



TRCs and Beyond:

How to Effectively Integrate ENERGY STAR Version 3 into your Program Design

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EPA's ENERGY STAR for New Homes Program

Learn more at energystar.gov

OUTLINE



- Achieving success with ENERGY STAR
- Strategies for making your program cost-effective
- Utility program design templates for partnering with ENERGY STAR
- Resources to aid in the transition to v3
- Next steps



Achieving success with ENERGY STAR

The value proposition of integrating ENERGY STAR into your program design



1) Meaningful savings for every qualified home:

- Designed to be at least 15% more efficient than 2009 IECC, with homes typically achieving savings between 20-30%
- Also, at least 15% more efficient than homes built to the minimum requirements under ENERGY STAR Version 2

The value proposition of integrating ENERGY STAR into your program design



2) Lower implementation costs:

- Leverage EPA's investment in partner support. EPA answers partner questions about the program guidelines so that you don't have to.
- Leverage EPA's investment in training.
- Leverage EPA's investment in marketing and brand awareness to reduce costs required to recruit participants:
 - 6,000+ builder partners are already familiar with program requirements and the value of an ENERGY STAR qualified home.
 - >80% of households recognize the ENERGY STAR logo; even higher in areas where utilities promote the brand.

The value proposition of integrating ENERGY STAR into your program design



3) Greater quality assurance:

- One primary goal of Version 3 is to greatly improve oversight of details that are often overlooked
- All inspection checklists are directly or indirectly related to energy efficiency and were developed based on 15 years of experience implementing an efficient new homes program.

The value proposition of integrating ENERGY STAR into your program design



3) Greater quality assurance (cont.):

- The checklists increase the probability that predicted savings will be realized. Why pay the same incentive for an ENERGY STAR home and..
 - A home with missing insulation, poorly installed insulation, and air leakage into the attic?
 - An improperly installed HVAC system, with 30% of the heated and cooled air leaking between the equipment and the bedrooms?
 - A home with low infiltration and a ventilation system that's not compliant with industry standards?

Updates that make the program more accessible for partners



Revision process:

- The EPA periodically issues revisions to the specifications. These revisions respond to partner questions and feedback by clarifying requirements or providing additional compliance options.

New updates:

- EPA is releasing Revision 04, which includes some changes that make the program more accessible to partners. Some of the more significant changes include:
 - Clarifying exemptions to the slab edge insulation requirement;
 - Aligning the requirements for insulated headers with framing thickness rather than Climate Zone;
 - Allowing final grading to be scheduled after completion; and
 - Removing the requirement for aggregate or sand with geotextile matting.
 - Partially adjusting implementation timeline in response to partner feedback



Permit Date ²	Date of Final Inspection ¹		
	4/1/2011	1/1/2012	7/1/2012
Before 4/1/2011 ^{3, 4}	v2	v2.5	v3
Between 4/1/2011 and 12/31/2011 ⁴		v2.5	v3
On or after 1/1/2012 ⁵		v3	

Version 2	Version 2: 2006 Guidelines
Version 2.5	Version 2.5: Core Version 3 energy efficiency measures with Air Barriers and Air Sealing sections of Thermal Enclosure System Rater Checklist; Other checklists completed but not enforced
Version 3	Version 3: Core Version 3 energy efficiency measures with all checklists completed and enforced

1. The date of the final inspection for the home (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).
2. 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. In cases where permit or contract dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors. These assumptions should be both defensible and documented.
3. All low-income projects 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. If the application for funding is received between April 1, 2011 and December 31, 2011, then the homes must earn the ENERGY STAR under the Version 2.5 guidelines if completed before July 1, 2012, and under the Version 3 guidelines if completed on or after July 1, 2012. If the application for funding is received on or after January 1, 2012 then the homes must earn the ENERGY STAR under the Version 3 guidelines.
4. Homes can be qualified under the Version 2.5 guidelines in advance of the dates above at the discretion of builders and their Raters. However, homes may not be qualified as Version 3 until January 1, 2012.
5. Where a utility or state sponsor is mandating or incentivizing early adoption of Version 3 in their area, EPA will allow the labeling of ENERGY STAR Version 3 prior to January 1, 2012 on a pilot program basis, provided that the sponsor meets certain requirements.



Strategies for making your program cost-effective

What's cost-effectiveness?

- **What does “cost-effectiveness” mean?**
 - Simple payback
 - Return On Investment
 - Cash flow

- **From a utility perspective:**

$$\text{cost effectiveness} = \frac{\text{benefits}}{\text{costs}}$$

- It sounds simple, but in reality there's no single cost effectiveness value associated with Version 3. Values can vary across utilities, across program designs, and even across years. Why is this so?



Types of cost-effectiveness tests

- Benefits and costs can be measured from many perspectives
 - Whose costs and benefits are counted?
 - What *kind* of benefits are counted?

	PCT	TRC	SCT	RIM	PACT/UTC
Test	Participant Cost Test	Total Resource Cost Test	Societal Cost Test	Rate Impact Measure Test	Program Administrator Cost Test/Utility Cost Test
Benefits	<ul style="list-style-type: none"> ▪ Reduced utility bills ▪ Incentives ▪ Tax credits 	<ul style="list-style-type: none"> ▪ Avoided supply costs 	<ul style="list-style-type: none"> ▪ Avoided supply costs ▪ Externalities 	<ul style="list-style-type: none"> ▪ Avoided supply costs ▪ Increased revenue 	<ul style="list-style-type: none"> ▪ Avoided supply costs
Costs	<ul style="list-style-type: none"> ▪ Increased utility bills ▪ Upgrades (less incentives & tax credits) 	<ul style="list-style-type: none"> ▪ Increased supply costs ▪ Upgrades costs (less tax credits) ▪ Administration 	<ul style="list-style-type: none"> ▪ Increased supply costs ▪ Upgrades costs (less tax credits) ▪ Administration 	<ul style="list-style-type: none"> ▪ Increased supply costs ▪ Reduced revenue ▪ Incentives (less tax credits) ▪ Administration 	<ul style="list-style-type: none"> ▪ Increased supply costs ▪ Incentives (less tax credits) ▪ Administration

What affects cost-effectiveness?



2. There are many input parameters for the test, with little standardization

Program-Level Inputs	Utility-Level Inputs
Incremental Costs	Escalation Rates
Incentives	Discount Rates
Measure Lifetime	Transmission & Dist. Losses
Program Admin. Costs	Utility Reserve Margin
Net-To-Gross Ratio (NTG)	Avoided Costs
	Retail Rates
	Economic Benefits Rate
	Other Benefits Rate



How does Version 3 fare?

- To help partners evaluate the Version 3 guidelines, EPA completed an exercise during the development of the guidelines to calculate illustrative examples of TRC values.
- EPA estimated the incremental labor and material costs as well as the energy savings compared to the 2009 IECC for one common housing configuration in each IECC climate zone. Each home was evaluated twice – once with electric heat and once with gas heat.
- EPA then combined these results with typical assumptions about program- and utility-level inputs to calculate Total Resource Cost Test values.

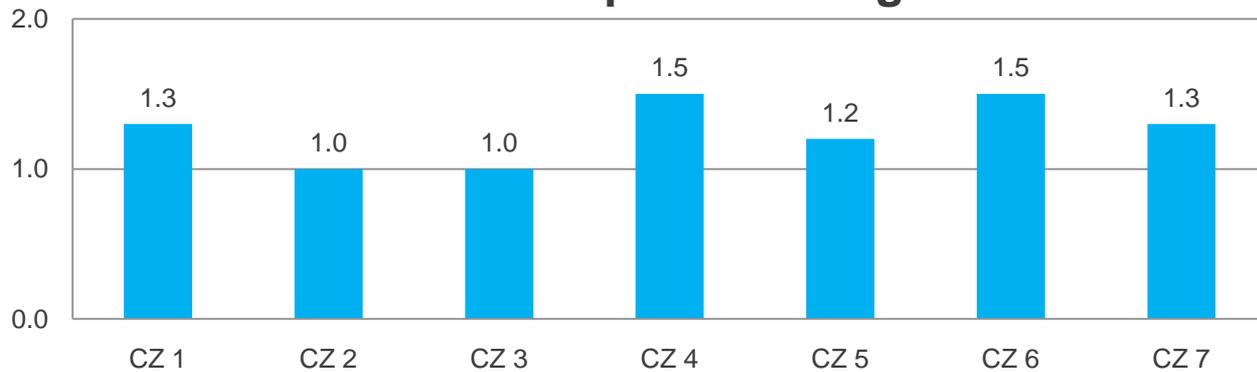
How does Version 3 fare?



Gas Space Heating



Electric Space Heating





How does Version 3 fare?

- **Key messages**

- For this exercise, Version 3 was cost-effective in every climate.
- Utility partners that get significantly better or worse results may be using significantly different inputs.
- There's too much variation in utility-level inputs for EPA to guarantee that Version 3 will be cost-effective for every utility partner. However, we have not yet seen calculations from any partner that illustrate that the program is not cost effective.
- EPA is willing to work with sponsors to review and provide feedback on their cost-effectiveness calculations.

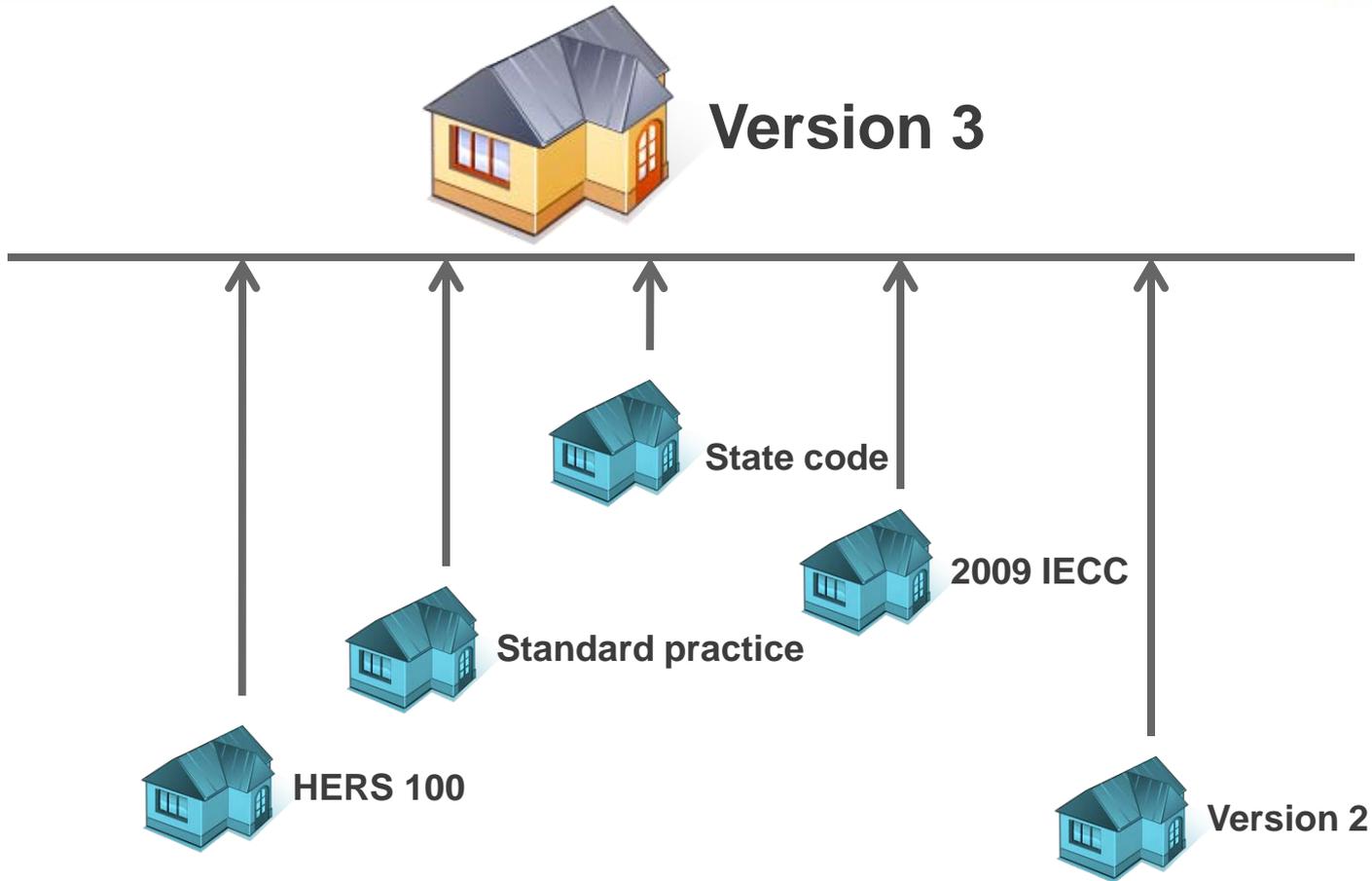
Strategies for improving cost effectiveness



1. Consider the baseline against which costs and savings are calculated

- There are generally two philosophies:
 - Use state or local code as the baseline, or
 - Use standard practice as the baseline
- For example:
 - The 2009 IECC requires field verification of duct leakage and infiltration in most homes. Therefore, one could account for incremental material and labor costs associated with these measures, but discount verification costs.
 - The IECC references proper HVAC design, which is not often enforced. Therefore, one could account for costs and benefits from these measures OR negate costs and benefits. However, one should not account for costs and then assign no benefits.
 - Many of the requirements on the Water Management System Builder Checklist are required by code or are no-cost prohibitions on bad practices (e.g., don't install carpet in bathrooms, don't use building materials with mold or water damage).

Baselines



Strategies for improving cost effectiveness



2. Carefully account for incremental costs

- Costs are notoriously difficult to assess, even by partners themselves. There is no single right answer.
- Costs will vary by partner, even within a single service territory. For example:
 - Production builders sometimes achieve significantly lower costs and produce the majority of homes in a utility program.
 - Non-partners that are not fully code compliant will have higher incremental costs
- Incremental costs are likely to decrease over time as practices and products become more standard. For a multi-year program, consider using an average anticipated cost across all years, rather than using higher costs in year one.
- Don't neglect to consider the potential for increased admin. costs if the program does not align with ENERGY STAR.

Strategies for improving cost effectiveness



3. Tailor the analysis to maximize savings

- Ensure that your estimates of savings reflect the particulars of your territory:
 - Use the geographic location where most homes are likely to be built
 - Use representative house sizes. Larger homes deliver higher incremental savings without a linear increase in incremental costs.
- Use an appropriate value for measure life. Consider developing a weighted average value across measures. Many measures will last for decades and should be accounted for.
- Note that not all of the inspection checklist savings are easily reflected in HERS software tools. EPA has provided conservative estimates of savings for those that are not reflected.

Strategies for improving cost effectiveness



4. Tailor the program to maximize savings

- The Performance Path allows partners to pick a variety of efficiency measures. Overlay additional prescriptive requirements to help generate desired savings. For example:
 - If gas savings are desired, require that partners always use an instant water heater or high efficiency gas furnace.
 - If electric demand savings are desired, require that partners always use high efficiency HVAC and low-e windows.
 - If electric energy savings are desired, require that partners always use a high percentage of CFL's.
- This strategy can increase desired savings without increasing costs.

Strategies for improving cost effectiveness



Illustrative Example

Efficiency Strategy		Incremental Pkg. Cost	HERS Index	Savings		
				Gas	Electric	
				(Therms)	(kWh)	(kW)
Gas	Pkg. Including 94 AFUE Furnace	\$3,000	72	150	1,800	0.7
Elec. Demand	Pkg. Including 16 SEER AC	\$3,000	72	75	2,200	1.0
Elec. Energy	Pkg. Including 100% Fluorescent	\$3,000	72	75	2,400	0.8

Strategies for improving cost effectiveness



4. Tailor the program to maximize savings (cont.)

- Consider a multi-tier program that defines ENERGY STAR as one of the tiers:
 - This allows savings from lower tiers to be captured
 - Integrating lower tiers with lower costs and savings can sometimes improve the cost effectiveness of the overall program.
 - A multi-tier approach has the added benefit of allowing the market to select the most appropriate level, avoiding scenarios where a utility preemptively ceases support for ENERGY STAR.



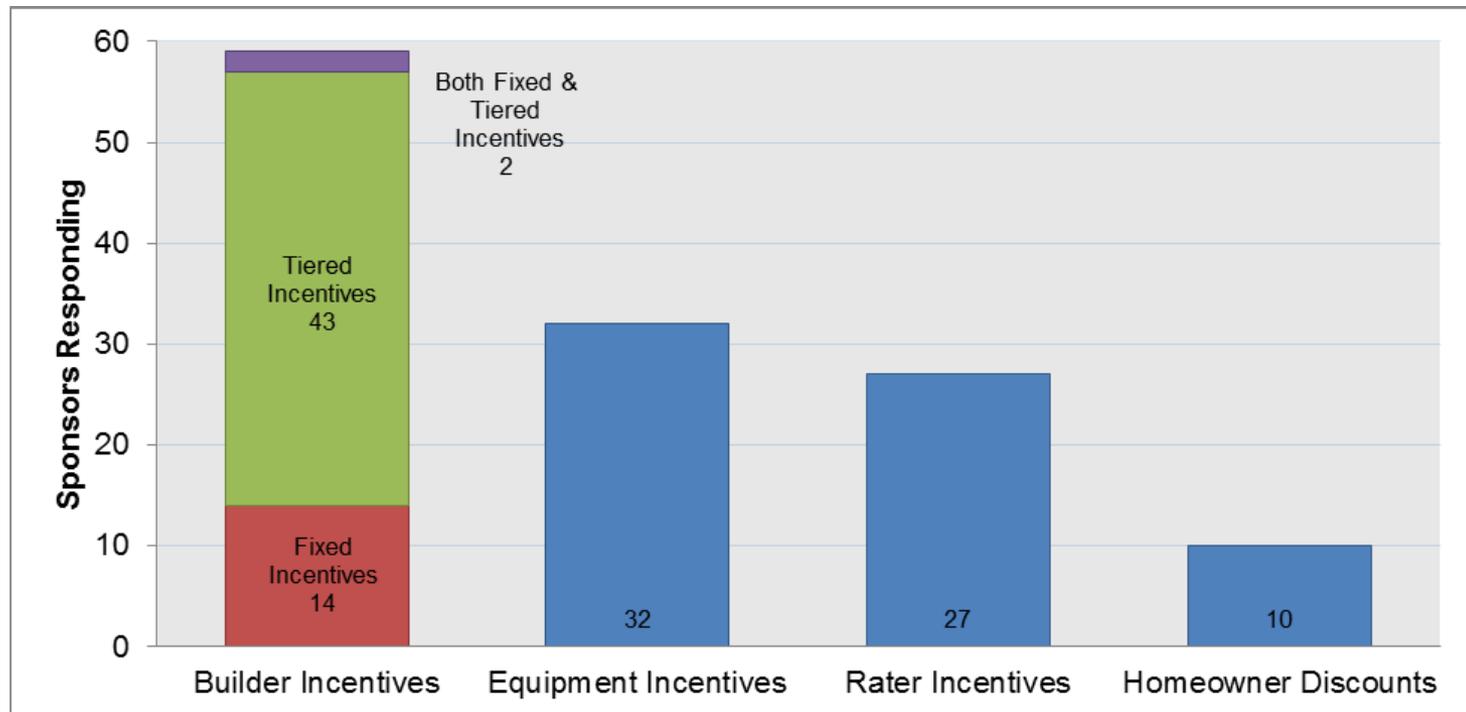
Utility program design templates for partnering with **ENERGY STAR**

Innovative program design ideas



Various strategies for integrating ENERGY STAR based on local needs

- **Results from 2011 Questionnaire** (91 responded):
- Question: Which of the following best describes your program's incentive structure?

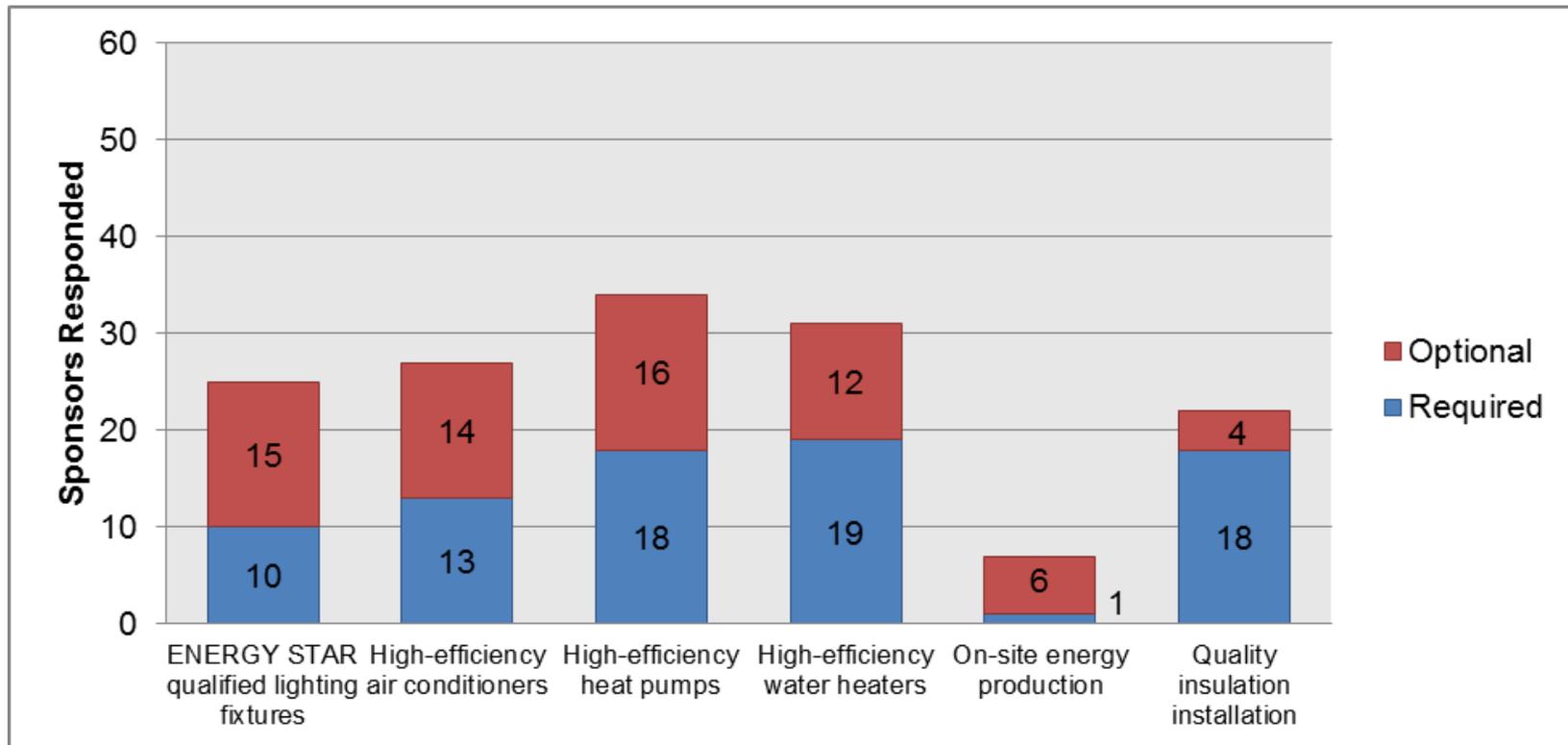


Innovative program design ideas



Various strategies for integrating ENERGY STAR based on local needs

- Question: Do you provide incentives for specific high-efficiency equipment?

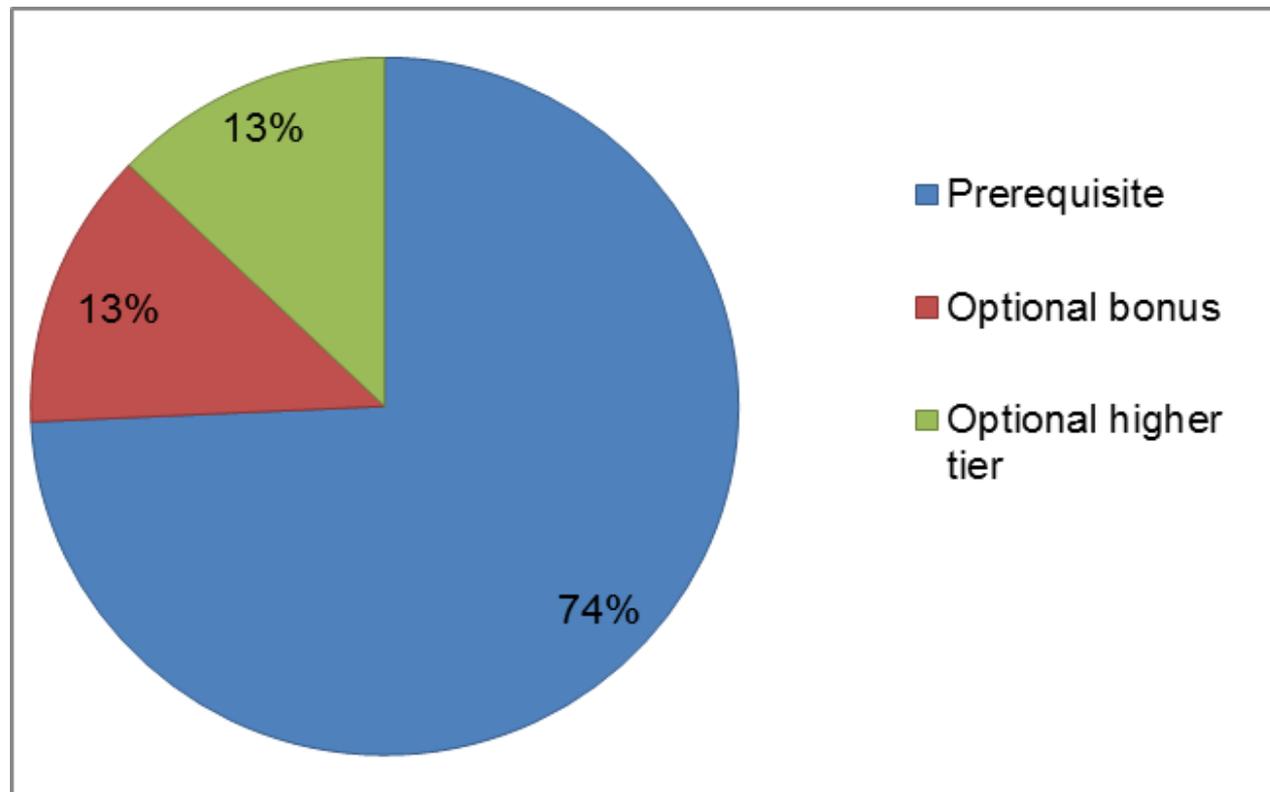


Innovative program design ideas



Various strategies for integrating ENERGY STAR based on local needs

- Question: In what way is ENERGY STAR qualification incorporated into your incentive structure?



Innovative program design ideas



- **Two key questions for incentive design**
 - Who will receive incentives?
 - What will be incentivized?

Innovative program design ideas



- **Who receives incentives?**
 - Builder
 - Raters
 - Ensure rater training is available in your market. Consider hosting it.
 - Consider a short-term rater incentive to help with learning curve and additional responsibilities. Reduce increased cost being pushed to builders.
 - HVAC contractors
 - Identify HVAC contractors serving program builders. Work with them to ensure that they obtain required credential by hosting training and/or helping to offset cost.

Innovative program design ideas



- **What will be incentivized?**
 - Option 1: Align with ENERGY STAR.
 - Incentivizing ENERGY STAR qualified homes provides simple, clear messaging that can help utilities successfully market their program to consumers and builders. This model creates an especially compelling recruitment message for builders because the same set of requirements (with some reporting responsibilities) gives them access to all the benefits of utility and national programs.

Innovative program design ideas



- **What will be incentivized?**
 - Option 2: Use a tiered structure.
 - In new or less mature markets, multi-tiered incentive structures that incorporate ENERGY STAR as an incentivized option, or as the “reach” incentive, have been an effective way to establish the brand and grow participation.
 - Tiers can be defined by HERS Index or by square footage.
 - Alternatively, an ENERGY STAR incentive can be a bonus available at any tier.

Innovative program design ideas



- **What will be incentivized?**
 - For either option, high impact measures can be added
 - Boost savings and cost-effectiveness results by requiring high-impact prescriptive measures that both contribute towards compliance with the national ENERGY STAR guidelines and align with the goals of the utility (e.g., high gas savings, electric energy savings, or electric demand savings). For example, programs might mandate that high-efficiency air conditioners be used in the South, or high-efficiency heat pumps or furnaces be used in mixed or cold climates.

Naming your Energy Efficiency Program



- The following program offerings may be called an ENERGY STAR New Homes program:
 - Programs that include performance tiers and have at least one tier that requires ENERGY STAR qualification. Incentives must also be provided for ENERGY STAR qualification if incentives are provided for meeting any performance tier.
 - Programs that do not include performance tiers and only offer marketing, education, and outreach activities tied to ENERGY STAR and have received EPA approval.
- For example: a utility offering incentives based solely on a home's HERS index cannot call their program ENERGY STAR, even if offering incentives for marketing or training.

Sponsor concerns about Version 3



- **Concern:**

- Non-energy measures (e.g., water management measures) reduce cost-effectiveness

- **Response:**

- Many measures may be included in applicable building codes. Reviewing code requirements and the ENERGY STAR Checklists will take time, but this is part of defining the baseline and accurately counting incremental costs for measures that are above (not at) that baseline.
- ENERGY STAR works because builders and consumer trust the brand promise. ENERGY STAR doesn't just promise energy efficiency; it promised the same or better performance in addition to efficiency. Consumers need to trust that the label means a quality home, and builders need to trust that it helps them succeed, partly by reducing liability.

Sponsor concerns about Version 3



- **Concern:**

- HVAC Quality Installation lacks oversight, so sponsors will need to institute expensive QA

- **Response:**

- Under Version 3, Raters review key inputs in the HVAC design process and test critical performance characteristics.
- Credentialed contractors have company-wide approaches to technical compliance and are subject to QA by their credentialing organization.
- Sponsors should consider what scope and extent of additional QA is appropriate for their purposes.
 - Review the Quality Assurance Training available on the Utility Resources page of the ENERGY STAR website.

Sponsor concerns about Version 3



- **Concern:**

- The HVAC contractor infrastructure doesn't exist

- **Response:**

- ACCA launched its program in May and, with EPA, began actively recruiting contractors in July.
- ACCA is offering a 50% discount on sign-up fees through the end of December. Any contractor who has already sign up will be reimbursed for the discounted amount.
- As the cooling season ends and 2012 approaches, many more contractors will join. Currently credentialed contractors are early adopters.
- EPA continues to encourage sponsors to accelerate adoption by facilitating HVAC contractor credentialing and recruitment and invites sponsors to share obstacles or requests for assistance.



Resources to Aid in the Transition to Version 3

We're In Campaign



Gain market competition and momentum with public builder commitments

- **What is it?**
 - An opportunity for builders committed to Version 3 to get recognition now
- **These builders will:**
 - Be listed on a special ENERGY STAR web page (www.energystar.gov/v3builders)
 - Receive an EPA press release template for promotional use
 - May be featured in EPA-led media outreach about the value of the new Version 3 requirements

We're In Campaign



Are You "In" for Version 3?

Show your leadership and make a commitment!

www.energystar.gov/v3commitment



ENERGY STAR builder partners across the nation are making a public commitment to building their homes to the [new Version 3 requirements](#) in 2012. These builders will be featured on the ENERGY STAR web site, will receive an EPA press release template for promotional use, and may be featured in EPA-led media outreach about the value of the new Version 3 requirements.

Fill out and submit the form below to join the leading builders who have already committed to building homes to the Version 3 requirements next year.

Builder Information

*required.

Partner Name: *

Partner Name:

City:

State:

[Not a Partner Yet? Join Now!](#)

- "We're in!" We're committed to building homes to Version 3 in 2012.
- "We're All in!" We're committed to building all of our homes to Version 3 in 2012.

Contact Name:

Resources on the Utility Website



www.energystar.gov/homes → Utilities

[Home](#) > [Partner Resources](#) > [New Home Industry](#) > [Benefits](#) > [Sponsoring an ENERGY STAR for Homes Program](#)

Sponsoring an ENERGY STAR for Homes Program

Increasingly, utilities are looking to offer energy efficiency programs to meet regulatory obligations, reduce peak demand, and contribute to environmental protection. Voluntary partnerships are a key option for meeting these goals because energy efficiency delivers an impressive value proposition to both consumers and businesses. ENERGY STAR, the government-backed symbol for energy efficiency recognized by more than 75% of American households, provides a powerful platform for utilities implementing demand side management programs.

Residential buildings consume approximately 21% of the energy used in the United States each year. Therefore, working with the residential new construction market to ensure that homes are built to rigorous energy efficiency standards is an important opportunity to maximize end-use efficiency and avoid or postpone the construction of costly new power generation facilities.

ENERGY STAR qualified homes are designed and constructed to be significantly more energy efficient than those built to code while improving affordability, comfort, quality, and durability. As a result, an ENERGY STAR for Homes program is an opportunity for long-term peak and energy demand savings that can stand-alone or complement other residential energy efficiency initiatives.



**About ENERGY STAR
for New Homes**
(Including Version 3
Guidelines)

**Best Practices for
Program Design and
Implementation**

**Resources for Utility
Sponsors**

Resources on the Utility Website



- **Best Practices for Program Design**
 - Conduct Market Research
 - Assess Local HERS Infrastructure
 - Benchmark Construction Practices
 - Determine Barriers to Program Participation
- **Best Practices for Program Implementation**
 - Marketing
 - Strategic Incentive Structures
 - Training
 - Communication Strategy
 - Quality Assurance Protocols
 - Measurement and Evaluation

Comprehensive [Best Practices Guide](#) and [Checklist](#).

Resources on the Utility Website



- **Guidelines and Technical Resources**
- **Educational Resources**
- **Program Design and Implementation Resources**
- **Marketing Resources**

www.energystar.gov/homes → Utilities



Next steps

Next Steps for Effectively Integrating v3 into Utility Program Design



1. Take close look at your tailored cost-effectiveness analyses.
2. Provide specific feedback on concerns.
3. Utilize locally appropriate solutions that incorporate ENERGY STAR.



Questions?

Visit www.energystar.gov/homes

Email energystarhomes@energystar.gov