National Building America Challenge

Voluntary Home Energy Performance Initiative

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Department of Energy
RESNET
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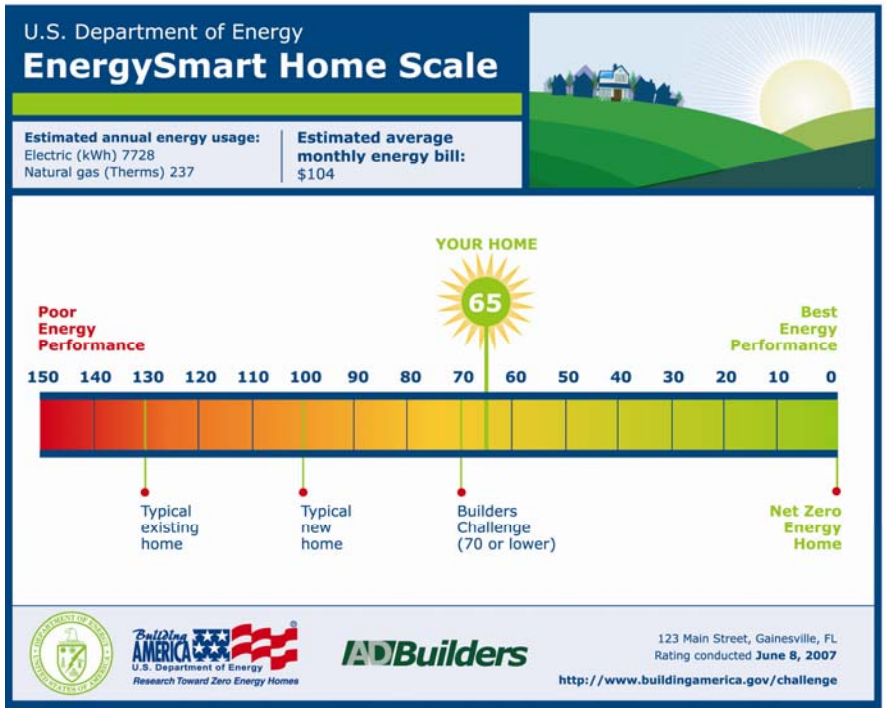
Builders Challenge

DOE has posed a challenge to the homebuilding industry – to build 220,000 high performance homes by 2012. Homes that qualify for the Builders Challenge must be between 70 and 0 on the EnergySmart Home Scale.

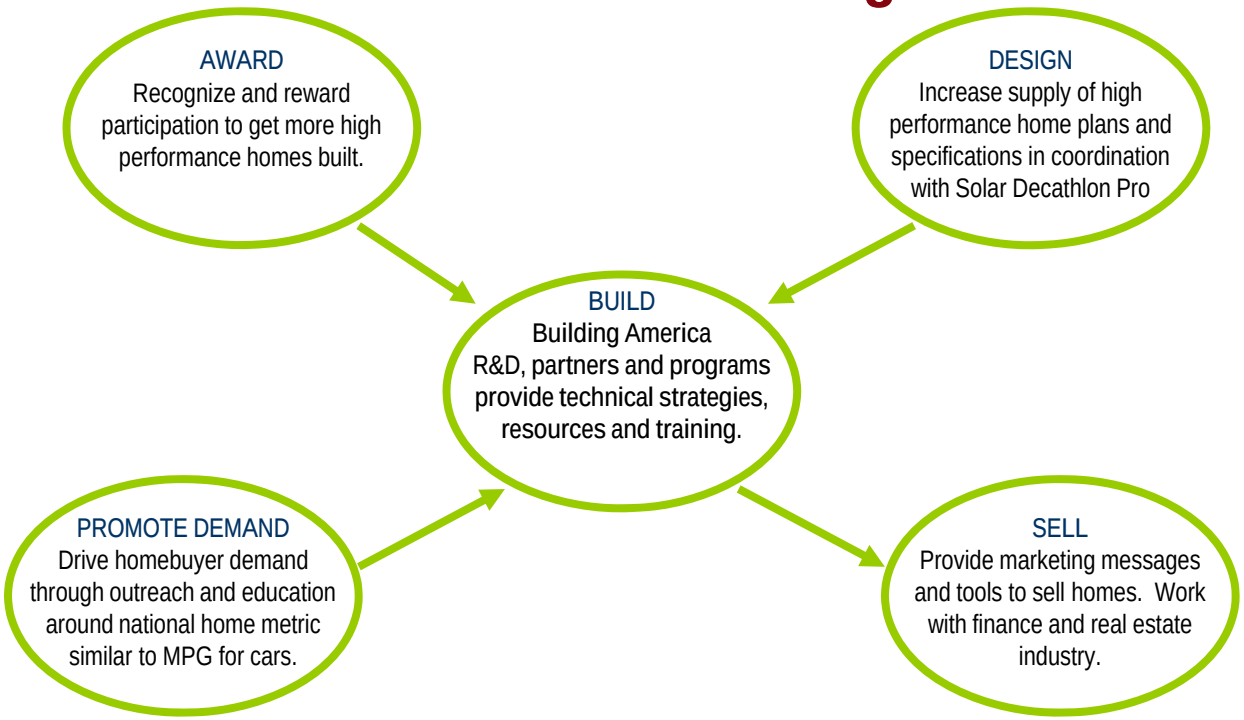


Initiative Goals	2012	2030
EnergySmart Home Scale (E-Scale)	70	0
Cumulative # of Homes from 2008	219K	1.3M
Cumulative Energy Savings (Quads, Primary)	0.015	0.178
Cumulative Energy Cost Savings	$143M	$1.7B
Cumulative Carbon Savings (Million Metric Tons)	0.231	2.799

These numbers are best estimates based on currently available data.

DOE's goal is that by 2030, new home buyers will have the option to buy a cost-effective Net-Zero Energy Home (NZEH) anywhere in the United States.

Builders Challenge



How will the goals be achieved? Through industry partnerships and existing programs, the Builders Challenge will promote the use of market-tested, cost-effective energy efficiency strategies and will support, recognize, and reward builders for achieving higher levels of energy efficiency.

Launch Event –

PROGRAM WAS LAUNCHED AT THE BUILLDER'S SHOW ON FEBRUARY 14, 2008

Palm Harbor Homes will assemble this 3,300 square foot "green home" onsite in the "Professional Builder Show Village."

PARTNERS FOR LAUNCH

Builder Partners Going on Stage

Actus Lendlease, Nashville, TN
Brownsville Affordable Housing Corporation, Brownsville, TX
Castle & Cooke, Florida, LTD, Winter Garden, FL
Chuck Miller Construction, Inc., Hidden Springs, ID
Ferrier Custom Homes, Fort Worth, TX
Florida Custom Homes, Naples, FL
G.W. Robinson Homes, Gainesville, FL
John Wesley Miller Companies, Tucson, AZ
Marc Rutenburg Homes, Trinity, FL
Marquis Construction and Development, Holiday, FL
Martha Rose Homes, Seattle WA
On Top of the World Communities, Inc., Ocala, FL
Palm Harbor Homes, Plant City, FL
Pulte Homes, Las Vegas, NV
Rural Development, Inc., Turners Falls, MA
Schackow Realty and Development, Gainesville, FL
Shroeders Homes, Venice, FL
Skobel Development, Inc., Boca Raton, FL
Stalwart Built Homes, Panama City, FL
Stitt Energy Systems Inc., Rogers, AR
Tommy Williams Homes, Archer, FL

Other Builder Partners

Alvis Projects, Fresno, CA
Artistic Homes,
Centex Homes, Pleasonton, CA
Charter Building and Development Corporation, Albuquerque, NM
Clarum Homes, Borrego Springs, CA
Harvard Communities, Denver, CO
Ideal Homes, Norman, OK
New Tradition Homes, Vancouver, WA
Organum Development (Lily Valley), Hattiesburg, MS
Pinnacle Homes, Las Vegas, NV
Premier Homes, Rancho Cordova, CA
Seastar Homes, Redding, CA
Spain & Cooper Construction, Gainesville, FL
Tiffany Homes, New Mexico
Treasure Homes, Sacramento, CA

Partner Organizations

Northwest Energy Efficiency Alliance
Energy Trust of Oregon
City of Portland Office of Sustainability
Oregon Department of Energy
City of Brownsville, Planning and Community Development Department
Earth Advantage
North American Insulation Manufacturers Association
Cambridge Energy Alliance
Gainesville Regional Utilities

Industry Barriers

Top 5 Reasons Builders Are Not Already Doing This…	How the Builders Challenge Helps…
1.Market Demand People would still rather have granite counter tops	Drive demand through education around the home energy use metric.
2. Cost • Don't believe cost neutral • Economies of scale • Learning curve	Provide proven cost-effective strategies, prescriptive option packages and training
3. Proof/Guarantees • Want data on products/processes • Want to limit liability	Provide case studies, work with manufacturers
4. Unaware of resources Awareness of Energy Star, HERS Index and Building America is minimal	Market availability of resources through industry and consumer media
5. Just don't buy it Some still think it is a fad	Recent market research demonstrates over and over again that homeowners are interested in reducing their energy bills. Given current trends, this is not likely to change.

Technical / Strategic Pathway

Eligible Candidates	Ways to Meet the Challenge	Design & Performance Analysis	Minimum Required Performance	Verification Process
Any U.S. builder of new single-family detached, attached or low-rise multifamily homes	Partner program	Achieve an equivalent level of performance within a partner program	Equivalent performance as defined by the partner program and agreed upon by DOE	Partner specified QA/QC procedure
	Prescriptive	Build to the Builder Challenge – Building Option Package (BC-BOP) for your climate	Meet all BOP criteria for the location	Third-party verification through a HERS rater or other qualified professional or company based QA program
	Performance	Model high performance design using approved software	Build to a maximum E-Scale Index of 70, plus Building America performance criteria	

DOE is working with NAHB, RESNET, EEBA, NASULGC, partner programs in the NW region and many other partners to provide technical information, training and marketing tools to help builders reach advanced levels of energy efficiency in the homes they build. Builders choose the technical path that best meets their needs.

Builder Option Packages (BOPS

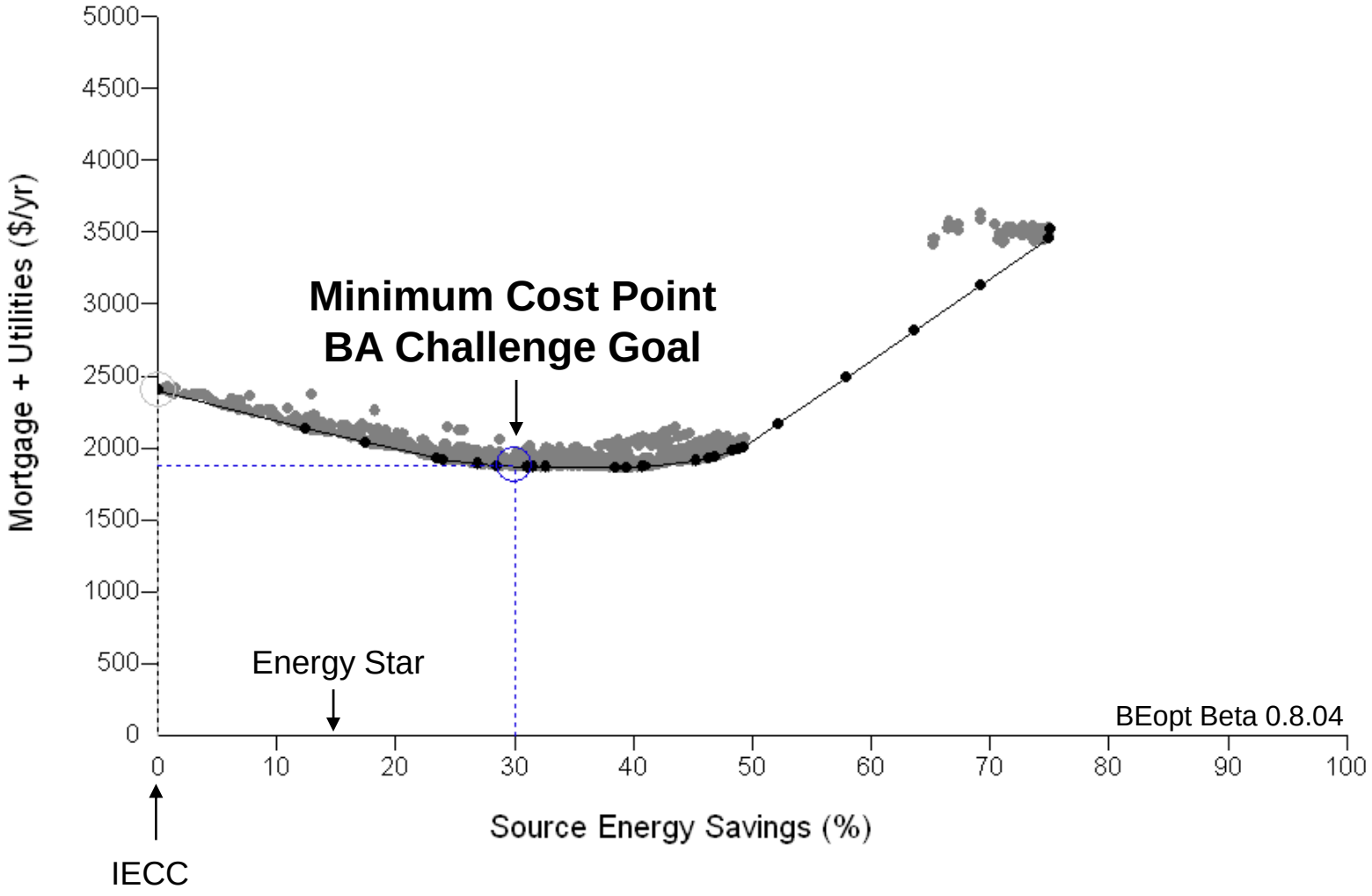
Builder's Challenge Package

High Efficiency Package with Tax Credit

Premium Efficiency Package with Tax Credit and Energy Efficiency

30% Savings Target

(Challenge Goal: Minimum Cost Point, HERS 70)



2000 ft2, 2-story, 16% window to floor area ratio), unconditioned basement
Mixed Humid Climate

Example: 30% Efficiency Package, Mixed Humid Climate[1]

- 2x6 + R-19 batts (R14 wall assembly)
- R40 ceiling assembly
- R10 basement
- .0002 SLA (4 ACH_{50})
- Low e/low SHGC glazing (0.3 U-value, 0.37 SHGC)
- 50% CFL Lighting
- SEER 14 AC
- AFUE 90+ furnace
- Premium gas hot water, EF 0.61
- Tight ducts (Mastic, 5% Leakage), R-8
- BA QA (moisture control, …)

Estimated cost increase relative to standard home[2,3]: +$1.25-$2.00/ft2

Notes:
1. Equivalent packages may be substituted, based on specific builder preferences
2. Does not include costs associated with builder/contractor training and changes in business practices.
3. Incremental costs evaluated relative to IECC

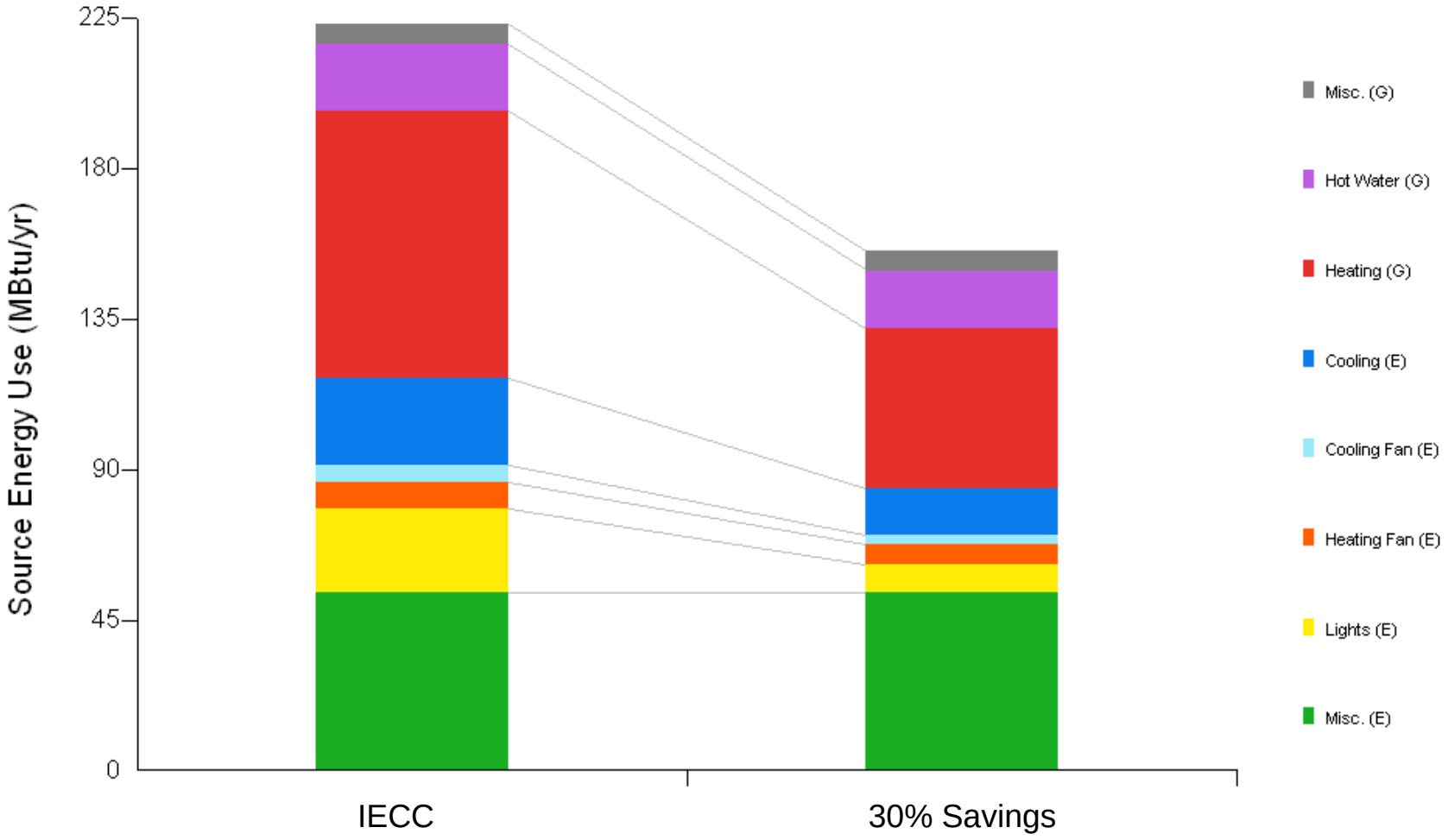
Estimated Annual Cost Savings: 30% Energy Savings Target

Estimated Incremental First Cost Relative to Standard Practice[1]	$4,000
Annual Amortized Cost 7%, 30Year mortgage[2]	$211
Estimated Annual Utility Bill Savings	$723
Net Annual Savings	**$512**

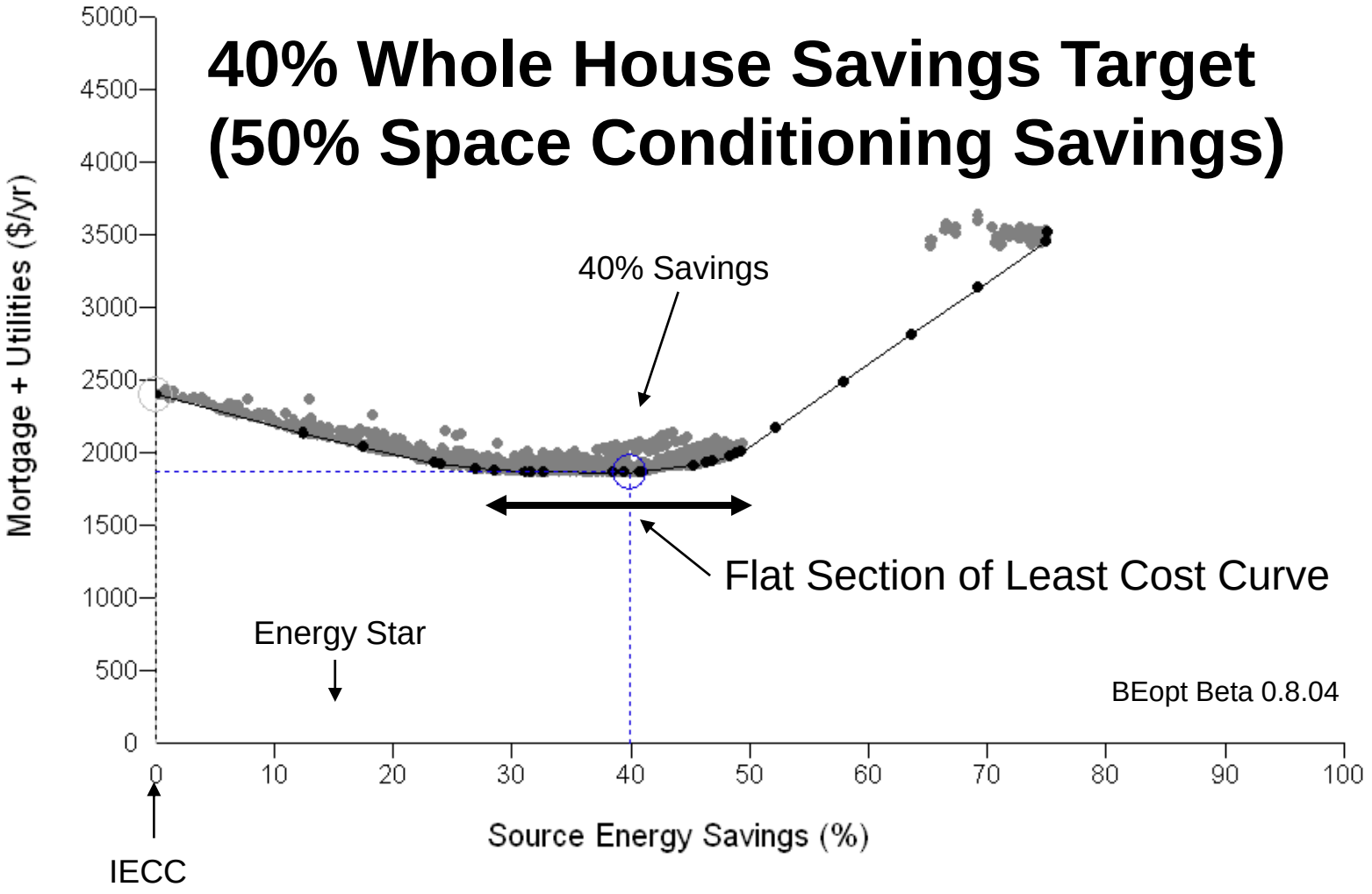
(2000 ft2, 2-story, 16% window to floor area ratio, unconditioned basement)

[1]Evaluated relative to minimum IECC
[2] Assumes 28% marginal tax bracket and includes present value of future replacements of equipment over 30 year life of mortgage.
REA cost of $0.12/kWh

Estimated Annual Energy Savings by End Use: 30% Target



Higher Savings Levels Provide Equivalent Benefits



(2000 ft2, 2-story, 16% window to floor area ratio, unconditioned basement)

Example: 40% Efficiency Package[1]

- 2x6 + R-21 batts (R15 wall assembly)
- R50 ceiling assembly
- R10 basement
- .0002 SLA (4 ACH_{50})
- Low e/low SHGC glazing, Argon Fill (0.28 U-value, 0.37 SHGC)
- 80% CFL Lighting
- SEER 18 AC
- AFUE 90+ furnace
- Premium gas hot water, EF 0.61
- Tight ducts (Mastic, 5% Leakage), R-8
- BA QA (moisture control, …)

Estimated cost increase relative to standard home[2,3]: +$3.00-$4.00/ft2

Notes:
1. Equivalent packages may be substituted, based on specific builder preferences
2. Does not include costs associated with builder/contractor training and changes in business practices.
3. Incremental costs evaluated relative to minimum IECC

Estimated Annual Costs: 40% Efficiency Target

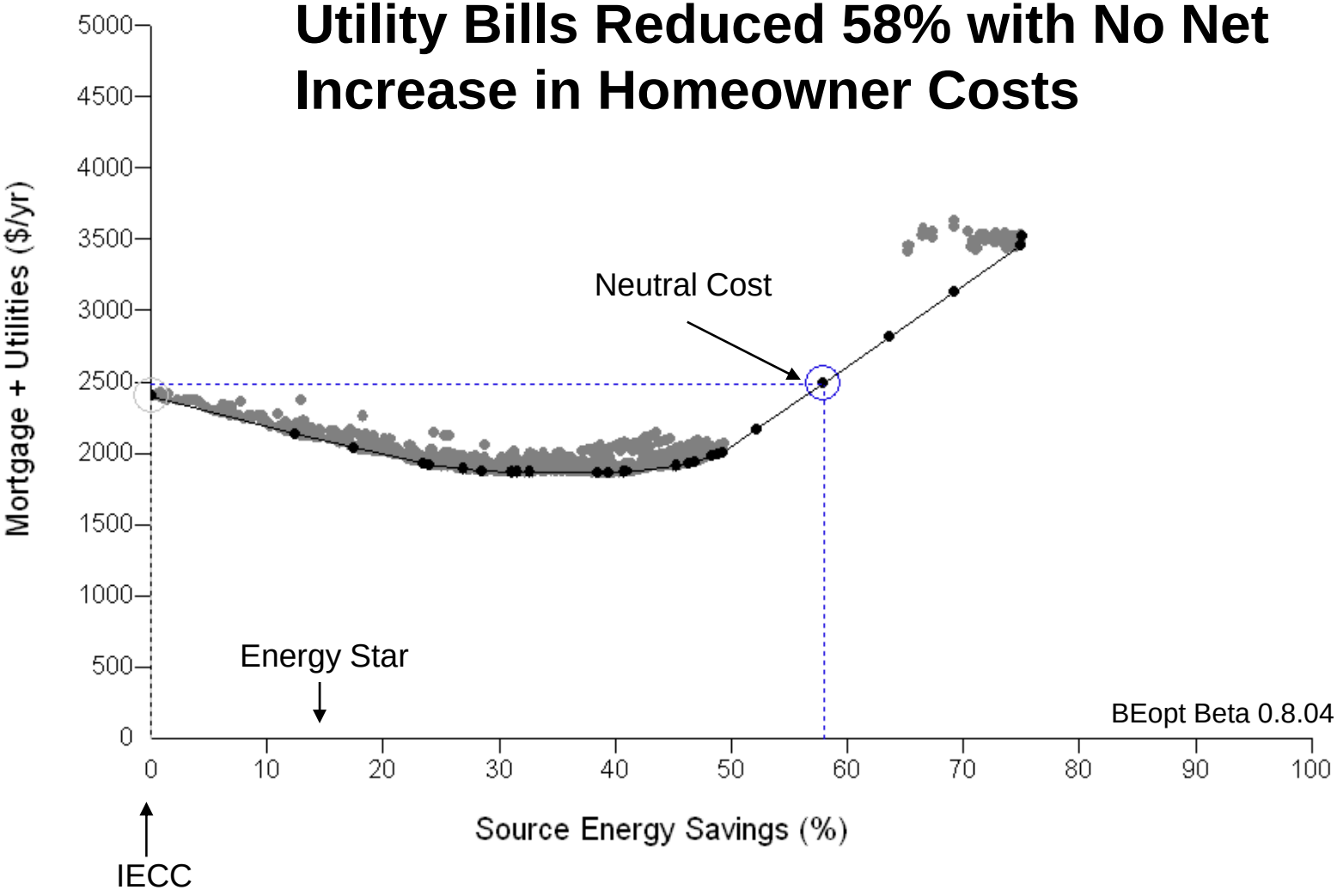
Estimated Incremental First Cost Relative to Standard Practice[1,2]	$7,000
Annual Amortized Cost 7%, 30 Year mortgage[3]	$411
Annual Utility Bill Savings	$919
Net Annual Savings	**$508**

(2000 ft2, 2-story, 16% window to floor area ratio), unconditioned basement

[1]Evaluated relative to minimum IECC. Cost does not include impact of $2000 tax credit.
[2]Qualifies for federal new home tax credit
[3] Assumes 28% marginal tax bracket and includes present value of future replacements of equipment over 30 year life of mortgage.

Neutral Cost Point:

Utility Bills Reduced 58% with No Net Increase in Homeowner Costs



(2000 ft2, 2-story, 16% window to floor area ratio, unconditioned basement)

Example: Neutral Cost Package[1]

- R22 wall assembly (2x6 + R-19 batts+ foam sheathing)
- R50 ceiling assembly
- R10 basement
- .0001 SLA (2 ACH_{50})
- Low e/low SHGC glazing, Argon Fill (0.28 U-value, 0.37 SHGC)
- 80% CFL Lighting
- SEER 18 AC
- AFUE 90+ furnace
- Gas tankless hot water, EF 0.8+
- Tight ducts (Mastic, 5% Leakage), in conditioned space
- Energy Star Appliances
- 1.5 kW_{DC} PV System
- BA QA (moisture control, …)

Estimated cost increase relative to standard home[2,3]: +$10.00-$13.00/ft2

Notes:
1. Equivalent packages may be substituted, based on specific builder preferences
2. Does not include costs associated with builder/contractor training and changes in business practices.
3. Incremental costs evaluated relative to minimum IECC

Estimated Annual Costs: Neutral Cost Target

Estimated Incremental First Cost Relative to Standard Practice[1,2]	$25,000
Annual Amortized Cost 7%, 30Year mortgage[3]	$1386
Annual Utility Bill Savings	$1386
Net Annual Savings	**$0**

(2000 ft2, 2-story, 16% window to floor area ratio), unconditioned basement

[1]Evaluated relative to minimum IECC
[2]Qualifies for federal new home tax credit
[3] Assumes 28% marginal tax bracket and includes present value of future replacements of equipment over 30 year life of mortgage.

DESIGN

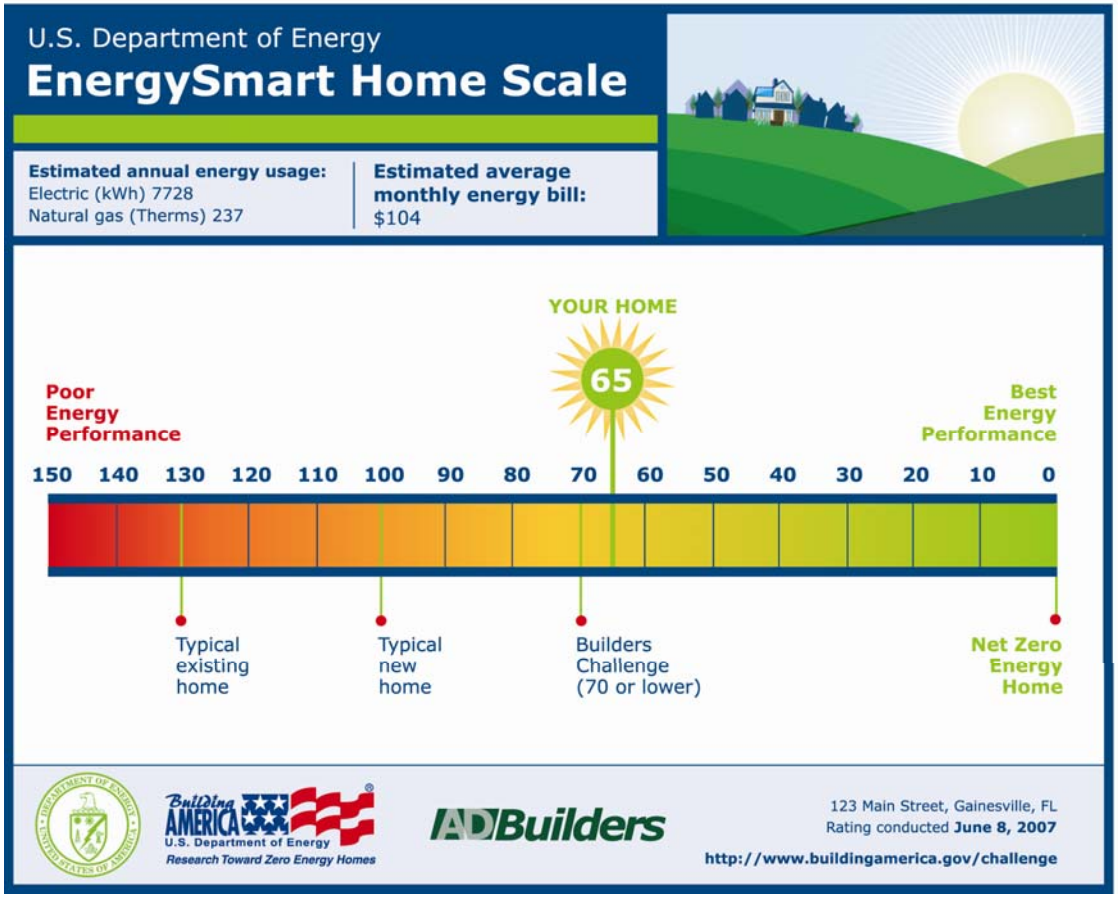
- **Provide builders with designs and strategies to build high performance homes**
  - **Builder Option Packages (BOPs) provide specifications**
  - **Coordinate with NAHB Research Center to award EVHA designers**
  - **Coordinate with Solar Decathlon Pro for designs beyond the current threshold**
  - **Work with designers to make plans**

Technical / Strategic Pathway

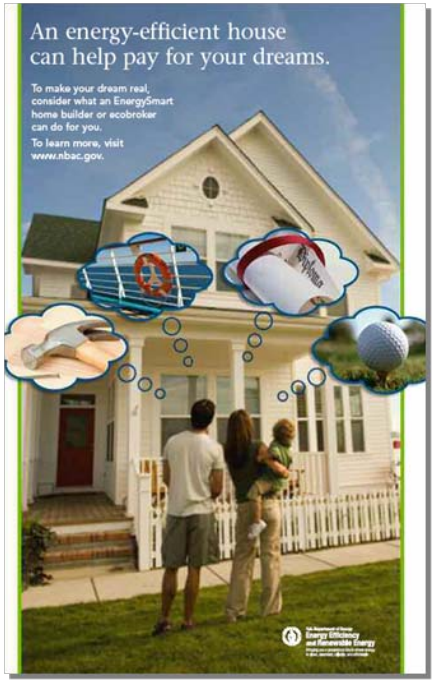
- Work with financial industry
  - Promote currently available products
  - Develop new products
  - Exploring use of Federal loan guarantees
- Work with real estate industry to accurately value and sell high performance homes
  - Ecobrokers and DOE/NAR initiative
  - Appraisers
  - HERS raters
  - NAHB Sales and Marketing
- Establish an Industry nonprofit corporation to promote residential energy efficiency

PROMOTE DEMAND

The EnergySmart Home Scale (E-Scale) allows homebuyers to understand – at a glance – how the energy performance of a particular home compares with others. Through the Builders Challenge, participating homebuilders will have an easy way to differentiate their high performance homes from other products in the marketplace, and to make the benefits clear to buyers.



Technical /Strategic Pathway



PROMOTE DEMAND

AWARD

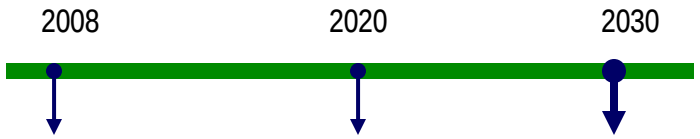
- **Reward builder participants and recognize partners**
  - **National Secretarial Award for Extraordinary Achievement**
  - **Regional awards to achieve local recognition where the sales count.**

ACCELERATION PLAN

These numbers are best estimates based on currently available data.

ACCELERATION TOWARD NZEH	2008	2012	2015	2018	2021	2024	2027	2030
Builders Challenge HERS Threshold	70	60	50	40	30	20	10	0
Cumulative # of Homes	35K	219K	374K	540K	719K	910K	1.1M	1.3M
Cumulative Energy Savings (Quads, Primary)	0.002	0.015	0.029	0.047	0.071	0.100	0.135	0.178
Cumulative Energy Cost Savings from 2008	$21M	$143 M	$280 M	$461 M	$690 M	$975 M	$1.3B	$1.7B
Cumulative Carbon Savings (Million Metric Tons)	0.034	0.231	0.451	0.742	1.112	1.571	2.129	2.799

Current Threshold:
- Challenging but achievable
- Meets Federal energy tax credit in most regions

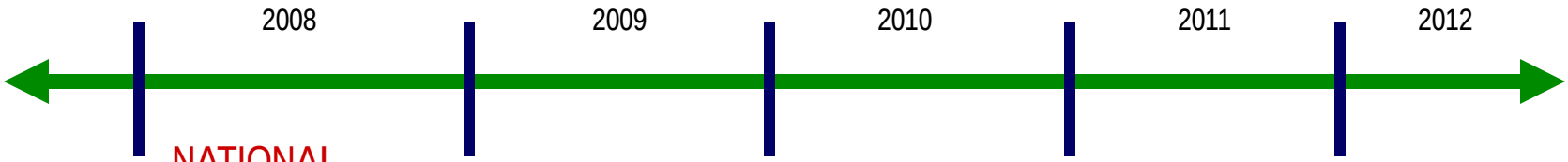


Builders Challenge: 30-40% above code and 15% above Energy Star

Building America Achieves NZEH

Builders Challenge – NZEH available across nation

Performance Metrics and Milestones



NATIONAL LAUNCH

Consumer education campaign

Begin regional roll-outs

Recruit, train and support builders

Recruit program, utility, manufacturer, state and local government, trade, education, and non-profit partners

- Re-assess goals
- Prepare for next efficiency threshold

- Automate the E-Scale label
- Develop more Builder Option Packages (BOPs)
- Develop/revise easy to use software
- Develop partnerships with financial and real estate industry
- Add carbon footprint to label
- Resolve MELs calculation
- Explore non-profit administrative organization

DOE Office of Building Technologies
Moving Energy Efficiency and Renewables into the Mainstream

Thank you