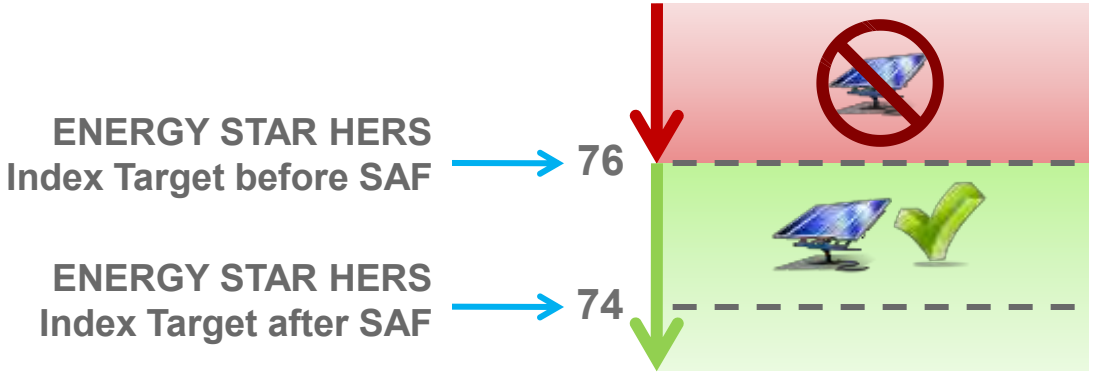
Verification Path **Bedrooms**	Performance Path 3 bedrooms	**CFA** **Benchmark Home Size**	2,500 ft^2 2,200 ft^2

- The home is larger than the Benchmark Home Size, so it must be qualified under the Performance Path.
- The Rater models the home to find the ENERGY STAR HERS Index Target.
  - Before the Size Adjustment Factor is applied, the ENERGY STAR HERS Index Target is 76.
  - The Size Adjustment Factor lowers the threshold by 2 Index points.
  - The ENERGY STAR HERS Index Target for the home is 74.
- The builder and Rater can select any set of upgrades that achieves a HERS Index ≤ 74 and meets other program requirements. The Rater verifies that the home is built with the selected upgrades and completes the inspection checklists.

Example #3

Verification Path	Performance Path	CFA	2,500 ft^2
Bedrooms	3 bedrooms	Benchmark Home Size	2,200 ft^2

- Note that onsite power generation (e.g., photovoltaics) can be used to help this home earn the ENERGY STAR.
  - The Size Adjustment Factor lowered the ENERGY STAR HERS Index Target by 2 Index points to 74
  - Onsite power generation cannot be used to help the home achieve an Index of 76. It can, however, be used to reduce the Index beneath 76.



Revision 02 overview

Revision 02 materials

- **Revision 02 has been released and includes the following:**
  - Revision 02 Version Tracking Document
  - ENERGY STAR Version 2.5 & 3 (Revision 02) National Program Requirements
  - ENERGY STAR Version 3 (Revision 02) County-Level Reference Designs
  - ENERGY STAR Version 3 (Revision 02) Inspection Checklists
  - ENERGY STAR Version 3 (Revision 02) HERS Index Target Procedure

- **Supporting resources available now:**
  - Thermal Enclosure System Rater Checklist Guidebook
  - HVAC System Quality Installation Rater Checklist Guidebook
  - Water Management System Builder Checklist Guidebook

Revision 02 highlights

- **Significant feedback was received since release of Revision 01.**
  - A few unexpected barriers were identified and the intent of many items needed to be clarified.
  - EPA encourages partners to read the version tracking document and the revised program documents for details.

- **Revision 02 is effective April 1, 2011.**

Revision 02 Highlights: The Major Changes

- Extends timeline: Version 2.5 mandatory for most homes permitted after April 1, 2011 instead of January 1, 2011.
- Excludes most basements from Size Adjustment Factor.
- Better aligns exceptions to the window performance and insulation requirements with the exceptions included in the 2009 IECC.
- Better explains the process for using the equivalent U-factor and UA alternative compliance paths.

Revision 02 Highlights: National Program Requirements

- Most basements are now excluded when calculating the Size Adjustment Factor and assessing eligibility to use the Prescriptive Path
- For these purposes, the number of bedrooms and the CFA of the home to be built are determined using RESNET standards with the following exceptions: bedrooms and floor area in basements with at least half of the gross surface area of the basement's exterior walls below grade shall not be counted.
- To determine whether at least half of the basement wall area is below grade, use the gross surface area of the exterior walls from the basement floor to the bottom of the basement ceiling framing. Exclude the area of all common walls in the basement.
- Note that this change is only for the purpose of determining a home's Benchmark Home Size, Size Adjustment Factor, and eligibility to use the Prescriptive Path. The full conditioned floor area and number of bedrooms, per RESNET's standards, should be used when rating the home (e.g., determining compliance with duct leakage requirements).

Revision 02 Highlights: National Program Requirements

- The definition of single-family homes in footnote 1 of Exhibit 4 has been revised to include quadplexes.
- The term “Building Completion Date” has been revised to “Date of Final Inspection” (i.e., the date at which all of the field inspections are complete for the home, not necessarily the date when the label is issued).
- The rater may define the „permit date“ as either the date that the permit was issued or the date of the contract on the home.
- All low-income projects (both single-family and multifamily) financed through low-income housing agencies may earn the ENERGY STAR under the last iteration of the guidelines, Version 2, until January 1, 2013 as long as the application for funding for those homes was received by the low-income housing agency before April 1, 2011 and the housing project includes at least one unit reserved for low-income tenants.

Revision 02 Highlights: General Changes Checklists

- The Rater's role in assessing compliance with the inspection checklists has been clarified:
  - The role of the Rater is to determine whether the intent of each checklist item has been met;
  - First the Provider, and then EPA, should be contacted if the Rater cannot determine whether the intent has been met;
  - If EPA believes the current program guidelines are sufficiently clear to determine whether the intent has been met, then this guidance will be provided to the partner and enforced beginning with the house in question.
  - In contrast, if EPA believes the program guidelines require revisions to make the intent clear, then this guidance will be provided to the partner but only enforced for homes permitted after a specified transition period after the release of the revised guidelines, typically 60 days in length.
- Per Rev 01, the Rater must verify that the Builder is a partner and the HVAC contractor is credentialed prior to qualifying a home.

Revision 02 Highlights: Thermal Enclosure System Chk.

Fenestration is required to meet ENERGY STAR requirements for the Prescriptive Path and 2009 IECC requirements for the Performance Path. The following exceptions apply:

a) An area-weighted average of fenestration products shall be permitted to satisfy the U-factor requirements;

b) An area-weighted average of fenestration products more than 50% glazed shall be permitted to satisfy the SHGC requirements;

c) 15 square feet of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements, and shall be excluded from area-weighted averages calculated using a) and b), above;

d) One side-hinged opaque door assembly up to 24 square feet in area shall be exempt from the U-factor requirements and shall be excluded from area-weighted averages calculated using a) and b), above;

e) Fenestration utilized as part of a passive solar design shall be exempt from the U-factor and SHGC requirements, and shall be excluded from area-weighted averages calculated using a) and b), above. Additional information is provided regarding the definition of passive solar design.

Revision 02 Highlights: Thermal Enclosure System Chk.

Insulation levels in a home shall meet or exceed the component insulation requirements in the 2009 IECC - Table 402.1.1. The following exceptions apply:

a) Steel-frame ceilings, walls, and floors shall meet the insulation requirements of the 2009 IECC – Table 402.2.5. In CZ 1 and 2, the continuous insulation requirements in this table shall be permitted to be reduced to R-3 for steel-frame wall assemblies with studs spaced at 24” on center. This exception shall not apply if the alternative calculations in d) are used;

b) For ceilings with attic spaces, R-30 shall satisfy the requirement for R-38 and R-38 shall satisfy the requirement for R-49 wherever the full height of uncompressed insulation at the lower R-value extends over the wall top plate at the eaves. This exemption shall not apply if the alternative calculations in d) are used;

Revision 02 Highlights: Thermal Enclosure System Chk.

c) For ceilings without attic spaces, R-30 shall satisfy the requirement for any required value above R-30 if the design of the roof/ceiling assembly does not provide sufficient space for the required insulation value. This exemption shall be limited to 500 square ft. or 20% of the total insulated ceiling area, whichever is less. This exemption shall not apply if the alternative calculations in d) are used;

d) An alternative equivalent U-factor or total UA calculation may also be used to demonstrate compliance, as follows:

- An assembly with a U-factor equal or less than specified in 2009 IECC Table 402.1.3 complies.
- A total building thermal envelope UA that is less than or equal to the total UA resulting from the U-factors in Table 402.1.3 also complies. The insulation levels of all non-fenestration components (i.e., ceilings, walls, floors, and slabs) can be traded off using the UA approach under both the Prescriptive and the Performance path. Note that fenestration products (i.e., windows, skylights, doors) shall not be included in this calculation. Also, note that while ceiling and slab insulation can be included in trade-off calculations, the R-value must meet or exceed the minimum values listed in items 4.1 through 4.3 of the checklist to provide an effective thermal break, regardless of the UA tradeoffs calculated...

Revision 02 Highlights: Thermal Enclosure System Chk.

- For insulated ceilings with attic space above (i.e., non-cathedralized ceilings), uncompressed insulation shall extend to the inside face of the exterior wall below at the following levels: CZ 1 to 5: ≥ R-21; CZ 6 to 8: ≥ R-30. Use any available strategy, such as a raised-heel truss, alternate framing that provides adequate space, and/or high-density insulation.
- In climate zones 4 and higher, slab insulation of at least R-5 is required regardless of the UA calculations used.
- Insulation beneath attic platforms (e.g., HVAC platforms, walkways) shall be ≥ R-21 in CZ 1-5 and ≥ R-30 in CZ 6-8.
- Slab insulation is required to be aligned with the thermal boundary of walls in CZ 4 and higher. Exceptions are provided for post-tensioned slabs with integrated porch foundations and post-tensioned slabs with integrated garage foundations in multi-family buildings.

Revision 02 Highlights: Thermal Enclosure System Chk.

- The allowance to use Grade II insulation coupled with insulated sheathing has been extended to all surfaces (e.g., insulated floors, rim joists or ceilings).
- Up to 10% of the total exterior wall surface area is exempted from the reduced thermal bridging requirements to accommodate thermal fins, wing walls, masonry fireplaces or similar architectural details.
- Batts that completely fill a floor cavity enclosed on all six sides may be used without the need for supports, as long as the compressed value meets or exceeds the required insulation level. The following values may be used:
  - R-19 batts in 2x6 cavities,
  - R-30 batts in 2x8 cavities,
  - R-38 batts in 2x10 cavities,
  - R-49 batts in 2x12 cavities.

  For example, in a home that requires R-19 floor insulation, an R-30 batt may be used in a six-sided 2x8 floor cavity.

Revision 02 Highlights: Thermal Enclosure System Chk.

- An allowance has been added to install a tabbed baffle in each bay with a soffit vent, rather than in every bay, as long as the tabbed baffle can prevent wind washing of insulation in adjacent bays.
- For slabs on grade in Climate Zones 4 and higher, 100% of slab edge must be insulated to ≥ R-5 at the depth specified by the 2009 IECC and aligned with thermal boundary of the walls.
- Insulation beneath attic platforms (e.g., HVAC platforms, walkways) must be ≥ R-21 in CZ 1-5 and ≥ R-30 in CZ 6-8.

Revision 02 Highlights: HVAC System Contractor Chk.

- The contractor must now record the number of occupants served by the system, rather than the number of bedrooms.
- The number of occupants among all HVAC systems in the home must be equal to the number of bedrooms, plus one. Occupants listed for systems that are indicated in the header as a cooling system for temporary occupant loads shall be permitted to exceed this limit.
- A cooling system for temporary occupant loads may be required to accommodate a significant number of guests on a regular or sporadic basis and shall be handled by a supplemental cooling system (e.g., a small, single-package unit or split-coil unit) or by a system that can shift capacity from zone to zone (e.g., a variable volume system).”

Revision 02 Highlights: HVAC System Contractor Chk.

- ACCA Manual J design temperatures are required to be used unless otherwise required by code.
- A „Smart Cycler" is allowed to be used in place of an ECM/ICM fan for supply-side ventilation systems.
- For home plans built in multiple orientations, the worst-case orientation can be used to select equipment size in some cases, as follows:

  "If the loads are calculated for multiple orientations and the loads across all orientations vary by ≤ 25%, then the largest load shall be permitted to be used for equipment selection for all orientations, subject to the over-sizing limits of ACCA Manual S. Otherwise, the contractor shall group the load for each orientation into a set with < 25% variation and equipment selection shall be completed for each set of loads."
- An OEM test procedure may be used in place of a standard sub-cooling or super-heat process if documentation has been attached that defines this procedure.

Revision 02 Highlights: HVAC System Rater Chk.

- The Rater is now required to confirm that the ACCA Manual J design temperatures have been used unless otherwise required by code. The Rater shall either confirm that the contractor selected the geographically closest available location or collect from the contractor a justification for the selected location. The Rater need not evaluate the legitimacy of the justification to qualify the home.

- When HVAC condenser is installed after time of inspection, additional options have been provided to verify the HVAC manufacturer and serial # using photographs and exemptions provided for testing the thermostat controls.

- The Rater is required to verify that the proper number of occupants, rather than bedrooms, has been reported on the contractor checklist.

Revision 02 Highlights: HVAC System Rater Chk.

- For cooling systems, the next largest nominal piece of equipment may be used that is available to satisfy the latent and sensible requirements. Single-speed systems generally have OEM nominal size increments of ½ ton. Multi-speed or multi-stage equipment may have OEM nominal size increments of one ton. Therefore, the use of these advanced system types can provide extra flexibility to meet the equipment sizing requirements.

- When balancing dampers are used, they shall be located at the trunk to limit noise unless the trunk will not be accessible when the balancing process is conducted. In such cases, Opposable Blade Dampers (OBD) or dampers that are located in the duct boot are permitted.

- The Rater is now able to verify the net-free area for bedroom pressure balancing using contractor-reported airflow from registers, rather than requiring the Rater to measure the airflow from registers.

- EPA has clarified that for the pressure balancing test, pressure is to be measured relative to the house rather than to the outside.

Revision 02 Highlights: HVAC System Rater Chk.

- Total duct leakage testing is now required for all homes. Previously an exemption was inadvertently provided for homes with ducts in conditioned space.
- Duct leakage testing must occur after the installation of the air handler and grilles.
- The net exhaust and net supply flow restrictions have been removed in alignment with anticipated revisions to ASHRAE 62.2-2010.
- While not a change, EPA has reiterated that the ventilation rates required by ASHRAE 62.2-2010 must be met (i.e., a humidistat cannot be used to simply turn off the ventilation system during periods of high humidity).
- The outlet and inlet of balanced ventilation systems must meet the spacing requirements of ASHRAE 62.2-2010 unless manufacturer instructions indicate that a smaller distance may be used. However, if this occurs the manufacturer's instructions shall be collected for documentation purposes.

Revision 02 Highlights: HVAC System Rater Chk.

- An exemption of the airflow test has been added for kitchen exhaust fans that are integrated with microwaves. Instead a higher nominal flow rate must be used.
- For combustion safety tests, the Rater may use either the Building Performance Institute's (BPI's) Combustion Safety Test Procedure for Vented Appliances or RESNET's Interim Guidelines for Combustion Appliance Testing and Writing Work Scope and must be BPI-certified or RESNET-accredited.
- The options for combustion safety testing of fireplaces have been clarified and expanded. A new test option has been added, allowing the Rater to verify that the pressure differential is $\leq$ 5 Pa using BPI's or RESNET's combustion safety test procedure.
- A combustion safety test is now required for unvented combustion appliances. The Rater must conduct RESNET's or BPI's combustion safety test procedure and determine that the ambient CO test results are less than 35 ppm.

Revision 02 Highlights: Water Management System Chk.

- An additional column was added to the checklist that includes checkboxes for items verified by the Rater, if any.
- Polyethylene sheeting in crawlspaces only needs to be lapped high enough on perimeter walls or piers to allow for fastening with furring strips; as an alternative, it can be secured in the ground at the perimeter using stakes.
- The limits on the use of vapor retarders have been clarified.:
  - Class 1 vapor retarders must not be installed on the interior side of air permeable insulation in exterior below-grade walls.
  - In Warm-Humid climates, Class 1 vapor retarders must not be installed on the interior side of air permeable insulation in above-grade walls, except at shower and tub walls.
  - An exception is provided for ceramic tile at shower and tub walls and for mirrors as long as clips or spacers are used.
- The requirements for gutters and downspouts have been relaxed; now only required for homes that don‟t have a slab-on-grade foundation and do have expansive or collapsible soils.

Version 3

Transition to Version 3

	ENERGY STAR for Homes Guidelines		
	Version 2.0	**Version 2.5**	**Version 3.0**
Performance Path	• Fixed HERS Index target • Cap on CFLs to achieve HERS Index. • On-site power may not be used to achieve HERS Index.	• Custom HERS Index target with Size Adjustment Factor • No cap on efficient lighting to achieve ENERGY STAR HERS Index Target. • On-site power allowed only to make up for the incremental change in the ENERGY STAR HERS Index Target caused by Size Adjustment Factor.	
Prescriptive Path	Builder Option Package (BOP)	ENERGY STAR Reference Design	
Ducts	Version 2 guidelines for duct insulation, leakage thresholds, and waivers for testing leakage.		More rigorous Version 3 guidelines.
Inspection Checklists	Thermal Bypass Checklist	Version 3 checklists with partial enforcement	Version 3 checklists with full enforcement

Version 3 Performance Path

- **Limitations on trade-offs**
  - In Version 3, EPA has imposed certain limitations on trade-offs. These limitations are contained in the inspection checklists. Some of the key limitations include the following:
    - Insulation levels, window U-value, and window SHGC must meet or exceed 2009 IECC requirements;
    - All ceiling, wall, floor, and slab insulation shall achieve RESNET-defined Grade I installation or, alternatively, Grade II for surfaces with insulated sheathing at or above the following levels:

2009 IECC Climate Zone	Minimum R-value
CZ 1-4	R-3
CZ 5-8	R-5

Version 3 Performance Path

- **Limitations on trade-offs (cont'd)**
  - Ventilation rate must meet ASHRAE 62.2;
  - Duct Insulation must be > R-6;
  - Duct leakage to outside must be < 4 CFM_{25} per 100 ft^2 CFA; and
  - In CA 4 and higher, 100% of slab perimeter must be insulated to ≥R-5 and aligned with the thermal boundary of the walls.

Regional specifications

- **Initial Version 3 implementation in states with advanced codes**
  - EPA is evaluating regional modifications to Version 3 for states with advanced energy codes.

Regional Specifications	
California	Draft specifications currently out for comment. EPA anticipates they will be finalized in the 2nd quarter of 2011.
Florida	Draft specifications to be released for comment by end of 1st quarter. EPA anticipates they will be finalized in the 2nd quarter of 2011.
Hawaii	Draft specifications currently out for comment. EPA anticipates they will be finalized in the 2nd quarter of 2011.
Pacific Northwest	Draft specifications in development.

Regional specifications

- **Advanced code adoption after Version 3 implementation**
  - As states that initially are subject to the national Version 3 requirements adopt more rigorous codes, EPA will provide modified guidelines.
  - Until such time, use the National Program Requirements and inspection checklists to qualify homes.

Version 3 training requirements

- **Training requirements for builders, Raters, and HVAC contractors**
  - Builders, Raters, and Field Inspectors must complete Version 3 training before they can work on homes qualified under Version 3.
  - HVAC contractors must be credentialed an EPA-recognized training and oversight organization before they can install HVAC systems in homes qualified under Version 3.
  - Homes that are built to the v3 guidelines but whose builder, Rater, Field Inspector, or HVAC contractor has not yet completed the v3 training cannot earn the ENERGY STAR under v3.

Version 3 training requirements

- **Builder training**
  - The ENERGY STAR Orientation Training for builders is a free, web-based training available through ENERGY STAR. It can be completed in under 1 hour and includes a test on the content.
  - One company representative per builder is required to complete the course; however, additional representatives are encouraged to also complete the training.
  - Builders who joined prior to 2011 must complete their orientation by January 1, 2012 to continue to hold active ENERGY STAR partnerships. They can access the training at www.energystar.gov/mesa.
  - New builders will need to take the orientation to join ENERGY STAR for the first time. They will be prompted to do this after submitting a Partnership Agreement through www.energystar.gov/homesPA.

Version 3 training requirements

- **Builder partnership**
  - All new builders must now sign ENERGY STAR Partnership Agreements to join ENERGY STAR before qualifying homes under Version 3. Builders who joined ENERGY STAR prior to 2011 will sign new Partnership Agreements as part of their ENERGY STAR Orientation.
  - EPA has previously accepted reports of qualified homes by builders who have not been partners. Starting in 2012, reports of qualified homes by non-partner builders will not be accepted. The online reporting system will not permit non-partner entries.
  - Raters should ensure that every builder they work with is an ENERGY STAR partner.

Version 3 training requirements

- **Rater and Field Inspector training**
  - ENERGY STAR Version 3 Training for Raters and Field Inspectors is available though training organizations recognized by RESNET specifically to deliver this training.
  - All individual Raters and Field Inspectors who work on qualified homes must complete Version 3 Training. It will not be sufficient for one Rater or one Field Inspector in each organization to complete this training.
  - Rating organizations must have at least 1 Rater who has completed the ENERGY STAR Version 3 Training by January 1, 2012 to maintain active ENERGY STAR partnerships.
  - New rating organizations who join ENERGY STAR beginning in 2012 will need to have at least one Rater take this training before they can become partners.
  - All rating organization partners must be working under an accredited Provider.

Version 3 training requirements

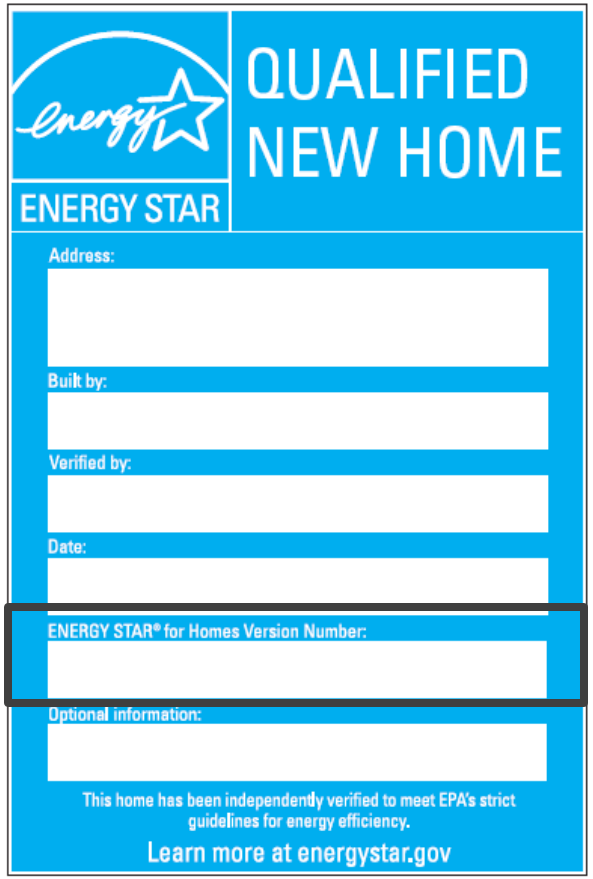
- **HVAC contractor credentialing**
  - HVAC contractors must be credentialed by an EPA-recognized HVAC Quality Installation Training and Oversight Organizations (H-QUITO) to install HVAC systems in homes qualified under Version 3.
  - A contractor must submit an application to an H-QUITO to demonstrate that they have the knowledge, skills, and company policies to deliver QI services.
  - At least one representative from each HVAC contractor must attend an ENERGY STAR Version 3 Orientation Training before the organization can apply. Training will be offered directly by H-QUITOs and will include online training to permit national accessibility.
  - Raters will sign off on the inspection checklists to show that they have verified HVAC contractors‟ credential status.
  - Lists of accredited HVAC contractors will be available from H-QUITOs through the ENERGY STAR Website at www.energystar.gov/newhomesguidelines.

Documentation

- **ENERGY STAR Version 3 certificate**
  - EPA is updating the ENERGY STAR certificate to include more customized information for homeowners. The updated certificate will only be available for homes qualified under Version 3.
  - Unlike the current ENERGY STAR certificate, which is optional for homes qualified under Version 2 and 2.5, the new certificate will be required to be distributed to all homes qualified under Version 3.

Documentation

- **Updated ENERGY STAR label**
  - The ENERGY STAR label is being updated to include the version of the guidelines that each home is qualified under.
  - This new label is not tied to Version 3; Version 2 and Version 2.5 homes can also use the new label.
  - Every ENERGY STAR qualified home must be labeled. This applies to homes qualified under all versions of the ENERGY STAR guidelines.



What to expect for 2011

Technical guidelines

- **Consistent revision process and versioning being implemented**
  - Purpose of revision process is to be responsive to partner questions, to disseminate and enforce policy changes in a consistent manner, and to adapt program as needed for success.
  - Anticipated revisions once per quarter in 2011, slowing to once every 6 months in 2012 and beyond.
  - EPA will post revised program documents and a Version Tracking Document. All technical guidelines area available through www.energystar.gov/newhomesguidelines.
  - EPA will also notify partners via email and will conduct webinars as warranted.

- **Regional guidelines and implementation plans will be finalized**

Technical guidelines

- **Early Version 3 availability**
  - No homes may be qualified under Version 3 until January 1, 2012 except where a utility or state sponsor is mandating or incentivizing early adoption of Version 3 in their area.
  - In these cases, EPA will allow the labeling of ENERGY STAR Version 3 homes prior to January 1, 2012 on a pilot program basis, provided that the sponsor meets certain requirements.
    - Ensure access to mandatory trainings
    - Verify training completion

Technical resources

- **Checklist field guidebooks available for download**
  - The checklist guidebooks and all other technical resources are available at www.energystar.gov/newhomestraining.
- **Webinar calendar**
  - EPA updates the calendar of webinars roughly semi-annually.
  - Webinars include regularly-scheduled core webinars on marketing qualified homes and a recruitment webinar for builders.
  - EPA also hosts webinars on special topics like financing, appraisals, sales training for raters, and related energy efficiency and green building programs.
  - Visit www.energystar.gov/newhomeswebinars to see the upcoming events.

Marketing

- **Version 3 certificate**

  The Version 3 certificate will be finalized, included in the Label Printing Tool for HERS Providers, and provided to makers of RESNET-Accredited Rating Software.

- **Consumer and builder marketing materials**
  - EPA has begun updating marketing materials to showcase the features and benefits of the Version 3 guidelines for builders and consumers.
  - Some materials will be available for early-adoption pilot programs.

Training

- **EPA will monitor and facilitate progress toward fulfilling training and credentialing requirements**

  By January 1:
  - All builders must be ENERGY STAR partners and have taken Version 3 Orientation Training
  - All Raters and Field Inspectors must have taken Version 3 Rater Training
  - All HVAC contractors must be credentialed by a training and oversight organization

2011 Rater to-do list

- **Finalize upgrade packages**
- **Ensure builders are partners**
  - www.energystar.gov/newhomesPA
- **Ensure builders take training**
  - www.energystar.gov/MESA
- **Encourage HVAC contractors to become credentialed**
  - Encourage builders to secure credentialed contractors early
  - Details for HVAC contractors and list of training and oversight organizations at www.energystar.gov/newhomeshvac.

2011 Rater to-do list

- **Evaluate progress toward Version 3**
  - All checklists must be completed and provided to Rater.
  - Look for what's not passing – has a workable solution been identified?
  - Communicate readiness throughout the year.

Lessons learned

Evolving guidelines

- **Guidelines have evolved several times**
  - Some changes have impacted compliance of upgrade packages
- **Understand EPA's revision process**
- **Stay in touch**

  Ensure your partner record is up to date at www.energystar.gov/mesa.

Upgrade analysis

- **Determining worst-case configuration**
  - The Size Adjustment Factor complicates experienced Raters‟ judgment of the worst-case scenarios.
  - Picking a single package of upgrades for a portfolio of home plans with large variations in home size can produce very aggressive upgrades for smaller models

- **Determining ENERGY STAR HERS Index Target**

  The HERS rating software tools now calculate the ENERGY STAR HERS Index Target, but many raters found it challenging to do so manually.

- **Finding cost-effective upgrades**

  Most low-hanging fruit has already been gathered – raters must identify and evaluate increasingly aggressive (and sometimes unfamiliar) technologies.

Upgrade analysis

- **Clarify how many packages to evaluate**
  - Builders may want 1 (or some other small number) of upgrade packages to use across a number of models and options to simplify purchasing.
  - It may take practice to determine worst-case configurations.
- **Use latest versions of software**
  - The latest versions of REM/Rate and EnergyGauge USA include the current ENERGY STAR HERS Index Target procedure.
  - EPA is coordinating with the makers of these programs, but changes to the procedure are not expected.

Upgrade analysis

- **Use loads to target reductions**
  - Attack the biggest loads. In many cases, lighting upgrades are extremely cost-effective.
  - Design changes (e.g., overhangs, locating ducts in conditioned space) can have significant impacts with low costs.

Builder recruitment & retention

- **High perceived cost and complexity**
  - Builders accustomed to a fixed HERS Index target may find it difficult to adapt to custom targets.
  - Incremental material costs may be high, particularly for new products and technologies with limited availability.

Builder recruitment & retention

- **Clearly define choices**
  - Builders typically want the most cost-effective compliance option: the set of upgrades with the highest ratio of HERS Index reductions to incremental costs.
  - This means upgrade analyses need to include cost estimates.
- **Hold kickoff meetings**
  - Approaching the change as a team helps trades understand the rationale and reduce resistance to change.
  - It also ensures that requirements are known, reducing surprises that require rework and unexpected costs.

Builder recruitment & retention

- **Kickoff meetings reduce costs**
  - Incremental costs are calculated component-by-component.
  - Systems thinking and creative collaboration among trades will identify creative alternatives to costly new products and find opportunities for labor & resource efficiency.
- **Kickoff meetings reduce complexity**
  - Raters must know the guidelines and the resources to help explain them.
  - Raters must use those resources correctly. Effective training delivers manageable amounts of information.
- **Don’t count yourself out**

HVAC requirements

- **Difficulty working with HVAC contractors**
  - Contractors may not see value in credentialing
  - Contractors may not have skills to complete & pass checklist
  - Contractors may perceive questions and oversight as attacks on their knowledge and experience
- **Raters may not feel comfortable verifying HVAC contractor work**

HVAC requirements

- **Help HVAC contractors succeed**
  - Affirm their experience and expertise.
  - Connect them with training organizations.
  - Use Version 2.5 to provide feedback and encourage progress.
  - Promote their expertise and credentialed status.
- **Build requirements into HVAC scope**
  - Checklists must be submitted before work is considered complete and paid.
  - Credentialing must be secured to work on homes qualified under Version 3.
- **Understand role and responsibility of rater**
  - Verifying items on HVAC System QI Rater Checklist.
  - Know the guidelines.

Know the guidelines!

- **Read the complete guidelines!**
  - This will help you understand what‟s in them, and it will help you understand the structure so you know where to look to find information.
  - Use headings to get you to the right section of the guidelines, and then use the notes to be sure you‟ve got all the details.

- **Technical questions**
  - The best first step when you have a question about the guidelines is to read the guidelines themselves. The guidelines, including notes, include many details that answer common, and uncommon, partner questions.
  - For checklist items, consult the checklist guidebooks, which explain the rationale and installation standards for each item.
  - Builders can consult their Raters, particularly for questions on the Thermal Enclosure Checklist. Raters should consult with their Providers.
  - If you can‟t find your answer through the above steps, contact the ENERGY STAR team at energystarhomes@energystar.gov.

Know the guidelines!

- **Don’t forget to use the training resources**
  - The Guidebooks, guidance documents, and recorded trainings, included presentations by Sam Rashkin, are at www.energystar.gov/newhomestraining.

Discussion

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Version 2.5 activities

- Upgrade/plan analysis?
- Kickoff meetings?
- Training builders or subcontractors?
- Registered for a Version 3 Rater Training?