



## U.S. Department of Energy Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy  
is clean, abundant, reliable, and affordable



# Builders Challenge

Recognizing Energy Leadership in Homebuilding



**2009 RESNET Building Performance Conference**

*Tuesday, February 17th*



Ed Pollock, US DOE  
Joe Nebbia, Newport Partners  
Dave Roberts, NREL





## What is the Purpose?

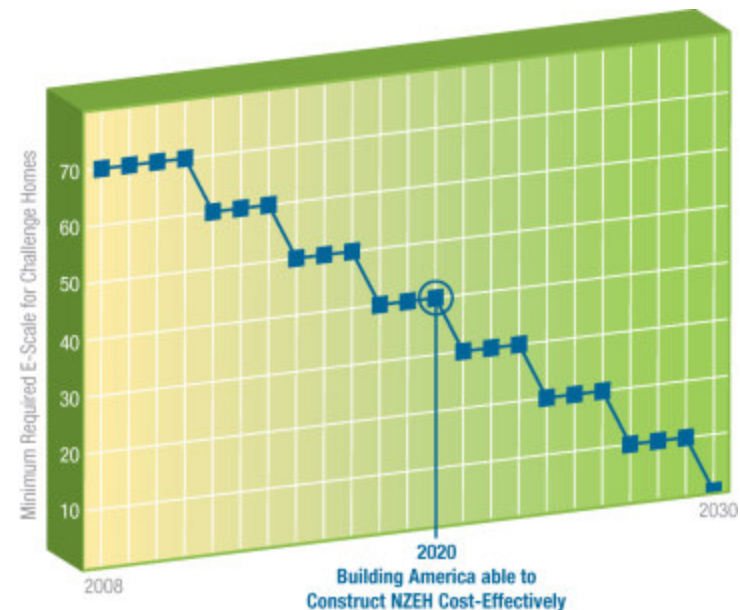
Transform the market and give all Americans the opportunity to purchase the best homes that technology allows and save an estimated \$1.7 billion dollars (cumulative) on energy bills.





## What is the goal?

- Cost-neutral Net-Zero Energy Home (NZEH) anywhere in the United States by 2030
- 15,000 high performance homes this year
  - 70 threshold on the E-Scale
  - Meet the Builders Challenge Quality Criteria
- Incremental increases after 2012 to reach 2030





## Why is DOE doing this?

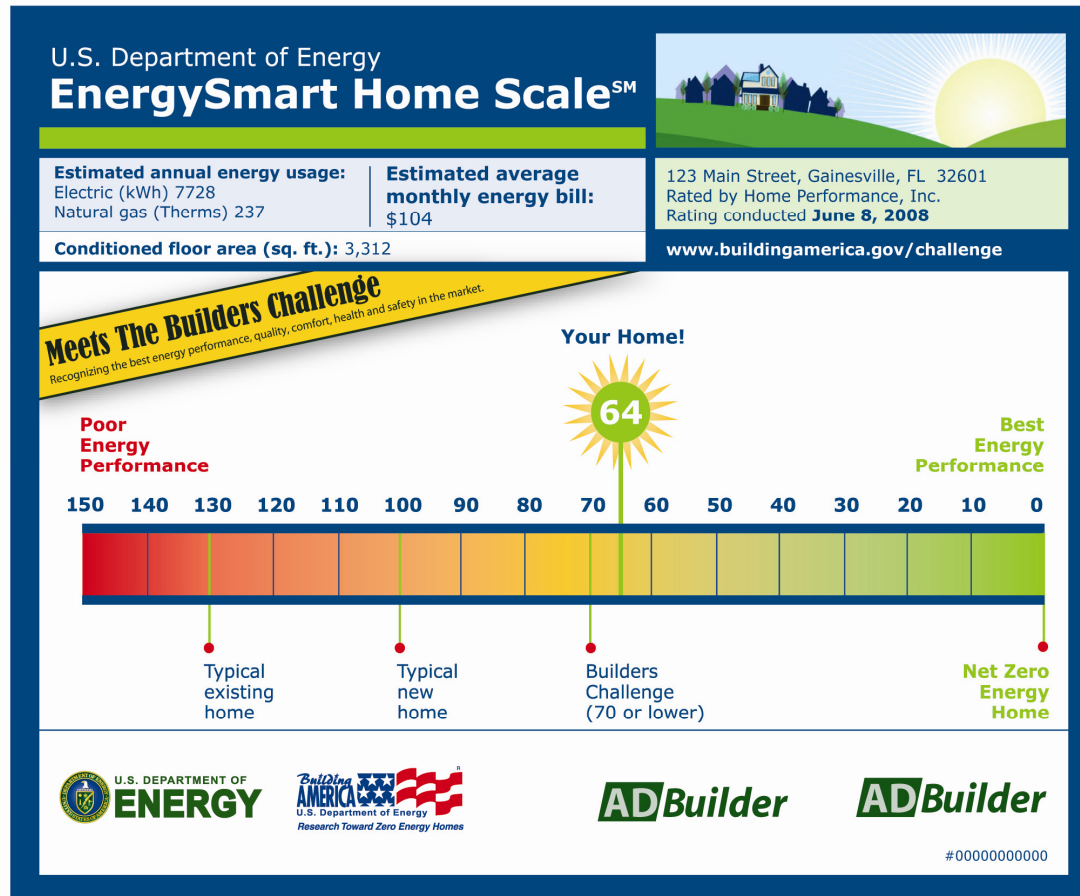
- Reduce U.S. residential energy consumption
- Utilize over a decade of market-tested Building America research
- Allow differentiation and increased recognition for increased energy efficiency and quality
- Promote a national metric equivalent to an MPG for cars to reduce consumer confusion



# U.S. Department of Energy Energy Efficiency and Renewable Energy

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# Overview



**Drive demand:**  
Help homebuyers recognize that homes that meet the Builders Challenge represent the best energy performance, quality, comfort, health and safety available in the current housing market.



**Builders Challenge**  
Recognizing Energy Leadership in Homebuilding



## Builders Challenge launched at 2008 International Builders Show in Orlando

By 2030, new home buyers will have the option to buy a cost-neutral Net-Zero Energy Home (NZEH) anywhere in the United States.

Initiative Goals	2012	2030
EnergySmart Home Scale (E-Scale)	70	0
Cumulative # of Homes from 2008	220K	1.3M
Cumulative Energy Savings (Quads, Primary)	0.015	0.178
Cumulative Energy Cost Savings	\$143M	\$1.7B
Cumulative Carbon Savings (Million Metric Tons)	0.231	2.799



**February 14, 2008, Orlando , FL—U.S. DOE Secretary Bodman posed a challenge to the homebuilding industry – to build 220,000 high performance homes by 2012.**



- Not a new program, not the competition:  
reinforces and leverages existing programs
  - Relies heavily on RESNET Standards and procedures
  - E-Scale utilizes the HERS Index
  - QC requirements embody Building America research
  - ENERGY STAR product labeling



## How does the Builders Challenge differ from ENERGY STAR Qualified Homes?

- Builds on ENERGY STAR and uses same rating infrastructure
- Point of differentiation for those who want recognition for increased energy efficiency
- Higher level of energy efficiency (approximately 30% above 2004 IECC v. 15%)
- Recognition for actual levels of efficiency rather than pass/fail
  - Will help pave the way towards Net-Zero Energy Homes
- Quality criteria for health, durability, and IAQ



- Complying with a Program Partner at a certain equivalent level = Meeting the Builders Challenge.
  - DOE's E-Scale on the home
  - Additional market recognition for the builder
- Initial Program Partners include EarthCraft and Environments for Living, with several other discussions underway.





## Partnering Opportunities

- **Raters/verifiers** provide services to builders and increase consumer confidence
- Builder partners can make the Challenge part of their portfolio for recognition at higher levels
- Resource partners provide training and outreach
- National, regional and local energy efficiency and green partner programs and HERS Providers provide infrastructure.
- Manufacturer partners support marketing
- Lending institutions, utilities, and others all can leverage more efficient homes

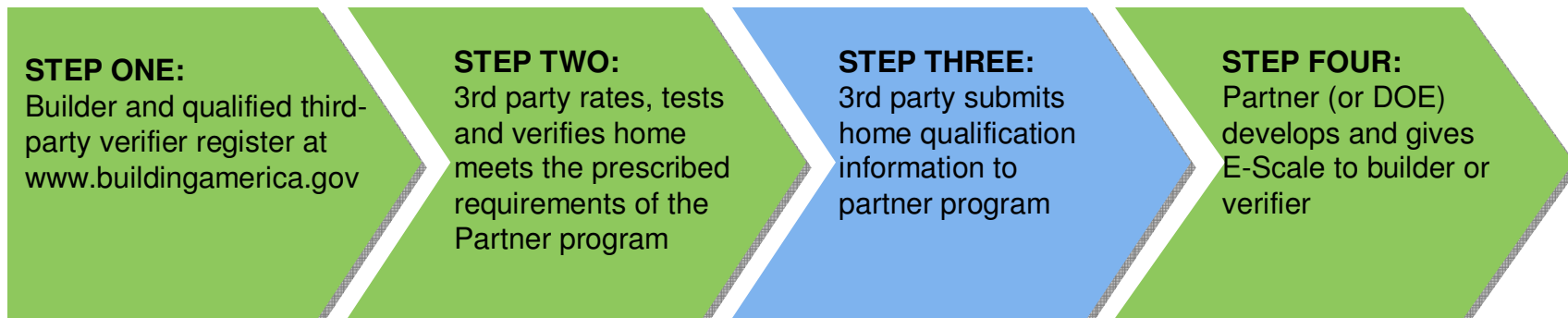


## Three pathways to meet every builder's needs:

1. Partner Program
2. Performance
3. Prescriptive



- 1. Partner Program - establishes equivalency and operations with DOE**
2. Performance
3. Prescriptive

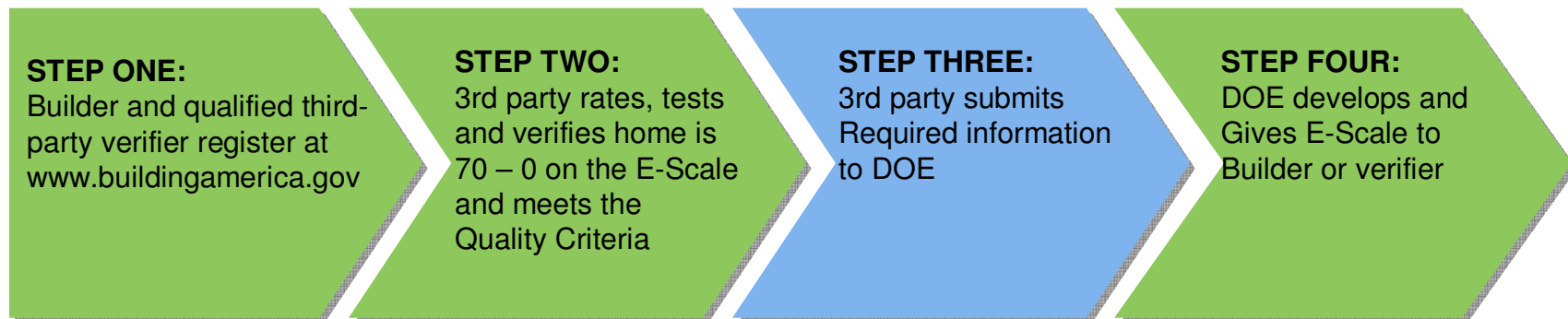


*Examples:*

- *Environments for Living Diamond Level*
- *Earthcraft Homes - Tier II Level*

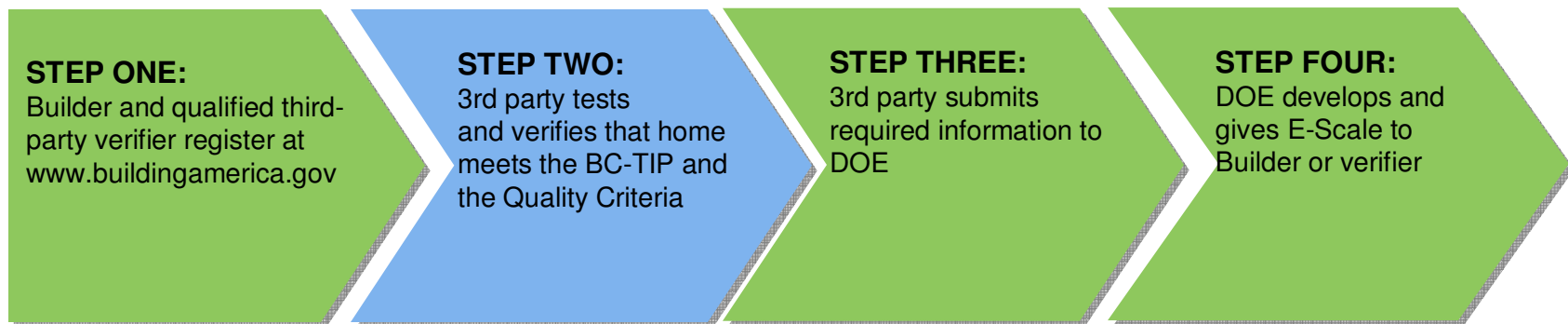


1. Partner/HERS Provider—establishes equivalency and operations with DOE
- 2. Performance**
3. Prescriptive





1. Partner/HERS Provider—establishes equivalency and operations with DOE
2. Performance
- 3. Prescriptive—Builder chooses a Builders Challenge Technology Information Package (BC-TIP)**





U.S. Department of Energy

Builders Challenge Technology Information Packages



## Hot-Humid Climate: New Orleans

The U.S. Department of Energy's Builders Challenge recognizes quality homes that also save you money.

U.S. homebuilders from all areas of the country report growing buyer interest in energy-efficient houses, yet buyers often lack basic information that can help them make informed decisions. How can homebuyers tell exceptional energy performance from average energy performance? And how do they figure out just what that difference will mean in their energy bills?

Spearheaded by the U.S. Department of Energy (DOE), the Builders Challenge is a voluntary effort to address these consumer questions. The Builders Challenge seeks to galvanize the housing industry to move 220,000 high-performance homes into the marketplace by 2012, and to spur consumer demand

for these homes. Through the Builders Challenge, participating homebuilders can differentiate their best energy-performing homes from other products in the marketplace. The Challenge highlights homes that provide substantial reductions in energy use and home-owner utility bills and recognizes the best practices for quality, comfort, health, and safety in the market.

DOE's ultimate vision is that, by 2030, a consumer will have the option to buy an affordable net-zero energy home anywhere in the United States—a home that, over the course of a year, produces as much energy as it uses. The Builders Challenge establishes a framework for continuous improvement that will help propel the market toward net-zero energy performance.



Builders Challenge

Recognizing Energy Leadership in Homebuilding

Builders Challenge Technology Information Packages (BC TIPs) provide climate-specific guidance for builders wishing to meet the Builders Challenge.



Builders Challenge

Recognizing Energy Leadership in Homebuilding



Climate Region: Hot-Humid Location: New Orleans Foundation Type: Crawlspace	Minimum Builders Challenge Level		Premium Efficiency Level	
	Gas	Electric	Gas	Electric
<b>Heating Fuel</b>				
<b>Insulation</b>				
Walls <sup>1</sup>	2x4 R-15	2x4 R-15	2x4 R-15	2x4 R-15
Roof	R-30	R-30	R-30	R-30
Crawlspace	Sealed, R-10/R-13 <sup>2</sup>	Sealed, R-10/R-13 <sup>2</sup>	Sealed, R-10/R-13 <sup>2</sup>	Sealed, R-10/R-13 <sup>2</sup>
<b>Windows<sup>3</sup></b>				
	Double-Glazed, Low-E	Double-Glazed, Low-E	Double-Glazed, Low-E	Double-Glazed, Low-E
U-Factor	0.35	0.35	0.32	0.32
Solar Heat Gain Coefficient	0.35	0.35	0.27	0.27
<b>Lighting</b>				
% Fluorescent Fixtures <sup>4</sup>	90%	90%	100%	100%
<b>Heating</b>				
Furnace, Efficiency Rating, AFUE	82		92.5	
Air-Source Heat Pump, HSPF		8.8		8.8
<b>Air Conditioning</b>				
Efficiency Rating, SEER	14		17	
Air-Source Heat Pump, SEER		15		15
<b>(Builder-Supplied) Appliances</b>				
	ENERGY STAR <sup>®</sup>	ENERGY STAR <sup>®</sup>	ENERGY STAR <sup>®</sup>	ENERGY STAR <sup>®</sup>
<b>Water Heater</b>				
	Tankless/Gas	Tank/Electric	Tankless/Gas	Tank/Electric
Energy Factor, EF	0.77	0.95	0.77	0.95
Solar				64cf Closed-Loop
<b>Air Tightness</b>				
ACH50	5.0	5.0	3.0	3.0
<b>Ducts</b>				
Location	Sealed Crawlspace	Sealed Crawlspace	Sealed Crawlspace	Sealed Crawlspace
Insulation	R-4.2	R-4.2	R-4.2	R-4.2
Leakage	10%	10%	10%	10%

<sup>1</sup> Framing factor shall not exceed 23%.

<sup>2</sup> Window area shall not exceed 18% of conditioned, above-grade floor area.

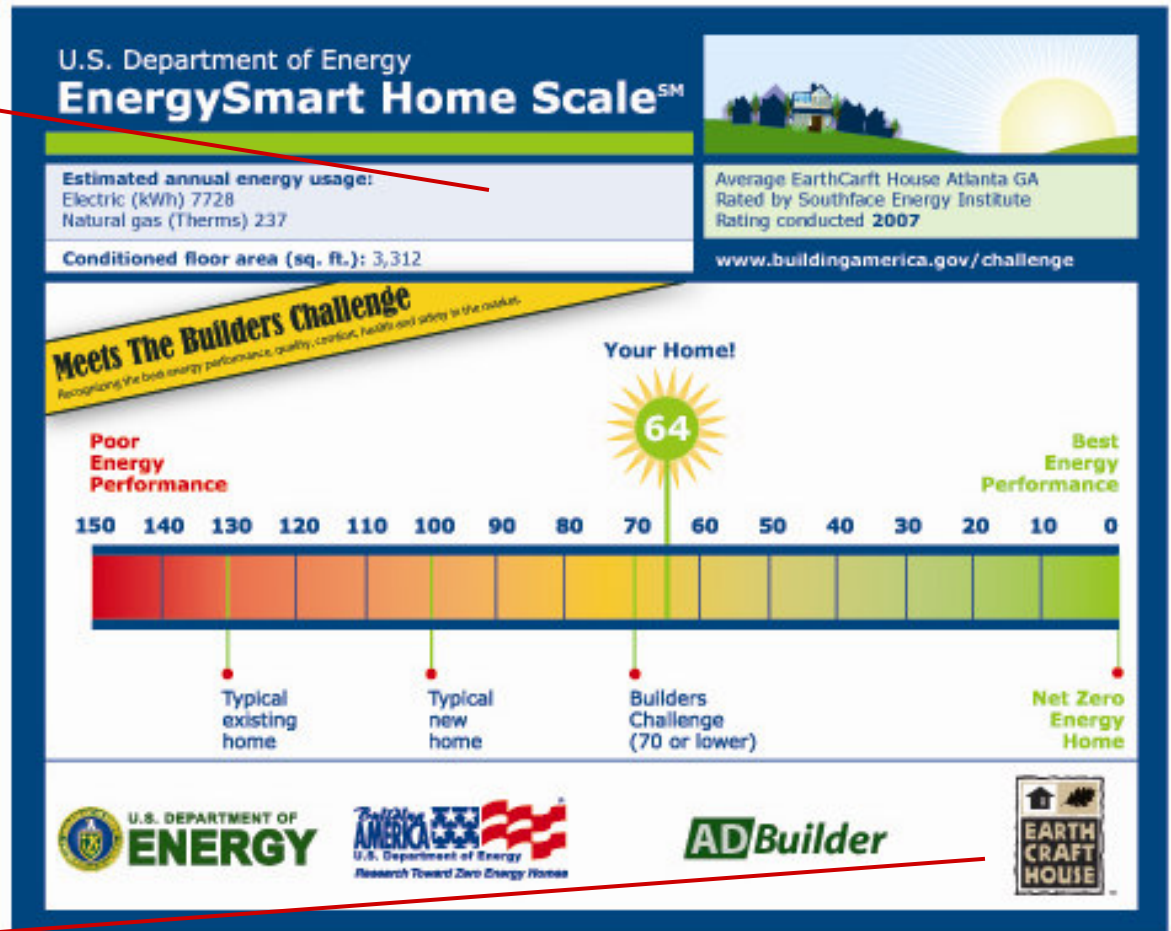
<sup>3</sup> Pin-based fluorescent fixtures or compact fluorescent lamps.

<sup>4</sup> The first R-value applies to continuous insulation, the second to framing cavity insulation; either meets the requirement.



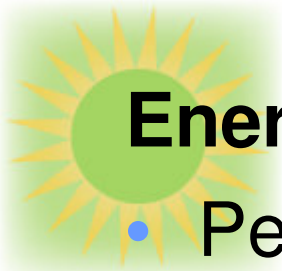
Cost data optional

Additional information on label may be added in accordance with the E-Scale usage guidelines.



Partner program logo



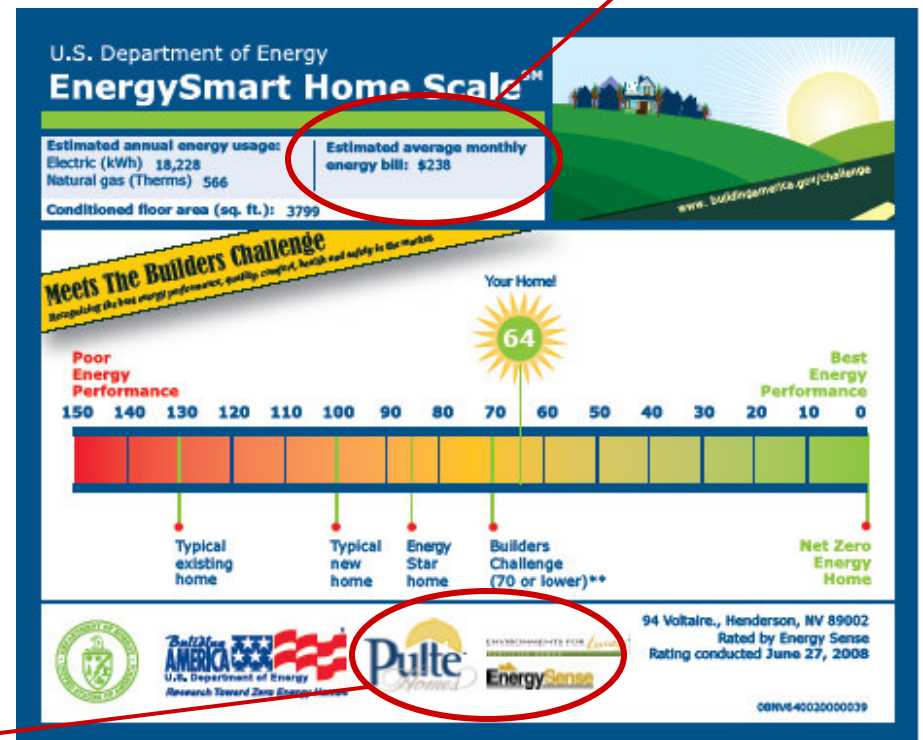


## EnergySmart Home Scale with banner

- Permanent sticker on the utility panel
- PDF for marketing

Cost data optional

- Features sunburst with HERS Score
- Energy use
- Conditioned floor area

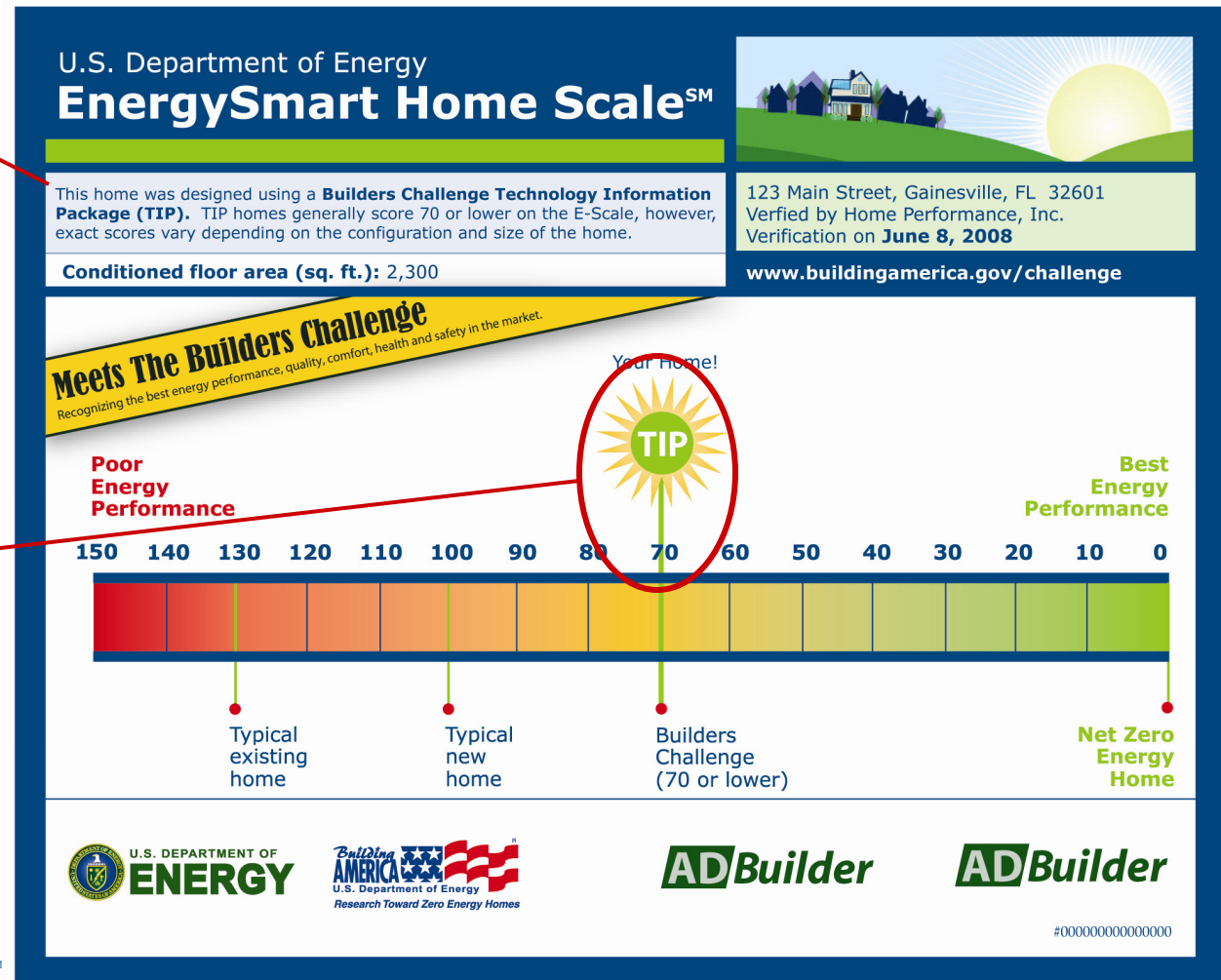


Partner logos optional



Identified as meeting the requirements of a Builders Challenge Technology Package

Sunburst always at 70 default to relate a conservative estimate for home's performance





## ***Verifiers are a critical component of the Builders Challenge***

- Consulting
- Educating
- Verifying
- Documenting
- Marketing

***Raising awareness and growing the market for high performance homes***





### **BC provides the bar - third-party verifiers provide the guidance to get over it!**

- Provide builders with expert advice
- Model options for optimal design and performance
- Rate performance and provides guidance on documentation
- Verify implementation of Quality Criteria through visual inspection and testing
- And qualifies homes.....



## Who can be a verifier?

RESNET-certified HERS raters and DOE Building Consortia team members qualify as third-party verifiers for the Builders Challenge. Other professionals may be eligible to serve as verifiers, if they have adequate training and credentials and are approved by DOE.



All verifiers must register with the Challenge online before qualifying homes.



- To qualify homes, the registered verifier logs in at [www.buildingamerica.gov/challenge](http://www.buildingamerica.gov/challenge) and goes to “Qualify Homes”
  - Chose the registered builder
  - Enter data REM/Rate and EnergyGauge™ Compliance Reports
  - Submit
- Verifier will receive customized E-Scale electric panel sticker (mailed) and .pdf file (emailed) within 5-10 business days



The screenshot shows a web browser window displaying the 'Builders Challenge Participants' page. The page title is 'Builders Challenge - Enter Homes'. The URL is <https://www.eere.energy.gov/buildings/challenge/participants/added/businesshomes.aspx?BusinessID=430>. The page features a navigation menu with links for 'About the Program', 'Program Areas', 'Information Resources', 'Financial Opportunities', 'Technologies', 'Agreement', and 'Home'. The main content area is titled 'Builders Challenge Participants' and includes a section for 'Add Homes'. Below this section, there are several required fields for submission: 'House Type', 'Year Completed', 'Building Plan Number', 'Square footage of conditioned space', 'Number of bedrooms', 'Site address' (with sub-fields for 'Street address', 'Street address 2', 'City', 'State', 'Postal/ZIP code', and 'Country'), and 'E-Scale Mailing Address' (with sub-fields for 'ATTN', 'Street address', and '?? ?av St').

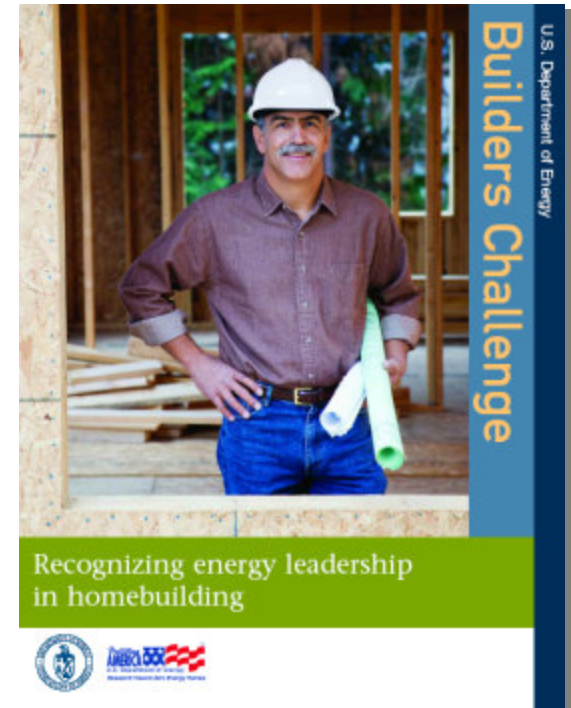
- Web-based submission tools
- Email or fax submission
- Submission of batches of homes with large-volume raters





## Core messages for Raters to take to builders:

- Take the challenge to build more energy efficient homes.
- Be recognized for building the best new homes on the market.
- The E-Scale is becoming the MPG sticker for America's homes
- Differentiate and meet customer demand.





## Builders Challenge Marketing Resources:

- Marketing Tool Kit (available online)
  - Logos
  - Overview Brochure
  - Buyer-Focused Brochure
  - Usage guidelines
  - Sample press release
  - Consumer ads



**Builders Challenge Partner**



# U.S. Department of Energy Energy Efficiency and Renewable Energy

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# Sample Resources

## Buyer-Focused Brochure



### Take Control of Your Energy Future

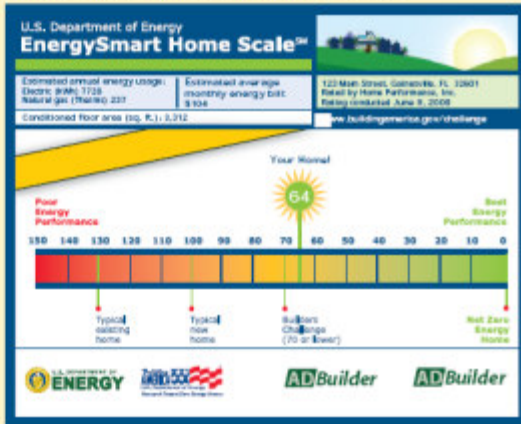
Choosing a new home is all about making the right decisions for you and your loved ones — selecting a neighborhood, a high-quality builder, and the features you value. You compare, ask questions, and make informed decisions about what matters most to you.

But what about energy? Today, more and more buyers value energy efficiency in their new homes — as a way to control their energy bills, reduce carbon emissions, and help preserve our natural environment. Yet, until now, there has been no easy way to compare the energy performance of different homes.

That is where the EnergySmart Home Scale (E-Scale) comes in. Brought to you by the U.S. Department of Energy, the E-Scale lets you compare the energy performance of homes on the market, simply by comparing a number rating. And like your car's MPG, it is a number worth knowing — a number that can put you in control of your energy future.

### Make smart choices with the E-Scale

Look for the EnergySmart Home Scale (E-Scale) to compare the energy performance of home models. The lower the number, the more energy — and energy dollars — you'll save.



## Sample Consumer Ad



### House Proud

Her flowers win awards. His DIY projects are envied. And both are house proud when it comes to energy savings. By choosing a high-performance house between 0 and 70 on the EnergySmart Home Scale (E-Scale), these neighbors enjoy lower energy bills and help the environment.

For more about the E-Scale, see <http://www.buildingamerica.gov/challenge>



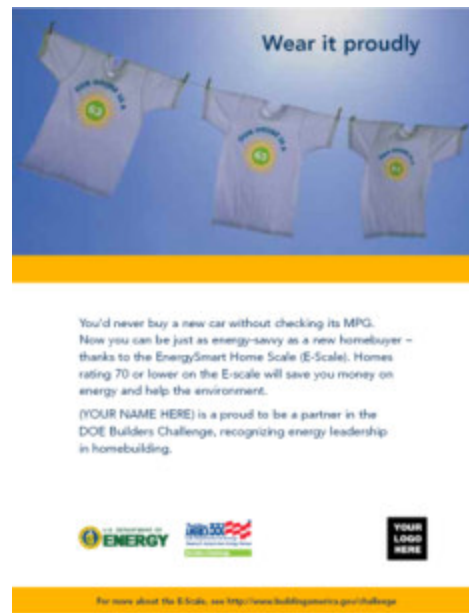
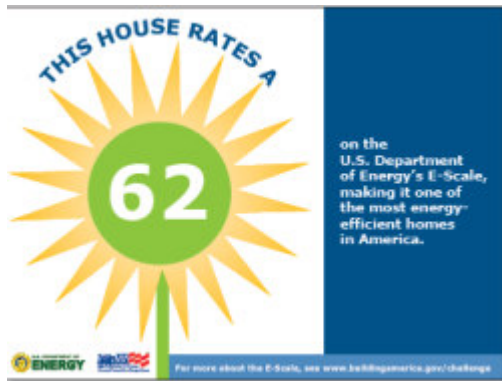
## Builders Challenge

Recognizing Energy Leadership in Homebuilding



## Why will builders be interested?

- Differentiation
- Meeting demand
- DOE recognition





## Builders Challenge Awards

- BASF bestows first BC awards at IBS
  - Pulte Del Webb for the **most** homes qualified to meet the Challenge
  - John Wesley Miller Companies for achieving the **first net-zero energy** home
  - Artistic Homes for the **first cost-effective net-zero energy** home

BASF Recognizes Builders Challenge Builders at the 2009 IBS





## Why have Quality Criteria in an energy program?

- Promote continuous improvement
- Reduced callbacks
- Enhanced comfort
- Better indoor environmental quality (health and safety)
- Durability



## Sample of required Quality Criteria provisions:

- Whole-house mechanical ventilation
- Building envelope moisture management practices
- HVAC sizing and design criteria
- Duct sealing and leakage testing
- CO alarms (most houses)
- Minimum HVAC filtration specifications
- Reliable documentation of specifications in plans and design

**Builders Challenge Quality Criteria Support Document**



## Roles/Responsibilities

- **Builders** must establish the expectations for quality practices, oversee their implementation, and keep records to confirm what was done
- **Trade contractors** must implement quality practices in accordance with their scope of work
- **Third-party verifiers** must verify the implementation of the QC either directly, or by confirming that the builder implemented the QC



## Verification Process

- Designed to minimize additional site visits for a rater to a site
- Shifts the responsibility for record-keeping and inspection to the builder for some items



# Quality Criteria Overview

**Buildings Challenge**  
 Recognizing Energy Leadership in Homebuilding

**EnergySmart Home Scale**  
**QUALIFICATION FORM: PERFORMANCE PATH**

*Third-Party Verifiers should complete form and submit to:*  
 MAIL: Builders Challenge, 3760 Tanglewood Lane, Davidsonville, MD 21035  
 EMAIL: [builderschallenge@newportpartnersllc.com](mailto:builderschallenge@newportpartnersllc.com) FAX: 301-889-0019

**ENERGY PERFORMANCE**

House type: Single-family detached Attached Duplex Low-rise multifamily Other:

<b>Year built</b> <small>(Homes completed in 2007 or later may qualify if they meet the energy threshold and a third-party verifier can verify the Quality Criteria)</small>	<b>Building Plan Number</b>
<b>Site address</b> (if not available, list the site Lot #)	<b>Square footage of conditioned space</b>
street	<b>Number of bedrooms</b>
city	<b>E-Scale Mailing Address</b> (where E-Scale will be mailed)
state	ATTN:
zip	street
<b>Registered Builder</b>	city state zip
company	phone
contact	<b>Developer</b> (if known)
phone	company
email	contact
<b>Third Party Verifier</b>	phone
company	email
contact	<b>E-Scale Score / HERS Index</b> (70-0)
phone	<b>Date of rating</b>
email	<b>Identification number</b> <small>(RESNET ID, Professional license #, etc.)</small>
website	<b>Rating software</b> (name and version used)
<b>Estimated annual energy use</b> (specify units)	<b>Estimated annual energy costs</b> (\$)
Electric (kWh) Natural gas (therms, CCF, MMBtu, MCF)	<i>Do you want this on the E-Scale?</i> Yes No
Oil (gallons or MMBtu) Propane (gallons or MMBtu)	<b>Estimated average monthly energy cost</b> (\$)
<b>Energy cost rates</b> (use same units as above)	<i>Do you want this on the E-Scale?</i> Yes No
\$/kWh \$/unit gas \$/unit oil \$/unit propane	<b>Estimated annual energy savings</b> (relative to reference home) <small>Use same units as for annual energy use</small>
	Electric Natural gas
	Oil Propane
	<b>Estimated annual emissions reductions</b> (relative to reference home)
	CO2 (tons) SO2 (lbs.) NOX (lbs.)

Performance Pathway Form 080108 Page 1  
 For more information on the Builders Challenge, visit: [www.buildingamerica.gov/challenge](http://www.buildingamerica.gov/challenge)

**Buildings Challenge**  
 Recognizing Energy Leadership in Homebuilding

**QUALITY CRITERIA CHECKLIST**

As the Third-Party verifier for this house, I certify that the house complies with all of the "Required" Builders Challenge Quality Criteria, as defined by the [Builders Challenge Quality Criteria Checklist](#).

**ADDITIONAL INFORMATION**

House will be certified under these programs (check all that apply):

Energy Star

Environments for Living

LEED for Homes

National Green Building Standard

Performance Pathway Form 080108 Page 2  
 For more information on the Builders Challenge, visit: [www.buildingamerica.gov/challenge](http://www.buildingamerica.gov/challenge)






## QC Interpretation & Waiver Process

- Standard process is in place
- Form for submitting requests
  - Issue, rationale for request, etc.
- Committee review
  - Represents broad expertise
  - Will review/respond to requests for interpretations, waivers and policy change
- Response within 30 days
- Interpretations will be posted to website



- Establishes
  - Requirements
  - Responsibilities



**Builders Challenge**  
 Recognizing Energy Leadership in Homebuilding

**Builders Challenge Quality Criteria Guide – Version 1.3**

The Builders Challenge Quality Criteria homeowners alike benefit from reduced homes, regardless of compliance path.

This version of the Quality Criteria is updated criteria. Items which are not available on the Builders Challenge website.

**Relationship to Codes & Manufacture**  
 The Quality Criteria are not intended to replace applicable codes apply. In cases where applicable codes apply. In cases where many of the provisions noted below as Challenge is focusing attention on the relationship to codes and manufacture.

**Roles and Responsibilities**  
 The Quality Criteria require different responsibilities for different roles. Builders must establish the roles and responsibilities are noted below.

**Third-party verifiers** must verify that the builder is in compliance with the Builders Challenge Quality Criteria. QC inspectors for homes are architects or employees of an organization) to use building codes.

Builders Challenge Quality Criteria V1.3 – June 4, 2009  
 For more information on the Builders Challenge, visit: [www.buildingamerica.gov](http://www.buildingamerica.gov)

Builders Challenge Quality Criteria	Builder Documentation & Verification Requirements	Third-Party Verification Requirements
<p><b>1. Project Documentation – Required</b>            Construction/design documentation (e.g., plans, details, specifications, job-ready complete checklists, and trade scopes of work and/or agreements) will include and quality provisions needed to meet the Builders Challenge criteria.</p>	<p>Include requirements for flashing, foundation details, and wall system in contractor's construction/design documentation.</p>	
<p><b>2. Building Envelope Moisture Management – Design Phase – Recommended</b>            In the design phase, include details for integrating the weather barrier system flashing components in the construction plans. Specify window and door flashing details.</p>	<p>Specify climate appropriate vapor retarder or barrier per locally applicable IECC. (Reference IECC Section 402.5)</p> <p>When using water absorbent cladding, including brick, stone (real or manufactured), stucco, and fiber cement, provide a pathway for bulk water that enters the wall assembly from the exterior to drain to the exterior. Typically this involves specifying a drainage space or pathway provided by furring strips, an air gap, contoured house wrap, or other products that create a vertical drainage channel behind the cladding and exit the wall horizontally. Cladding installation per manufacturer's recommendations is also permitted.</p>	
<p><b>3. Material Efficient Framing – Recommended</b>            Design building dimensions and layouts to minimize material cuts and waste for wall, floor, and roof system structural components and sheathing. Size all fasteners for actual structural loads, and insulate to the fullest extent possible. To the extent possible use building systems which minimize on-site waste, such as panelized walls, pre-cut framing packages, and engineered wood products. Incorporate these measures in the framing layout plan.</p>	<p>Develop framing layout plan and keep in project records.</p>	
<p><b>4. Construction Waste Management – Recommended</b>            Develop, post at the jobsite and implement a Construction Waste Management Plan. The plan should document the diversion pathways for major waste stream components including cardboard, lumber, land-clearing debris, and drywall. The plan should also document efforts to request minimized packaging from suppliers. Goals for waste diversion should be at least 25% (by weight) for construction and land-clearing waste.</p>	<p>Develop Construction Waste Management Plan and keep in project records.</p>	
<p><b>5. Space Conditioning Design – Required</b>            Right-size space conditioning system for heating/cooling loads based on ACCA Manual J Version 8 or comparable load sizing analysis (reference 2006 IRC M1401.3, 2006 IECC Section 403.6). The maximum over-sizing limit for cooling equipment is 15%, with the exception of heat pumps in Climate Zones 5 - 8 where the maximum over-sizing limit is 25%. Outdoor temperatures shall be the 99.0% design temperatures as published in the ASHRAE Handbook of Fundamentals for the home's location or most representative city for which design temperature data are available. Note that a higher outdoor air design temperature may be used if it represents prevailing local practice by the HVAC industry and reflects extreme climate conditions that can be documented with recorded weather data. Indoor temperatures shall be 75 F for cooling. Infiltration rate shall be selected as "tight", or the equivalent term. In specifying equipment, the next available size may be used. In addition, indoor and outdoor coils shall be matched in accordance with ARI standards.</p>	<p>Analyze load-sizing and duct-sizing and keep in project records.</p>	<p>Review the load-sizing and duct-sizing analyses to ensure that sizing criteria stated in the requirements were used for the home.</p>
<p><b>6. Space Conditioning Design – Recommended</b>            Identify the whole building ventilation strategy and equipment in the mechanical system design (see the 2 other Quality Criteria: Whole Building Ventilation I and II for requirements).</p>		

Builders Challenge Quality Criteria V1.3 – June 4, 2009  
 For more information on the Builders Challenge, visit: [www.buildingamerica.gov](http://www.buildingamerica.gov)

## — 29 criteria

- 15 required, 14 recommended
- Focus on comfort, IEQ, durability
- Organized by design/construction phase
- Developed by industry experts under DOE leadership





Requirements	Recommendations
1. Project Documentation	3. Material Efficient Framing
2. Building Envelope Moisture Management	4. Construction Waste Management
5. Space Conditioning Design (Manual J)	6. Space Conditioning Design (Manual D)
10. Energy Star Windows	7. Dehumidification
11. Whole-Building Ventilation	8. ACCA Quality Install
12. Kitchen Ventilation	9. Building Envelope Pressurization Test
13. Bathroom Ventilation	20. Carbon Monoxide Alarms (All)
14. Clothes Dryer Venting	21. Garage Exhaust Ventilation
15. Minimize Duct Leakage	24. Energy Star Equipment/Appliances
16. Energy Star Thermal Bypass Checklist	25. Whole-Building Ventilation per ASHRAE 62.2
17. High Quality Air Filtration	26. Pressure Balancing
18. Sealed Combustion Systems	27. Low VOC Interior Coatings
19. Carbon Monoxide Alarms (Some)	28. Low VOC Adhesives
22. No Air Handler in Garage	29. Low Emission Cabinets
23. Moisture Management Field Verification	



## 1. Project Documentation

- Construction/design documentation (e.g., plans, specifications, trade scopes of work, checklists) will include energy and quality provisions needed to meet the Builders Challenge criteria
- Builder to develop and retain
- Reviewed by third party



## 2. Building Envelope Moisture Management

### 23. Moisture Management Field Verification

- Window and door flashing
- Site/grade drainage
- Capillary breaks
- Vapor retarder
- Drainage planes
- Builder certifies implementation
- Third-party reviews plan, builder certification documents



## 5. Space Conditioning Design (Manual J)

- Size cooling equipment per Manual J
- Limited to 15% over-sizing
- Builder/trade responsible for calculations and proper specification
- Third party verifies calculations were done, equipment installed per calculations/specification
- Consistent with Energy Star Homes requirement



## 10. Energy Star Windows

- Install Energy Star qualified windows
  - Must be **labeled** windows
  - Not just performance, but quality
- Builder specifies windows, retains documentation
- Third party verifies installation



## 11. Whole-Building Mechanical Ventilation

- Design and install a mechanical system to provide outside air to the indoor environment through either exhaust, supply, or balanced ventilation.
- Builder specifies in plans, retains documentation
- Third party verifies installation



## 12. Kitchen Ventilation

## 13. Bathroom Ventilation

## 14. Clothes Dryer Venting

- Provide adequate spot ventilation per QC specifications (e.g., 100 cfm kitchen, 50 cfm bathrooms.)
- All venting to outdoors
- Builder to specify in plans, retain documentation
- Third party verifies



## 15. Minimize Duct Leakage

- Comply with 15A or 15B, and 15C
  - 15A: Duct leakage to outdoors is less than 5% of conditioned floor area ( $\text{cfm}_{25}/\text{cfa} < 0.05$ )
    - or -
  - 15B: All duct work is located within the conditioned envelope
    - and -
  - 15C: Total duct leakage is less than 10% of conditioned floor area
- Third party performs leakage test, verifies location



## 16. Energy Star Thermal Bypass Checklist

- Complete the Energy Star Thermal Bypass Checklist
- Either builder or third-party verifier may complete the checklist
- Builder must retain checklist, third-party must verify signed checklist



## 17. High Quality Air Filtration

- Equip the central air handler(s) with a MERV 8 filter or higher
- Builder specifies, accounting for the associated pressure drop from the filter in the design and sizing of the duct work
- Third-party to verify installation



## 18. Sealed Combustion Systems

- Fossil-fuel-fired furnaces or water heaters installed in conditioned spaces must be sealed combustion, direct vented, or power-vented units
- Third-party to verify



## 19. Carbon Monoxide Alarms

- For homes with combustion appliance(s) or an attached garage, install at least one carbon monoxide (CO) alarm in a central location outside of each separate sleeping area
- Third-party to verify installation



# Resources

The screenshot shows the homepage of the Building America program. It features a navigation menu with categories like 'About the Program', 'Information Resources', 'Financial Opportunities', 'Technologies', and 'Development'. The main content area includes sections for 'About Building America', 'Research Teams', 'Systems Engineering Approach', 'Research Projects', and 'Publications'. A prominent 'Builders Challenge' section highlights a program where builders who commit to building quality homes with a 70+ E-Score rating get special marketing and technical incentives. There are also 'Quick Links' for signing up for email updates and finding projects. At the bottom, it states '41,190 Homes Built in Building America Research Projects'.

[www.buildingamerica.gov](http://www.buildingamerica.gov)

This collage features several key resources from the Building America program:

- Building America Best Practices Series: Volume 1**: A handbook for improving home energy efficiency, comfort, and durability in hot and humid climates.
- Planning and Orientation**: A chapter from Volume 1 showing optimal tilt angles for solar panels across different regions (Alaska, Hawaii, and the continental U.S.).
- AIR SEALING DRYWALL**: A 'Building Tip' document with a checklist for ensuring airtightness in drywall construction, covering areas like window frames, door frames, and wall joints.
- Better Duct Systems for Home Heating and Cooling**: A document explaining how duct systems can be improved to reduce energy loss and improve indoor air quality.
- DUCT SEALING**: A 'Building Tip' document with diagrams and instructions for sealing ductwork, including sections on air handlers, supply and return plenums, flex duct, and boots.
- Technical Report: Building America Performance Tip Part 2, Air-Exchange Measurements**: A report from NREL providing guidance on how to measure and improve a home's air exchange rate.
- High-Performance Home Technologies: Solar Thermal Photovoltaic Systems**: A document discussing the integration of solar thermal and photovoltaic technologies.





- **BCQC Support Document**
  - Detailed guide to implementing Quality Criteria
  - Coming soon
- **BA Best Practices Guides, Case Studies**
  - Guides to implementing Building America practices embodied in Quality Criteria
  - Detailed, climate specific
  - Available online now





- **Builders Challenge FAQs on Website**
- **Some newer, Rater-specific questions...**
  - Does a certified rater need any BC-specific verification training? *RESNET Certified HERS raters do not need any further training to register as Verifiers with the Builders Challenge*
  - Do Verifiers need to be lined up with Builder Partners before registering? *No.*
  - Can Builders link up with Verifiers through website? *Builders (and others visitors to the website – like home buyers) can view the registered Verifiers on the Challenge website. Contact information (website, email, phone, etc.) is available.*
  - “Enter data from REM/Rate and EnergyGauge™ Compliance Reports” – Is a specific output report required? Or are the inputs required? *A specific data submission for a given home is required to qualify the home with the Builders Challenge. The software compliance reports offer this report (b/c it pulls data from the energy model for the home). Verifiers can also email or fax in the qualification form.*



- ⦿ Automated E-Scale Printing
- ⦿ More marketing tools
- ⦿ Consumer campaign
- ⦿ Design competition
- ⦿ More awards
- ⦿ Preparing for 2012





1. Register online at [www.buildingamerica.gov/challenge](http://www.buildingamerica.gov/challenge)
2. Work with your builders to submit the Builders Challenge Qualification Form
  - HERS Rating between 70 and 0
  - Builders Challenge Quality Criteria
3. Use E-Scale and other marketing materials to differentiate home from the competition



## Builders Challenge Website

- Register, submit homes, review Quality Criteria, etc.
- [www.buildingamerica.gov/challenge](http://www.buildingamerica.gov/challenge)

## Questions

- Technical, marketing, or general
- [Builderschallenge@newportpartnersllc.com](mailto:Builderschallenge@newportpartnersllc.com)