



ENERGY STAR Certified Homes: Don't be Left Out in the Cold

EEBA Conference
September 24th, 2014

Learn more at energystar.gov

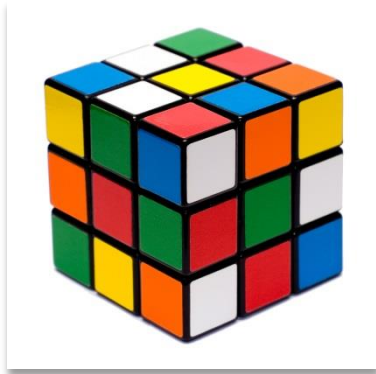


Agenda

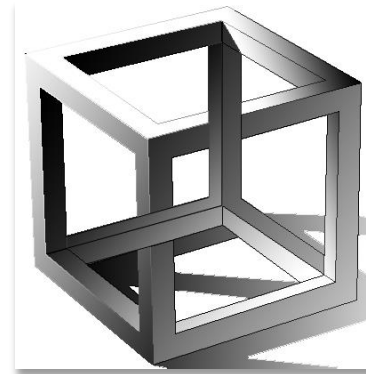
- Program update & overview.
- The value of ENERGY STAR: stepping up from a HERS rating.
- Top 5 ENERGY STAR Revisions: Mixed-Cold Climate Edition.
- What's ahead for ENERGY STAR.

Program Update & Overview

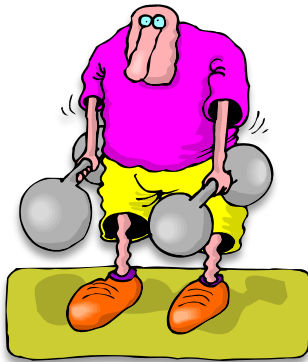
Program Overview & Update



Too hard.



Too complex.



Too cumbersome.



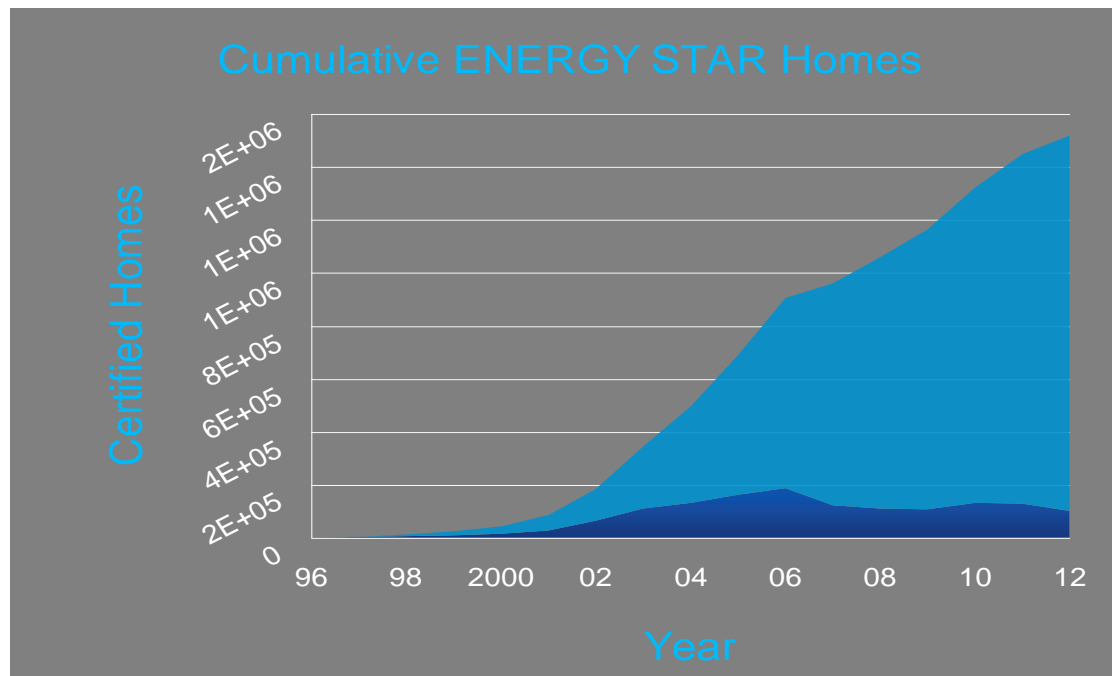
Too expensive.

Program Overview & Update

- ENERGY STAR Version 3 was a big change, yet..

90,000+ Certified Homes in 2013

- And over 1.5 million homes certified to date:





Program Overview & Update

- While some partners hit 'pause' others are stepping up..

**~850 New Partners
In the Last Year**

Program Overview & Update

Vitals:

- 2,500 Builders
- 675 Rating Organizations
- 150 Utility Partners
- 700 HVAC Companies



Program Overview & Update



**Committed to Building
100% ENERGY STAR**



Program Overview & Update



Program Overview & Update



Efficiency
Target



Inspection
Checklists

15 - 30 %
more stringent
than 2009 IECC

Thermal Enclosure System
HVAC System
Water Management System



Program Overview & Update

- Efficiency target for most homes is a HERS index of 65-75.
- Four mandatory inspection checklists:
 - Thermal Enclosure System Rater Checklist
 - HVAC System QI Contractor Checklist
 - HVAC System QI Rater Checklist
 - Water Management System Builder Checklist

Program Overview & Update

Selecting Measures for ENERGY STAR v3



- Modeled a 'typical' single-family home in St. Louis, MO using REM/Rate 14.5.1.

| Characteristic | Input Value |
|-------------------------------------|--------------------------|
| Foundation Type | Unconditioned basement |
| Size (sq. ft.) | 2,400 |
| # of Stories Above-Grade | 2 |
| # of Bedrooms | 4 |
| Wall Construction | 2x4 construction |
| Ceiling Height (ft.) | 8.5 |
| Window to Floor Area & Distribution | 15% / Equal Distribution |
| HVAC Type | AC with gas furnace |
| Mechanical Vent Type | Exhaust |
| ENERGY STAR HERS Index Target | 72 |

Program Overview & Update

Selecting Measures for ENERGY STAR v3



| Parameter | Prescriptive Path |
|---------------------------------------|-------------------|
| Ceiling Insulation | R-38 |
| Wall Cavity / Sheathing Insulation | R-13 / None |
| Window Efficiency (U-Value / SHGC) | 0.32 / 0.40 |
| Infiltration (ACH50) | 5 |
| Furnace AFUE | 90 |
| AC SEER | 13 |
| % Duct in Uncond. / Conditioned Space | 100% / 0% |
| Water Heater Efficiency (EF) | 0.61 |
| Percent CFLs | 80% |
| Resulting HERS Index | 71 |

The Value of ENERGY STAR: Stepping up from a HERS rating



Value of ENERGY STAR

- It takes more for a home to be ENERGY STAR certified than to complete a standard HERS rating, but the key questions are:
 - How much more does it cost?
 - How much value does it add?



Value of ENERGY STAR

- How much does it really cost?
 - It depends..
 - .. but it may not be as much as you think.
 - EPA's most recent estimate is ~\$2,000-2,500 for a typical home..
 - .. but most of that cost is for measures to hit the HERS index target.



Value of ENERGY STAR

- The average HERS Index of rated homes in 2013 was 64.
- This is the same ballpark as the ENERGY STAR HERS index target.



Poll Question

- What is the average HERS Index of homes you rated in the last year?
 - 60 or below
 - 61 to 65
 - 66 to 70
 - Above 70
 - I'm not sure, or I didn't rate any homes



Poll Question

- Over the last year, what percentage of homes that you built or performed a HERS rating on were also ENERGY STAR certified?
 - Less than 10%
 - 10% to 50%
 - 50% to 90%
 - More than 90%
 - I'm not sure

Value of ENERGY STAR

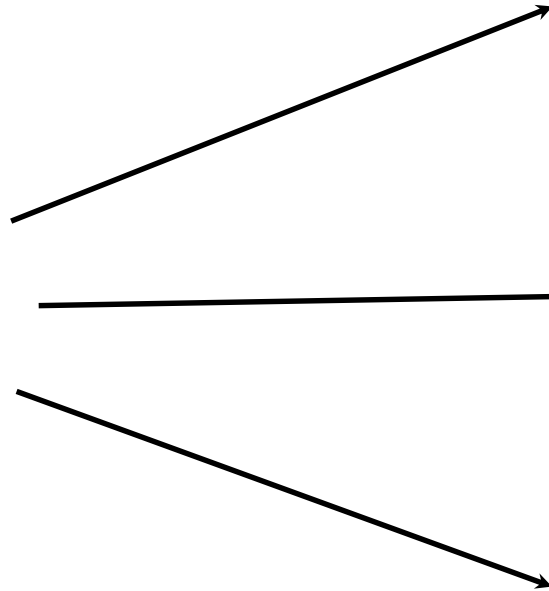
1. Branding.



Why ENERGY STAR?



65 Categories



17,000 Manufacturers
40,000 Individual Models

Why ENERGY STAR?

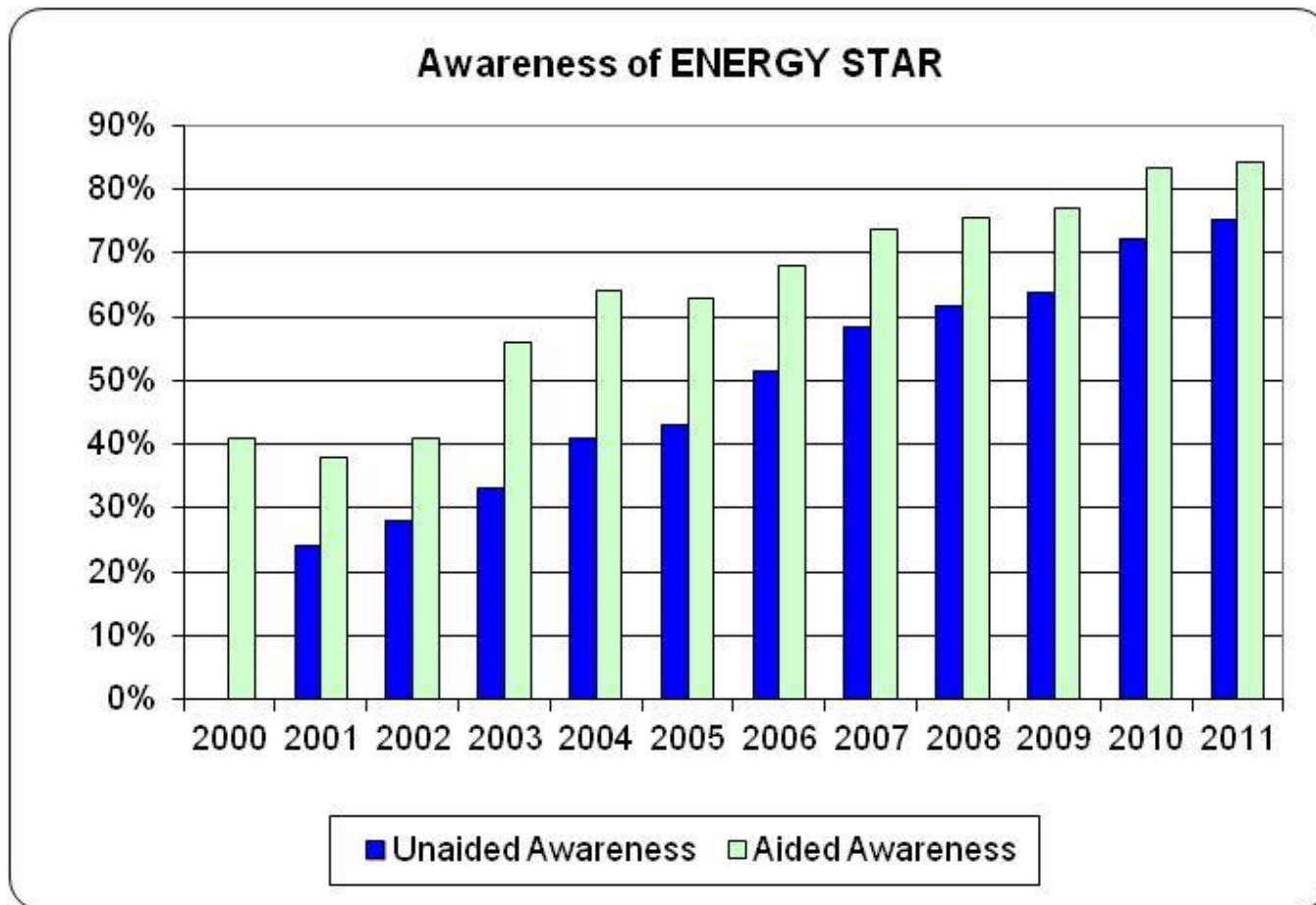


\$2 Billion Media Reach

Why ENERGY STAR?



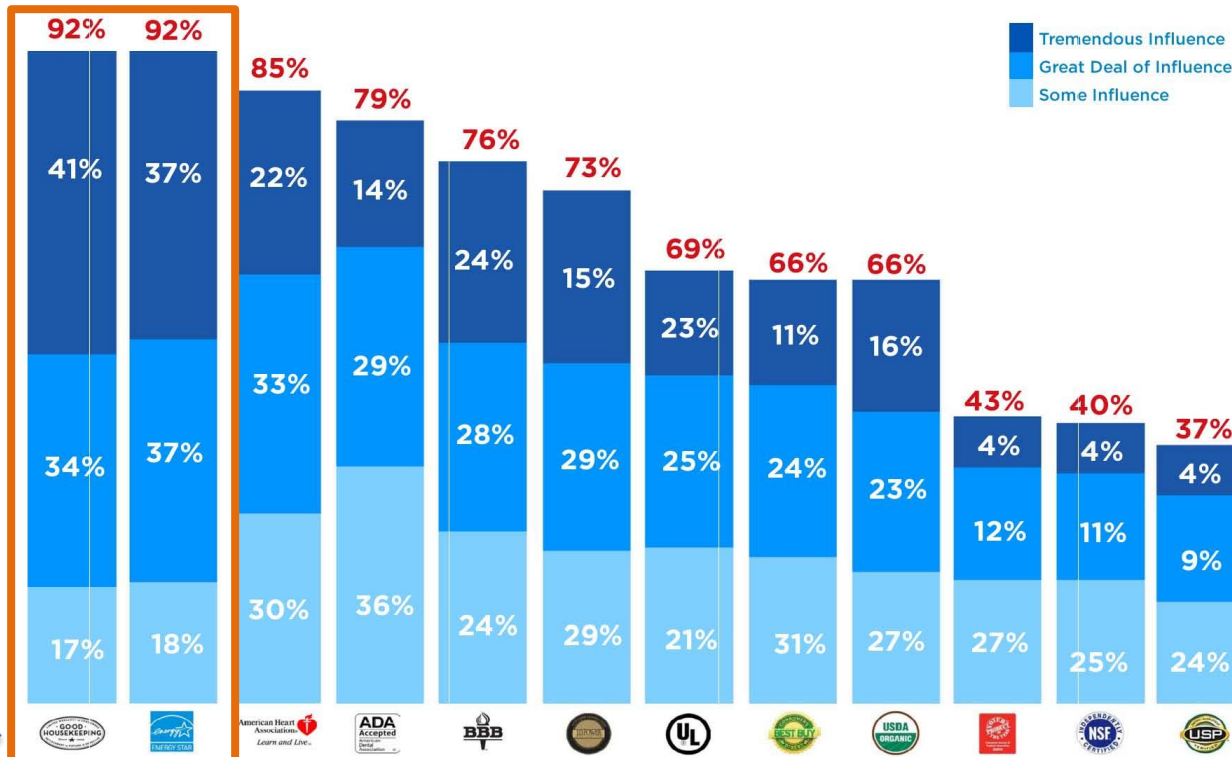
> 80% Awareness



Why ENERGY STAR?



top-ranked consumer emblem



SOURCE: Fairfield Research, July 2011

goodhousekeeping

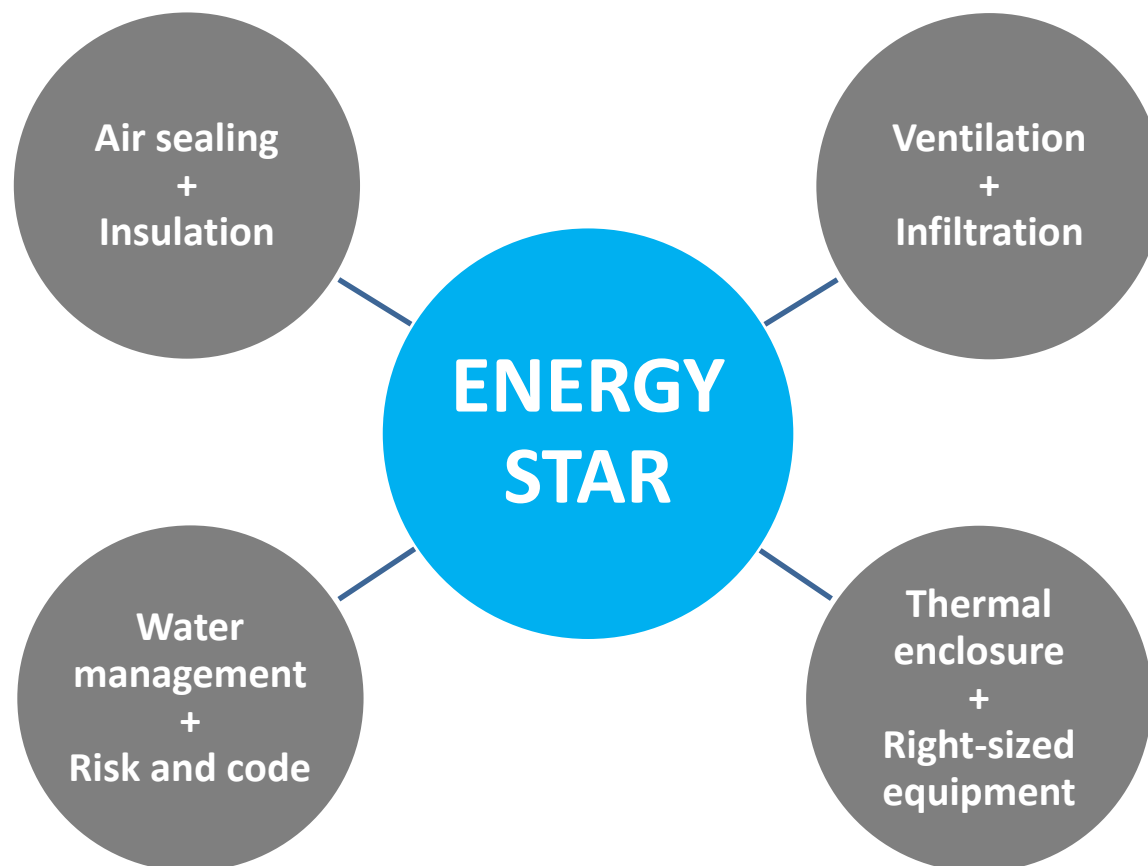
Value of ENERGY STAR

1. Branding.



Value of ENERGY STAR

1. Branding.
2. Systems-based approach.





Value of ENERGY STAR

1. Branding.
2. Systems-based approach.
3. Preparing for code updates.
 - 2012 & 2015 IECC – How can you prepare now?

Value of ENERGY STAR

1. Branding.
2. Systems-based approach.
3. Preparing for code updates.
4. Cost controls.



Value of ENERGY STAR

1. Branding.
2. Systems-based approach.
3. Preparing for code updates.
4. Cost controls.
5. Risk mitigation.



Value of ENERGY STAR



1. Branding.
2. Systems-based approach.
3. Preparing for code updates.
4. Cost controls.
5. Risk mitigation.



HERS Ratings and ENERGY STAR

HERS Ratings and ENERGY STAR

- Phase 1: Take-offs and modeling.
- Phase 2: Pre-drywall inspection.
- Phase 3: Final inspection.

HERS +



HERS Ratings and ENERGY STAR

Phase 1: Take-offs and Modeling

HERS Ratings and ENERGY STAR

Phase 1: Take-offs and Modeling



| Measure | Cost |
|------------------------------|------|
| Credentialed HVAC Contractor | \$25 |

ACCA QA



Advanced Energy QAP



HERS Ratings and ENERGY STAR

Phase 1: Take-offs and Modeling



| Measure | Cost |
|------------------------------|-------------|
| Credentialed HVAC Contractor | \$25 |
| Mechanical ventilation | \$100 - 375 |

HERS Ratings and ENERGY STAR

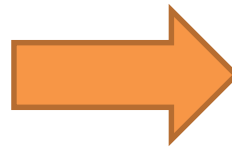
Phase 1: Take-offs and Modeling



| Measure | Cost |
|----------------------------------|---------------|
| Credentialed HVAC Contractor | \$25 |
| Mechanical ventilation | \$100 - 375 |
| Reduction in cooling system size | (\$275 - 325) |



3.5 tons



3.0 tons

HERS Ratings and ENERGY STAR

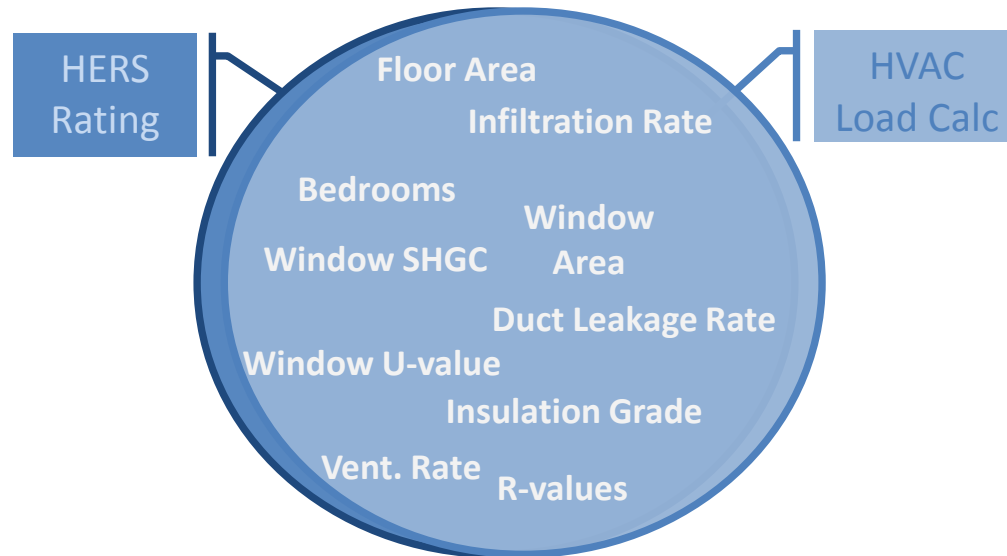
Phase 1: Take-offs and Modeling



| Measure | Cost |
|--|---------------|
| Credentialed HVAC Contractor | \$25 |
| Mechanical ventilation | \$100 - 375 |
| Reduction in cooling system size | (\$275 - 325) |
| Collection of HVAC design documentation and Rater review | \$50 |

HERS Ratings and ENERGY STAR

Phase 1: Take-offs and Modeling



Almost complete overlap in inputs!

- Raters verify key inputs of the load calculation to reduce improperly-sized equipment and comfort complaints.
- Design documentation can be reused, saving money.

HERS Ratings and ENERGY STAR

Phase 1: Take-offs and Modeling



| Measure | Cost |
|--|---|
| Credentialed HVAC Contractor | \$25 |
| Mechanical ventilation | \$100 - 375 |
| Reduction in cooling system size | (\$275 - 325) |
| Collection of HVAC design documentation and Rater review | \$50 |
| Total | \$150 Savings up to \$175 cost |

HERS Ratings and ENERGY STAR Phase 2: Pre-Drywall Inspection

HERS Ratings and ENERGY STAR

Phase 2: Pre-Drywall



| Measure | Cost |
|--------------------------|---------------|
| Reduced thermal bridging | (\$125 - 175) |



HERS Ratings and ENERGY STAR

Phase 2: Pre-Drywall



| Measure | Cost |
|--|---------------|
| Reduced thermal bridging | (\$125 - 175) |
| Completion of Thermal Enclosure System Rater Checklist | \$75 |



HERS Ratings and ENERGY STAR

Phase 2: Pre-Drywall



| Measure | Cost |
|--|---------------------|
| Reduced thermal bridging | (\$125 - 175) |
| Completion of Thermal Enclosure System Rater Checklist | \$75 |
| Total | (\$50 – 100) |

HERS Ratings and ENERGY STAR

Phase 3: Final

HERS Ratings and ENERGY STAR

Phase 3: Final



| Measure | Cost |
|--------------|------|
| Duct blaster | \$0 |
| Blower door | \$0 |

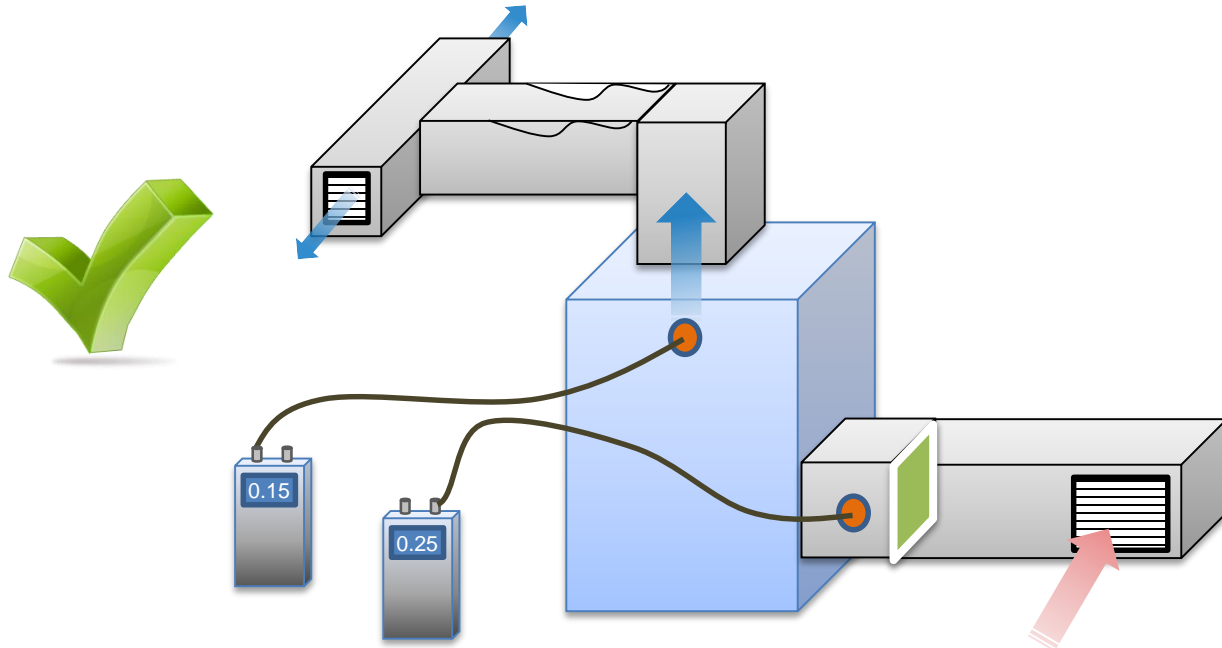


HERS Ratings and ENERGY STAR

Phase 3: Final



| Measure | Cost |
|--|------|
| Duct blaster | \$0 |
| Blower door | \$0 |
| Static pressure test (contractor & Rater verification) | \$25 |



HERS Ratings and ENERGY STAR

Phase 3: Final



| Measure | Cost |
|---|------|
| Duct blaster | \$0 |
| Blower door | \$0 |
| Static pressure test (contractor & Rater verification) | \$25 |
| Refrigerant charge test (contractor & Rater verification) | \$25 |



HERS Ratings and ENERGY STAR

Phase 3: Final



| Measure | Cost |
|---|-------|
| Duct blaster | \$0 |
| Blower door | \$0 |
| Static pressure test (contractor & Rater verification) | \$25 |
| Refrigerant charge test (contractor & Rater verification) | \$25 |
| Room-by-room airflow testing | \$100 |
| Filling out the contractor checklist with collected information | \$25 |



HERS Ratings and ENERGY STAR

Phase 3: Final



| Measure | Cost |
|---|-------|
| Duct blaster | \$0 |
| Blower door | \$0 |
| Static pressure test (contractor & Rater verification) | \$25 |
| Refrigerant charge test (contractor & Rater verification) | \$25 |
| Room-by-room airflow testing | \$100 |
| Filling out the contractor checklist with collected information | \$25 |
| Bedroom pressure balancing features & verification | \$200 |
| Verification of ventilation system, exhaust fans, & filter | \$75 |

HERS Ratings and ENERGY STAR

Phase 3: Final



| Measure | Cost |
|---|--------------|
| Duct blaster | \$0 |
| Blower door | \$0 |
| Static pressure test (contractor & Rater verification) | \$25 |
| Refrigerant charge test (contractor & Rater verification) | \$25 |
| Room-by-room airflow testing | \$100 |
| Filling out the contractor checklist with collected information | \$25 |
| Bedroom pressure balancing features & verification | \$200 |
| Verification of ventilation system, exhaust fans, & filter | \$75 |
| Completion and collection of Water Management System checklist | \$25 |
| Total | \$475 |

HERS Ratings and ENERGY STAR Summary



| Measure | Cost |
|---------------------------------|--------------------|
| Phase 1: Take-offs and Modeling | (\$150) - \$175 |
| Phase 2: Pre-Drywall | (\$50 – 100) |
| Phase 3: Final | \$475 |
| Total | \$225 - 600 |

HERS Ratings and ENERGY STAR Summary



Features

- A. Mechanical ventilation.
- B. Right-sized HVAC.
- C. Reduced lumber waste.
- D. HVAC system commissioning.
- E. ENERGY STAR

Value

- 1. Branding.
- 2. Systems-based approach.
- 3. Code preparation.
- 4. Cost controls.
- 5. Risk mitigation.

Summary



Value

1. Branding
2. Systems-based approach
3. Code change preparation
4. Cost controls
5. Risk mitigation

Costs

~ \$400

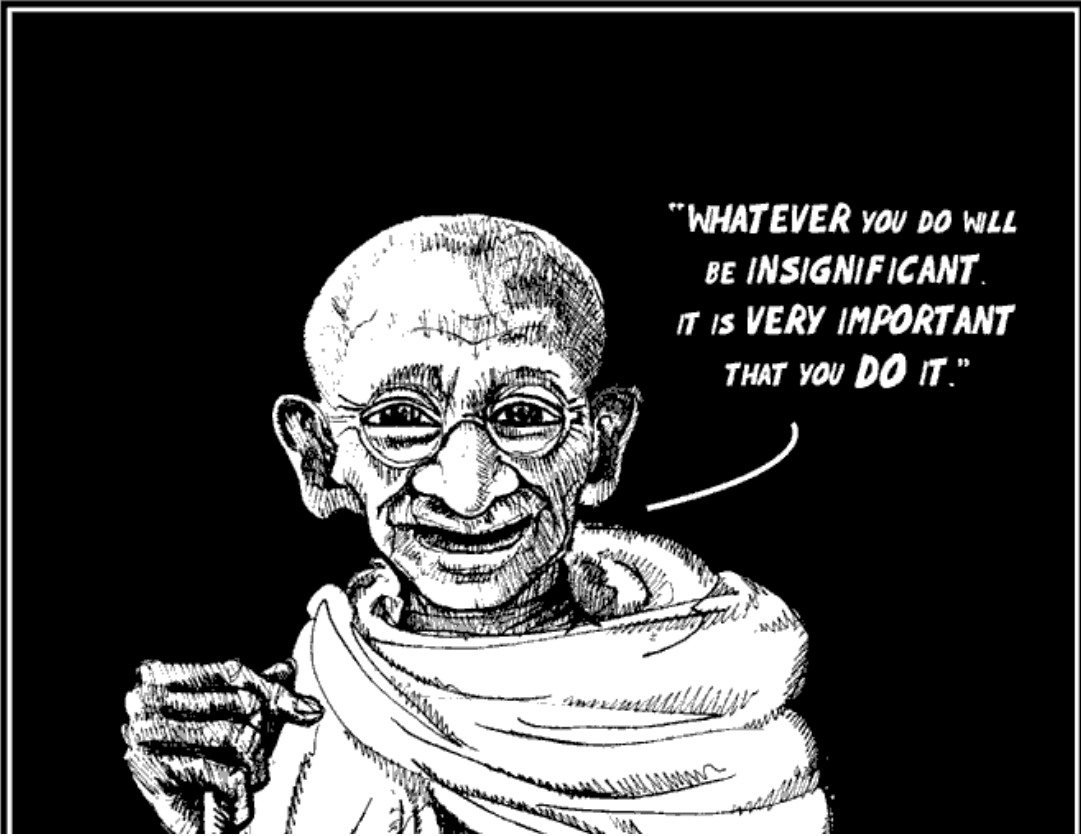


Poll Question

- What, in your experience, would you perceive to be the typical incremental cost from a HERS rating?
 - \$0 - \$499
 - \$500 - \$999
 - \$1,000 - \$1,499
 - > \$1,500
 - I'm not sure.

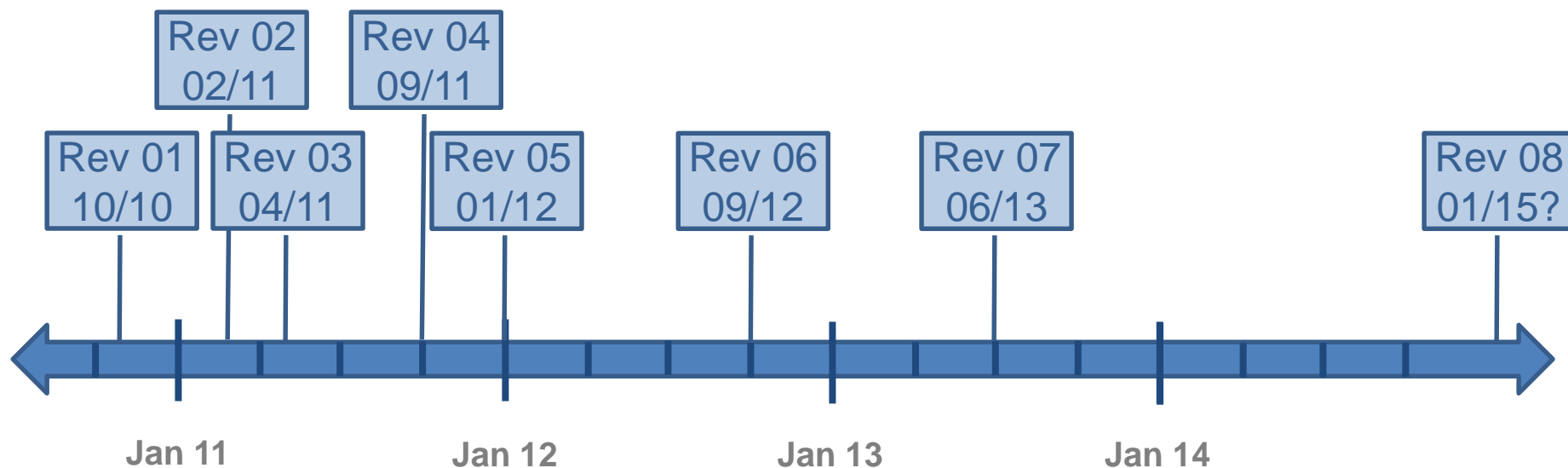
Top 5 ENERGY STAR Revisions: Mixed-Cold Climate Edition

The revision process



Purpose & timing of Revisions

- Driven by partner feedback.
- Goal is to make program clearer, simpler, and better.
- Time between revisions is growing:



#1. TES Item 4.4.5e

Allowance to use R-20 cavity insulation in lieu of 24” o.c. spacing for 2x6 walls in CZ 5-8



- **Original Policy:** For a home in CZ 5-8 with 2x6 framing, 24” o.c. spacing was required, unless alternate spacing was structurally required and a framing plan was provided.
- **Updated Policy:** The exemption was removed and replaced with an alternative compliance path using \geq R-20 wall cavity insulation in lieu of 24” o.c. spacing.

#2. TES Item 4.4.5e

Removal of requirement for 24" o.c. spacing or R-20 cavity insulation in CZ 5



- **Original Policy:** For a home in CZ 5 with 2x6 framing, either 24" o.c. framing or \geq R-20 cavity insulation was required.
- **Updated Policy:** This requirement was removed for homes in Climate Zone 5. Despite this, homes are still required to meet insulation levels in Item 2.1. Homes using R-19 cavity insulation in CZ 5 may need to increase insulation elsewhere or improve fenestration.
- No impact on CZ 6-8, where 2x6 framing is more common.

#3. TES Item 3.1

Removal of interior air barrier requirement in most basements & crawlspaces



- **Original Policy:** Interior air barrier required on all below-grade exterior walls in Climate Zone 4-8.
- **Updated Policy:** Interior air barrier recommended on all below-grade exterior walls in Climate Zone 4-8

#4. HVAC-R Section 4

Addition of alternative option to test total duct leakage at 'rough-in'



- **Original Policy:** Total duct leakage required to be verified at 'final'.
- **Updated Policy:** Total duct leakage permitted to be verified at either 'rough-in' or 'final':

| Test Option | Total Leakage | Leakage to Outside | Visual Inspection Of Duct Boot Sealing |
|-------------|--|--|--|
| Rough-in | The greater of ≤ 4 CFM/100 ft ² or ≤ 40 CFM | Not required | Mandatory at final inspection. |
| Final | The greater of ≤ 8 CFM/100 ft ² or ≤ 80 CFM | The greater of ≤ 4 CFM/100 ft ² or ≤ 40 CFM | Not mandatory. |

#5. HVAC-R Item 4.1

Increased total duct leakage limit for systems with only dedicated returns



- **Original Policy:** Total duct leakage limits of ≤ 4 CFM25 / 100 ft² at rough-in and ≤ 8 CFM25 / 100 ft² at final for all homes.
- **Updated Policy:** For a home with a dedicated return in each bedroom (i.e., not a bedroom pressure-balancing feature leading to a central return), the total duct leakage is permitted to be:
 - At rough-in: Greater of ≤ 6 CFM25 / 100 ft² or ≤ 60 CFM25
 - At final: Greater of ≤ 12 CFM25 / 100 ft² or ≤ 120 CFM25

#5. HVAC-R Item 4.1

Increased total duct leakage limit for homes with only dedicated returns



- **Updated Policy:**

| Test Option | Total Leakage | Leakage to Outside | Inspection of Duct Boots |
|--|--|--|--------------------------------------|
| Rough-in w/o Ded. Returns | The greater of $\leq 4 \text{ CFM}/100 \text{ ft}^2$ or $\leq 40 \text{ CFM}$ | Not required | Mandatory at final inspection. |
| Final w/o Ded. Returns | The greater of $\leq 8 \text{ CFM}/100 \text{ ft}^2$ or $\leq 80 \text{ CFM}$ | The greater of $\leq 4 \text{ CFM}/100 \text{ ft}^2$ or $\leq 40 \text{ CFM}$ | Not mandatory. |
| Rough-in w/ Ded. Returns | The greater of $\leq 6 \text{ CFM}/100 \text{ ft}^2$ or $\leq 60 \text{ CFM}$ | The greater of $\leq 4 \text{ CFM}/100 \text{ ft}^2$ or $\leq 40 \text{ CFM}$ | Mandatory at final inspection. |
| Final w/ Ded. Returns | The greater of $\leq 12 \text{ CFM}/100 \text{ ft}^2$ or $\leq 120 \text{ CFM}$ | The greater of $\leq 4 \text{ CFM}/100 \text{ ft}^2$ or $\leq 40 \text{ CFM}$ | Not mandatory. |



What's Next With ENERGY STAR?

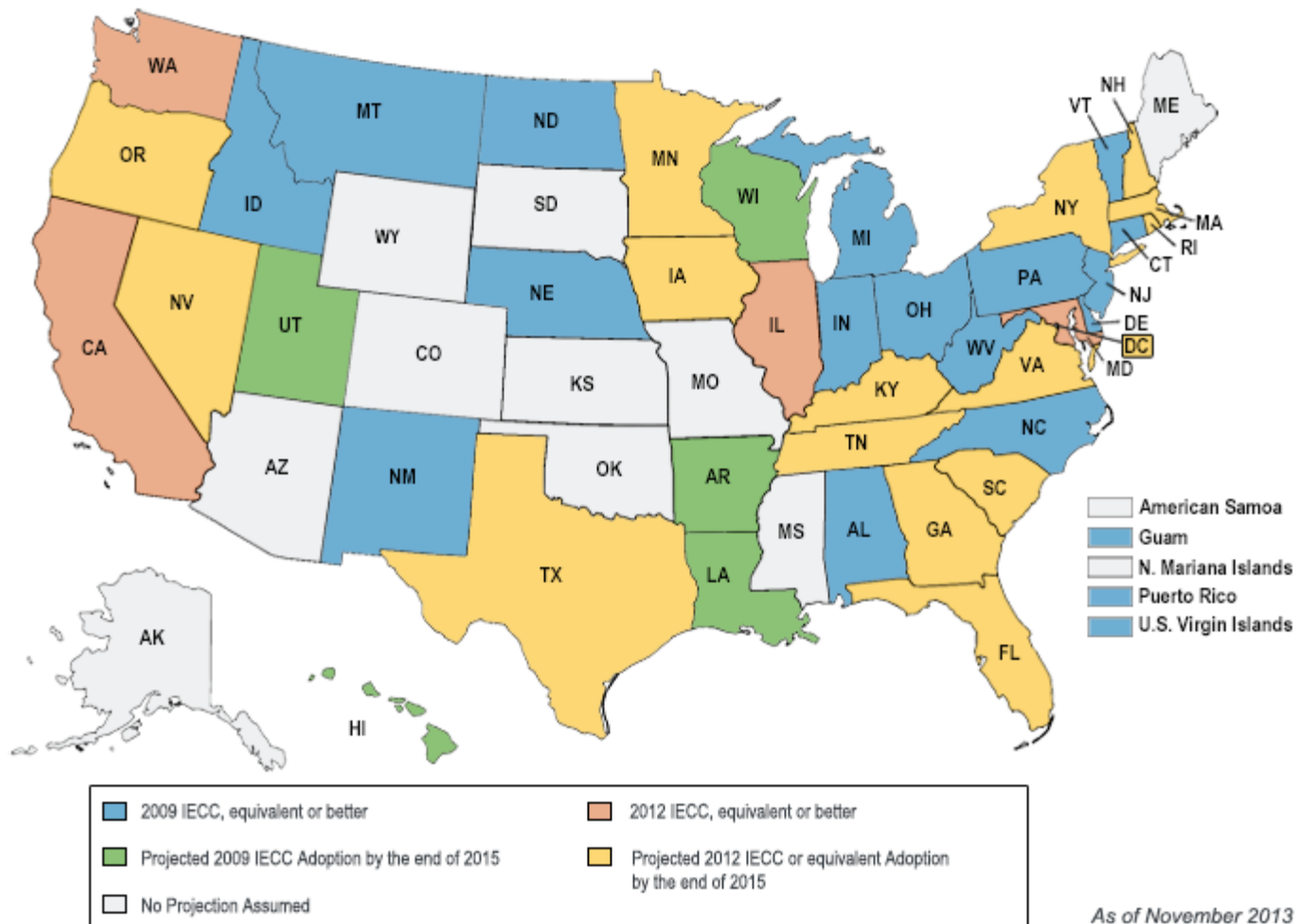
#1 Version 3.1

Rationale for Version 3.1

- Codes continue to evolve rapidly:
 - 2006 IECC is equally stringent to codes from 1998;
 - 2009 IECC is ~15% more efficient than 2006 IECC;
 - 2012 IECC is ~15% more efficient than 2009 IECC;
 - 2015 IECC is about the same as the 2012 IECC*.
- * Except for that new HERS compliance path.

Rationale for Version 3.1

- By 2015, **19 states + DC** expected to be at 2012 IECC



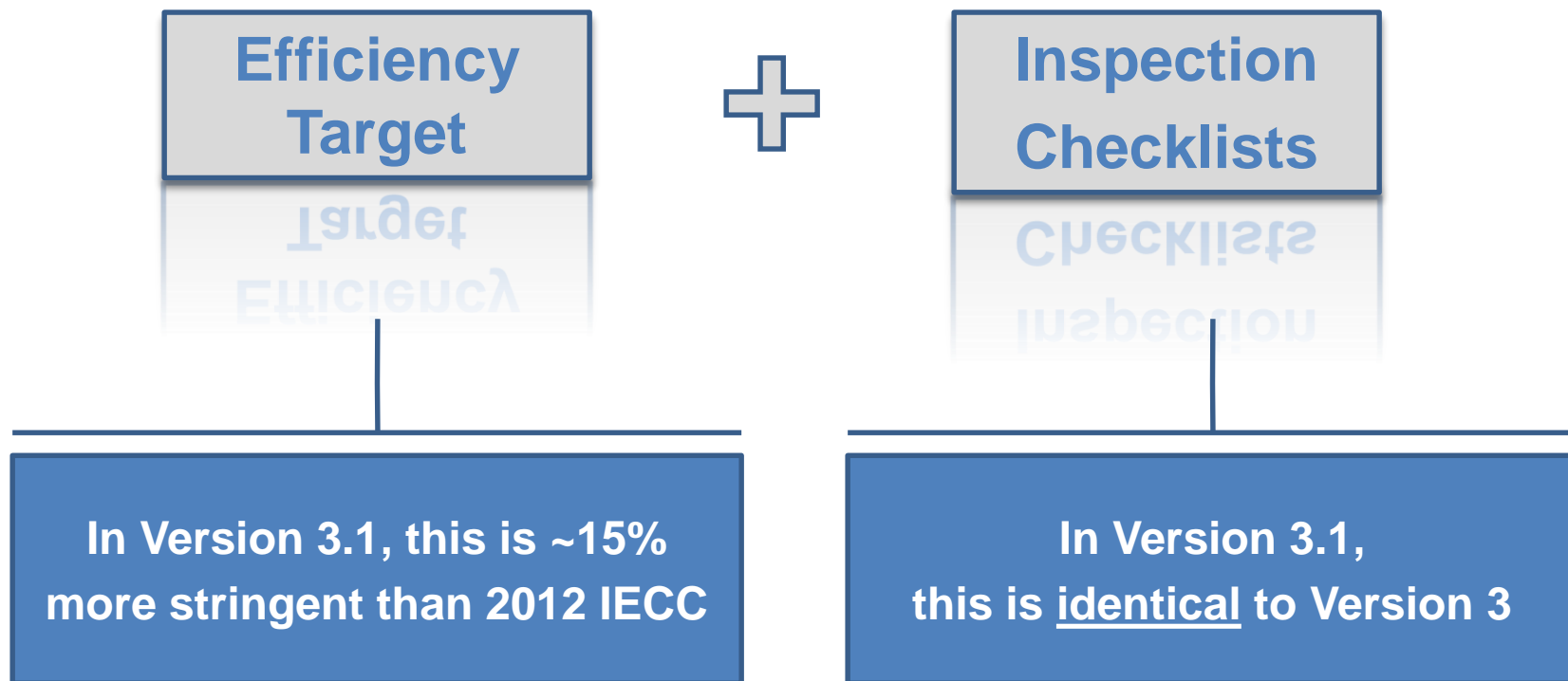


Rationale for Version 3.1

- Ensure program continues to deliver meaningful savings in states with 2012 IECC.
- Developing v3.1 state-specific program requirements is resource intensive & complex for partners (e.g., MA, FL).
- Instead, developing v3.1 national program requirements is more resource efficient and clearer for partners.
- At the same time, Version 3 is still a challenge for many partners. Therefore, want to make transition to v3.1 as painless as possible.

Key components of Version 3.1

- Two key components to program requirements:



- No new mandatory requirements in the Performance Path, but ENERGY STAR HERS index target in the range of ~55-65.

Version 3.1 implementation timeline

- For the foreseeable future, only enforce Version 3.1 in states that adopt the 2012 IECC.
- The timeline has been defined for the following locations, where the 2012 IECC has already been adopted:

Implementation Timeline for ENERGY STAR Certified Homes Version 3.1 National Program Requirements

| Location | Applicable to Homes with the Following Permit Date |
|--------------------------------------|--|
| Massachusetts | On or After 01/01/2015 |
| DC, Illinois, Maryland, Rhode Island | On or After 04/01/2015 |
| Iowa | On or After 06/01/2015 |
| Delaware | On or After 12/01/2015 |



Version 3.1 implementation timeline

- For states that have not yet adopted the 2012 IECC, enforce Version 3.1 for homes permitted starting one year after state-level implementation of 2012 IECC or an equivalent code.
- For example: state ABC adopts the 2012 IECC, with enforcement beginning 01/01/2015. One year after that is 01/01/2016. Homes permitted on or after 01/01/2016 would be required to meet Version 3.1 to be certified.
- This policy allows builders to focus on complying with the new code first and then ramping up to our new program requirements afterwards.

#2

HVAC, HVAC, HVAC



HVAC, HVAC, HVAC

- Continue to refine HVAC program requirements.



HVAC, HVAC, HVAC



- Develop better guidance for builders.

HVAC, HVAC, HVAC



- Streamline and standardize Manual J & S software report.

HVAC, HVAC, HVAC

- Additional training resources – presentations, videos, self-serve content, and standards.





ENERGY STAR Certified Homes

Web:

Main: www.energystar.gov/newhomespartners
Technical: www.energystar.gov/newhomesguidelines
Training: www.energystar.gov/newhomestraining
HVAC: www.energystar.gov/newhomesHVAC

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