

Time of Sale Labeling of Homes

A Concept Proposal
For a Six-Point Labeling Scheme

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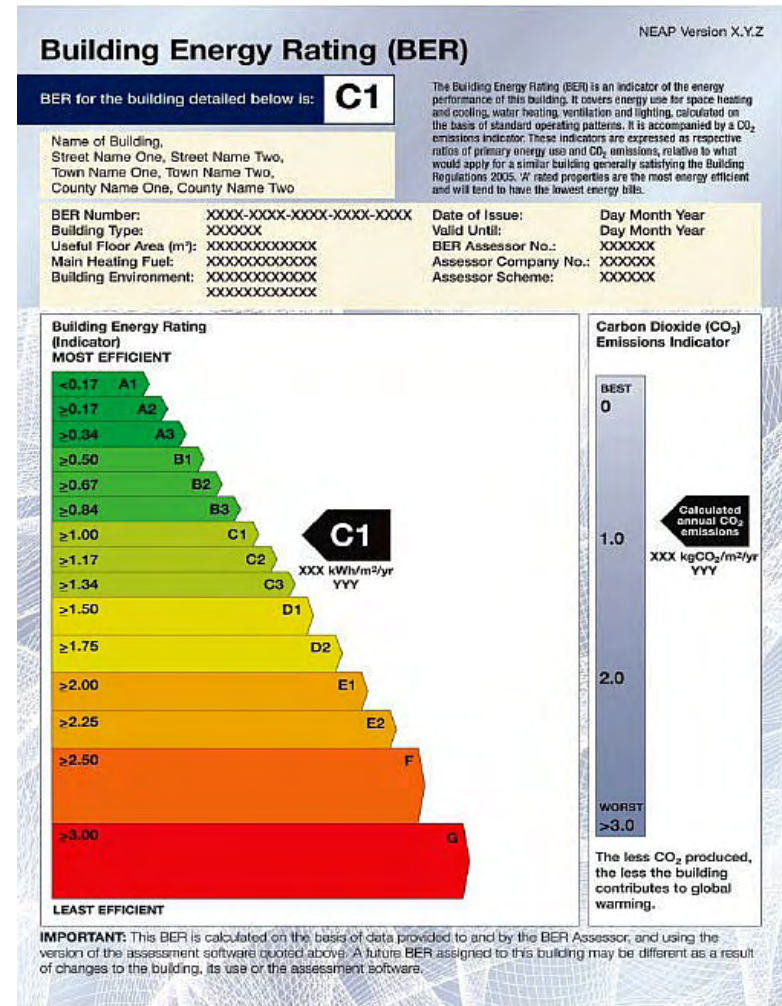


Background

- Buildings comprise 40% of U.S. primary energy use
- Buildings comprise 70% of U.S. electricity use
- Approximately 130 million U.S. existing dwellings
- New homes constructed this year will constitute less than one percent of the existing stock (i.e. more than 100 years to replace)
- The simple fact: to achieve a significant reduction in building energy use requires the retrofit of existing building stock.

The European Union's EPBD 2

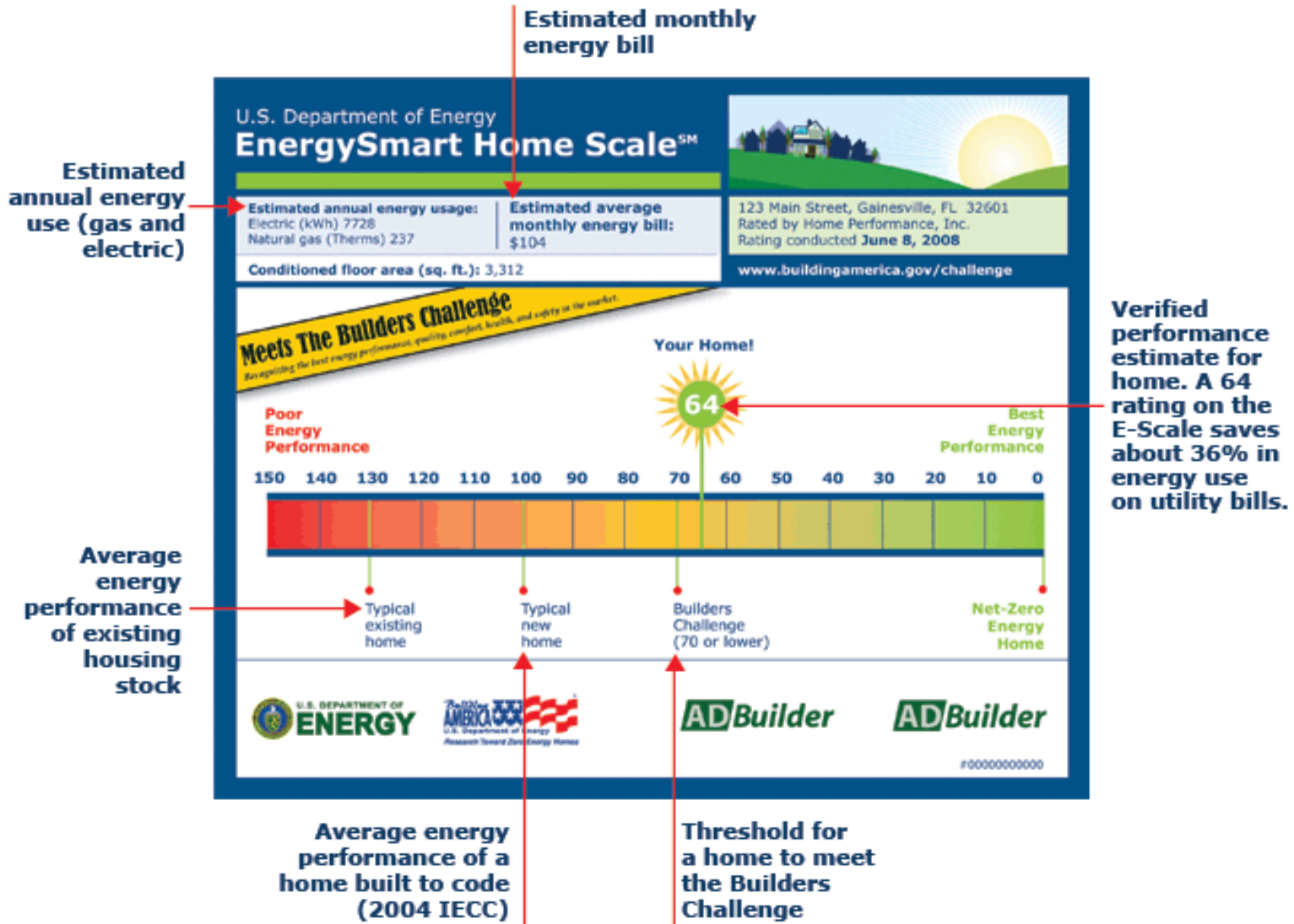
- Mandatory energy labeling of all buildings (new and existing)
- Harmonized calculation procedures for “cost optimized” construction
- By 2020 all new buildings will have to consume “nearly zero energy”
- Increased detail and rigor and additional QA controls for all certificates
- Mandatory penalties for non compliance.



U.S. History

- Voluntary, market-based approach using RESNET Standards (HERS Index) for qualification
- Largely used for new building “beyond code” programs
 - EPA Energy Star program
 - DOE Builders Challenge program
 - State, local and utility programs
- Surprisingly successful in new homes market
 - Energy Star has reached more than 1 million homes
 - Builders Challenge has exceeding all expectations
- However, there has been little to no rating or labeling of existing housing stock

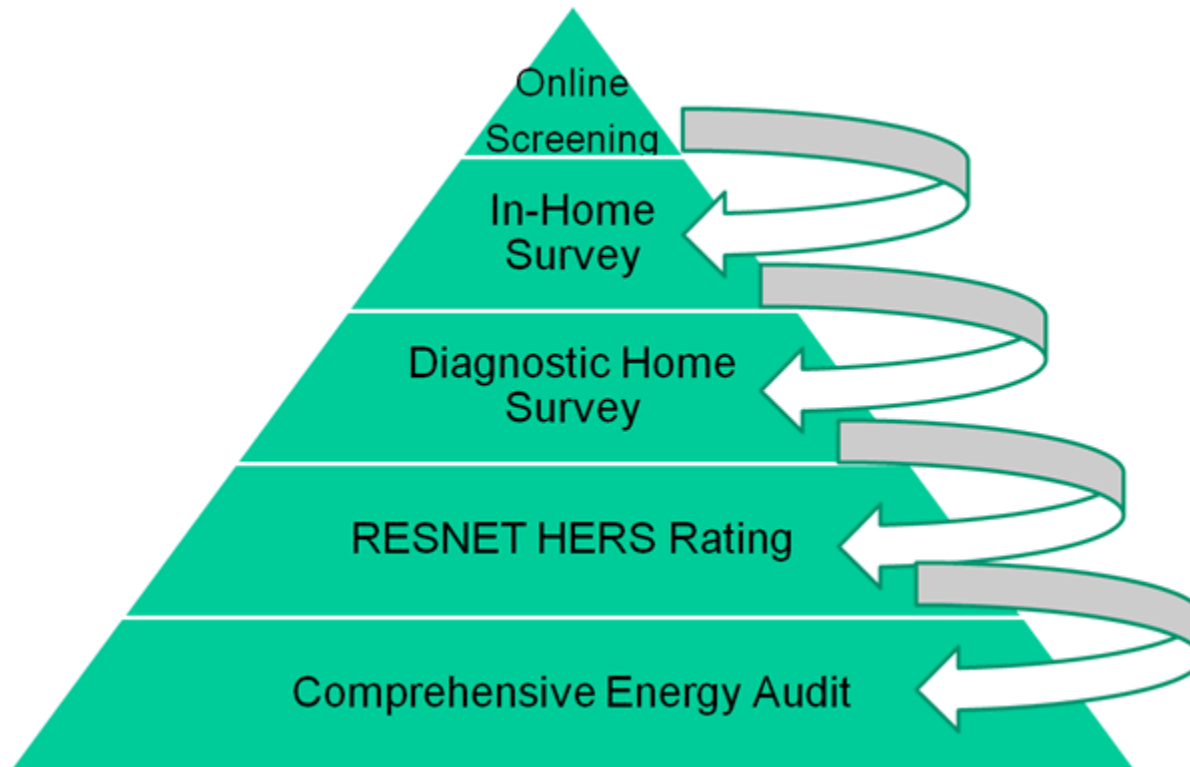
The DOE E-Scale (Rating)



Granularity – What Matters?

- Fine granularity (greater accuracy and precision) comes at greater cost
- Coarse granularity (lesser accuracy and precision) comes at lesser cost
- The old saw – pick any two:
 - Get it Quick
 - Get it Cheap
 - Get it Right
- But . . . “a difference, to be a difference, must make a difference”
- Will coarse granularity get some jobs done?

DOE's Hierarchy of Granularity



Labels versus Ratings

- Time of Sale Energy Labels
 - Course differentiation may be sufficient
 - Decision making tool for home purchasers
 - Must be considered trustworthy by consumer
 - Must be available prior to listings
 - Cost matters (130 million existing dwellings)
- Energy Ratings
 - Much finer differentiation required
 - Independent verification and QA very important
 - Mortgage risk assessment and reduction
 - Finance industry accuracy requirements
 - Energy and carbon reduction accounting

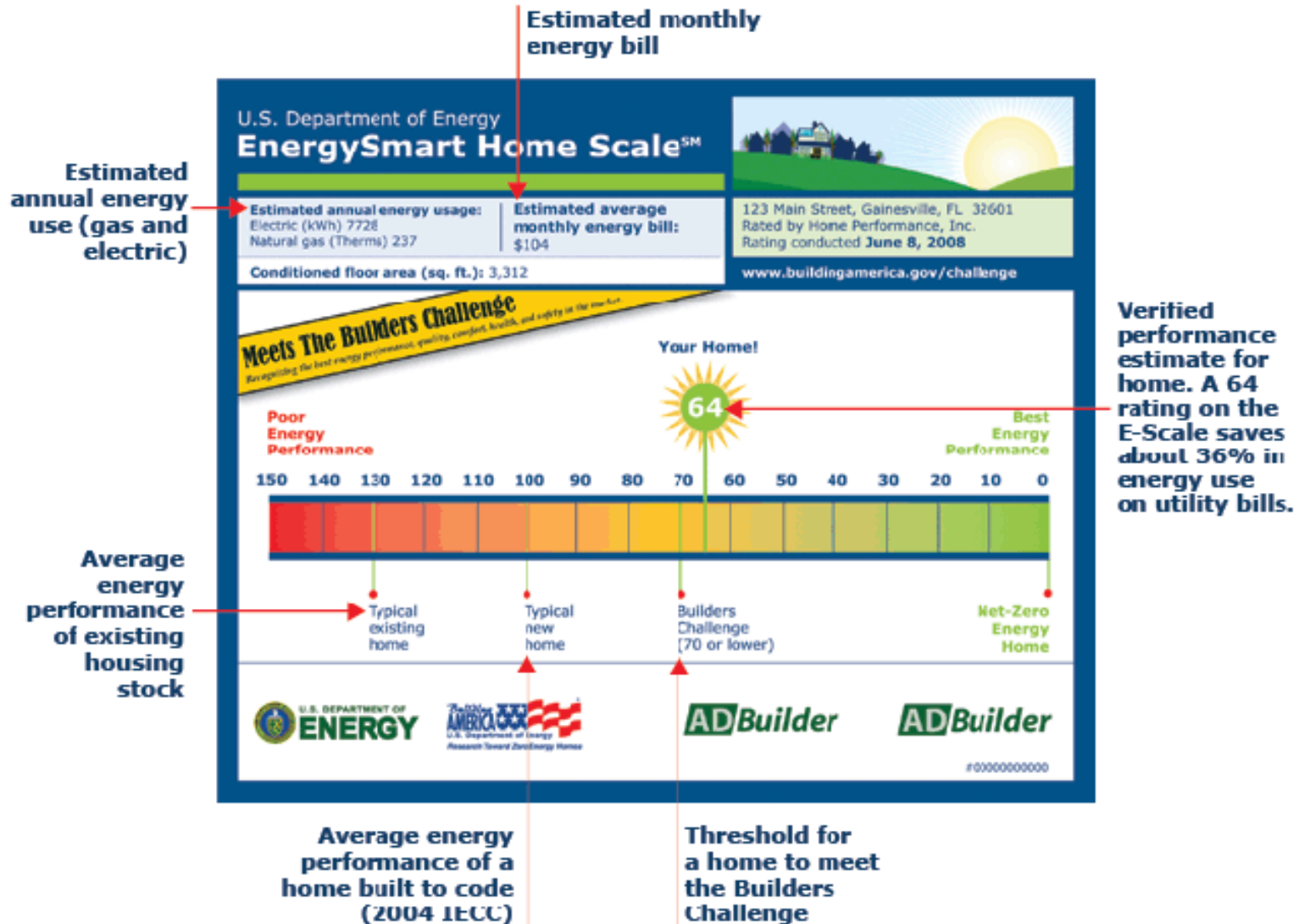
The Cost Issue

- Home Energy Ratings are expensive
 - On average, \$400 to \$600 per home
 - Most of expense for building take-offs, analysis of alternatives, field inspections, testing and QA
- Only minimal expense is associated with actually “calculating the Rating”
 - Virtually all expense due to determining the inputs required by software tools
 - If these expenses can be minimized, calculating “Rating” is virtually free (a few seconds of computer time).

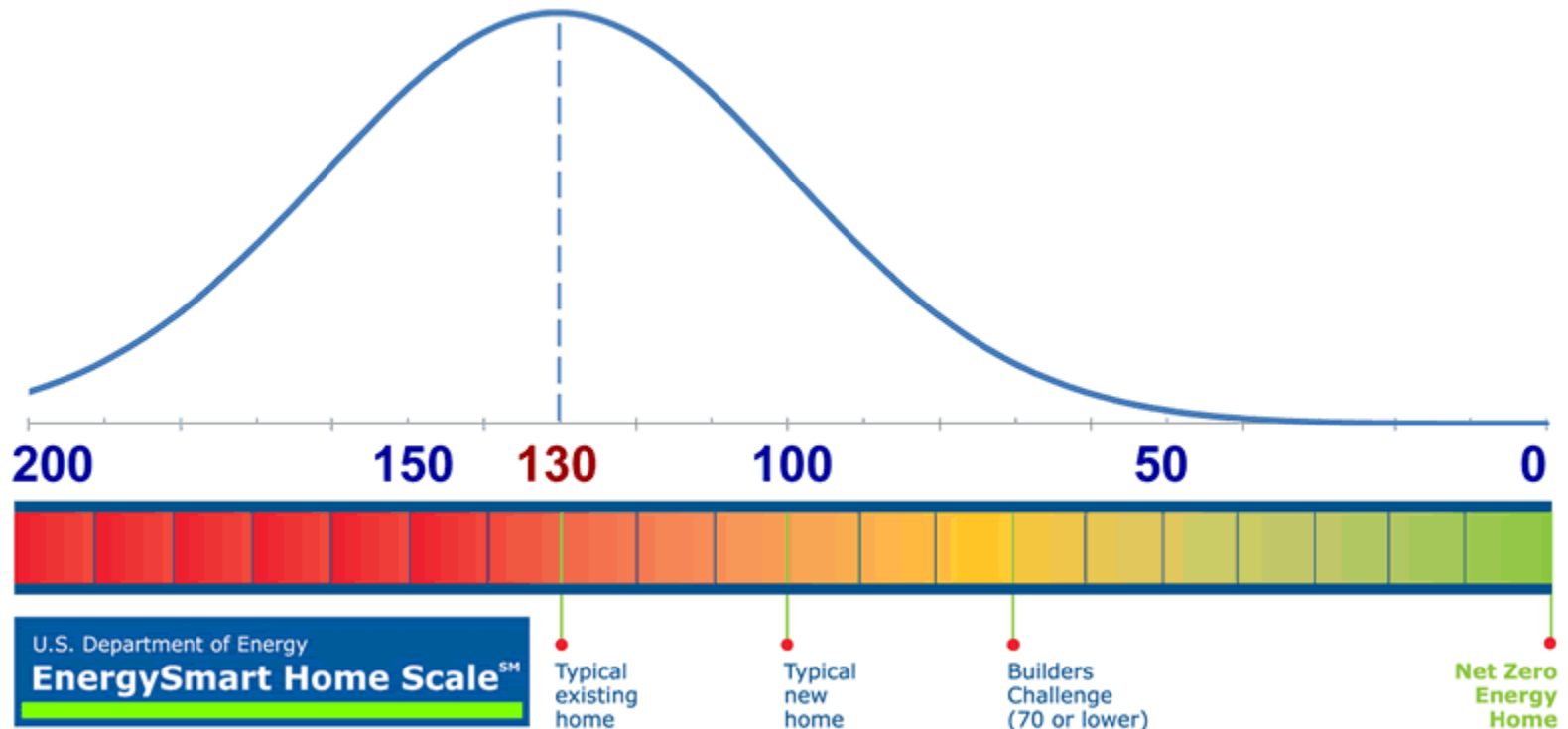
What If . . .

- . . . there is a way for software tools to automatically generate a large number of the required building inputs?
- . . . we are willing to accept a label granularity with an accuracy of $\pm 10\%$?
- . . . we can establish a reasonable set of standardized building assumptions informed by local or regional construction characteristics?

The DOE E-Scale (Rating)

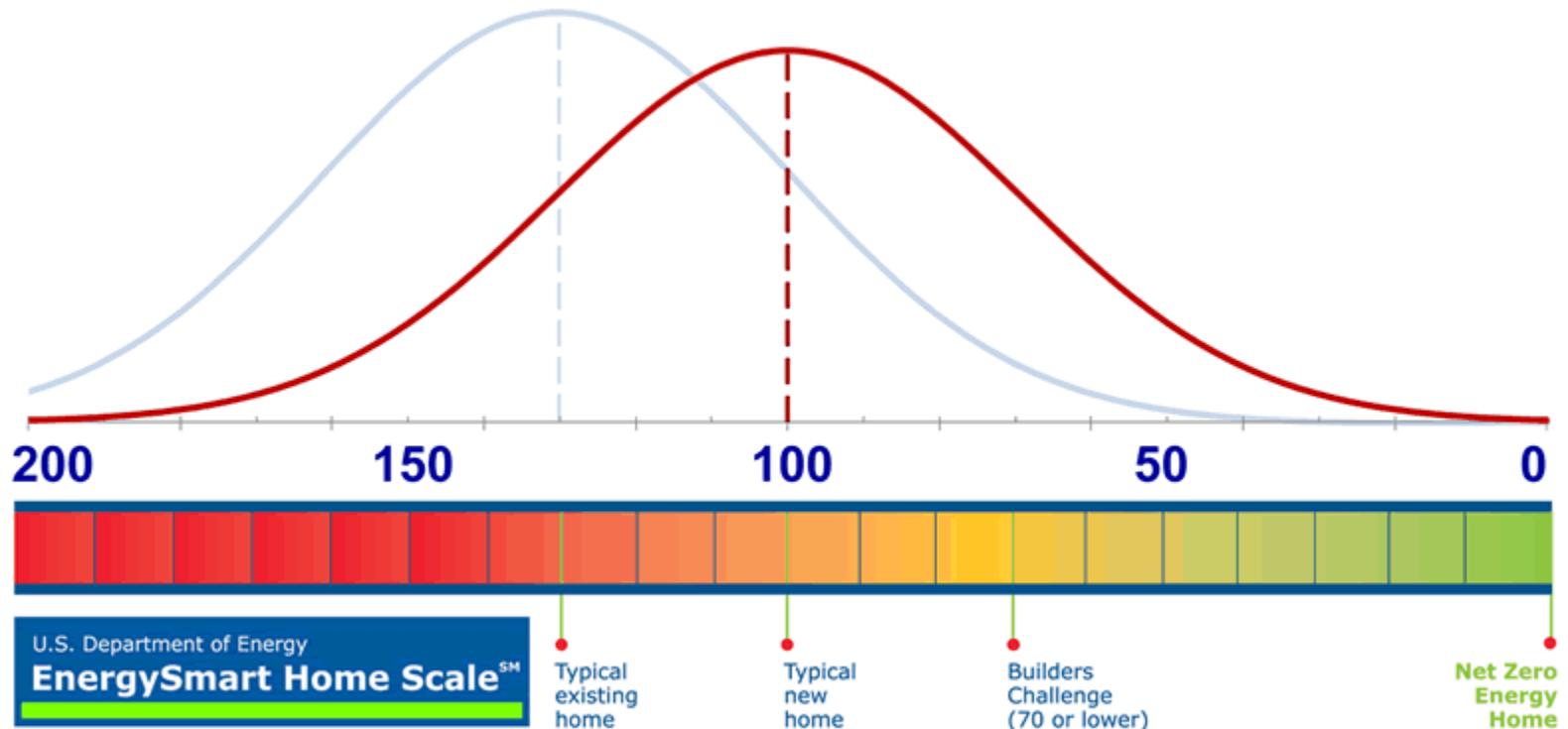


Let's Assume DOE Got it Right



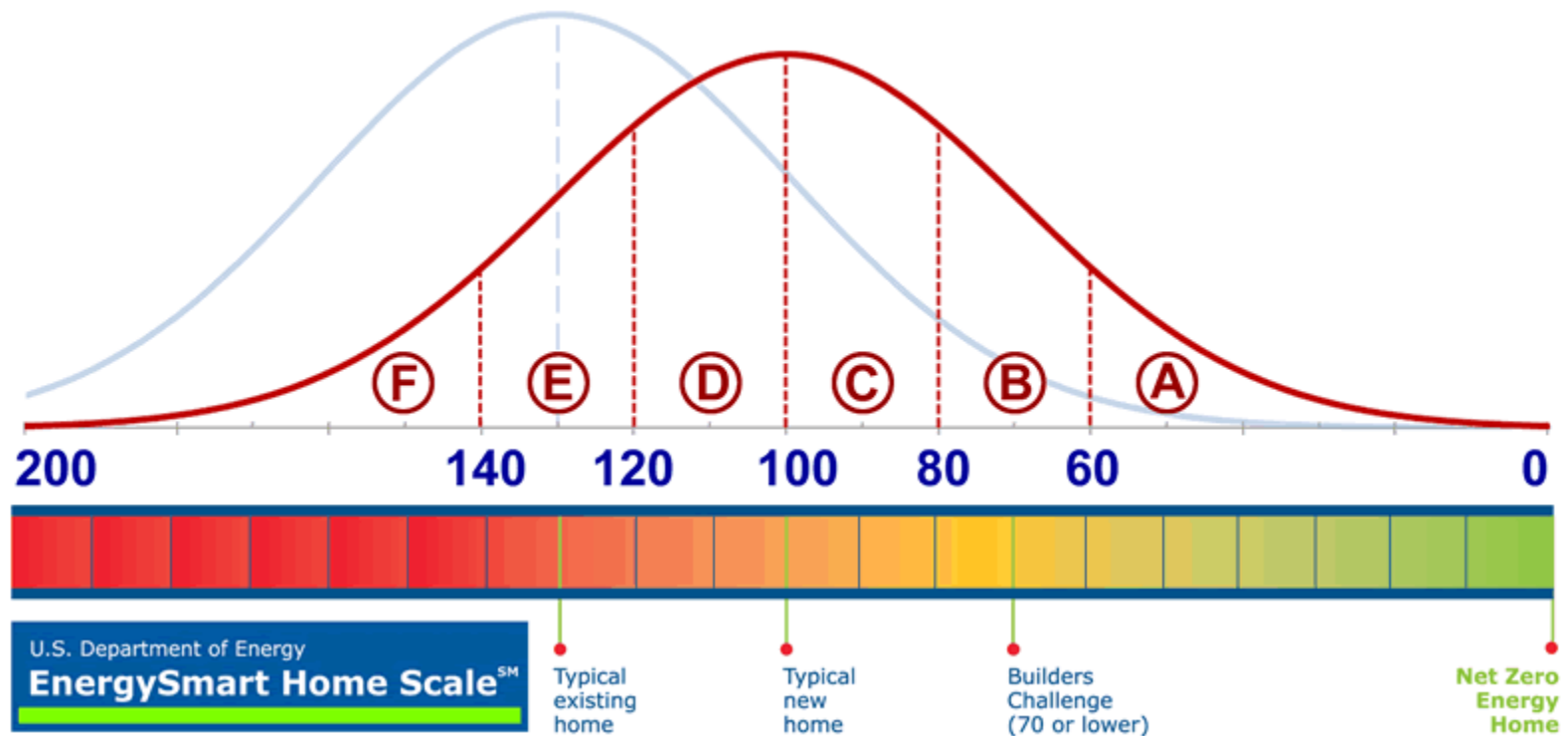
And assume a normal distribution of efficiency around a mean of 130 (typical existing home)

Set An Aspirational Goal



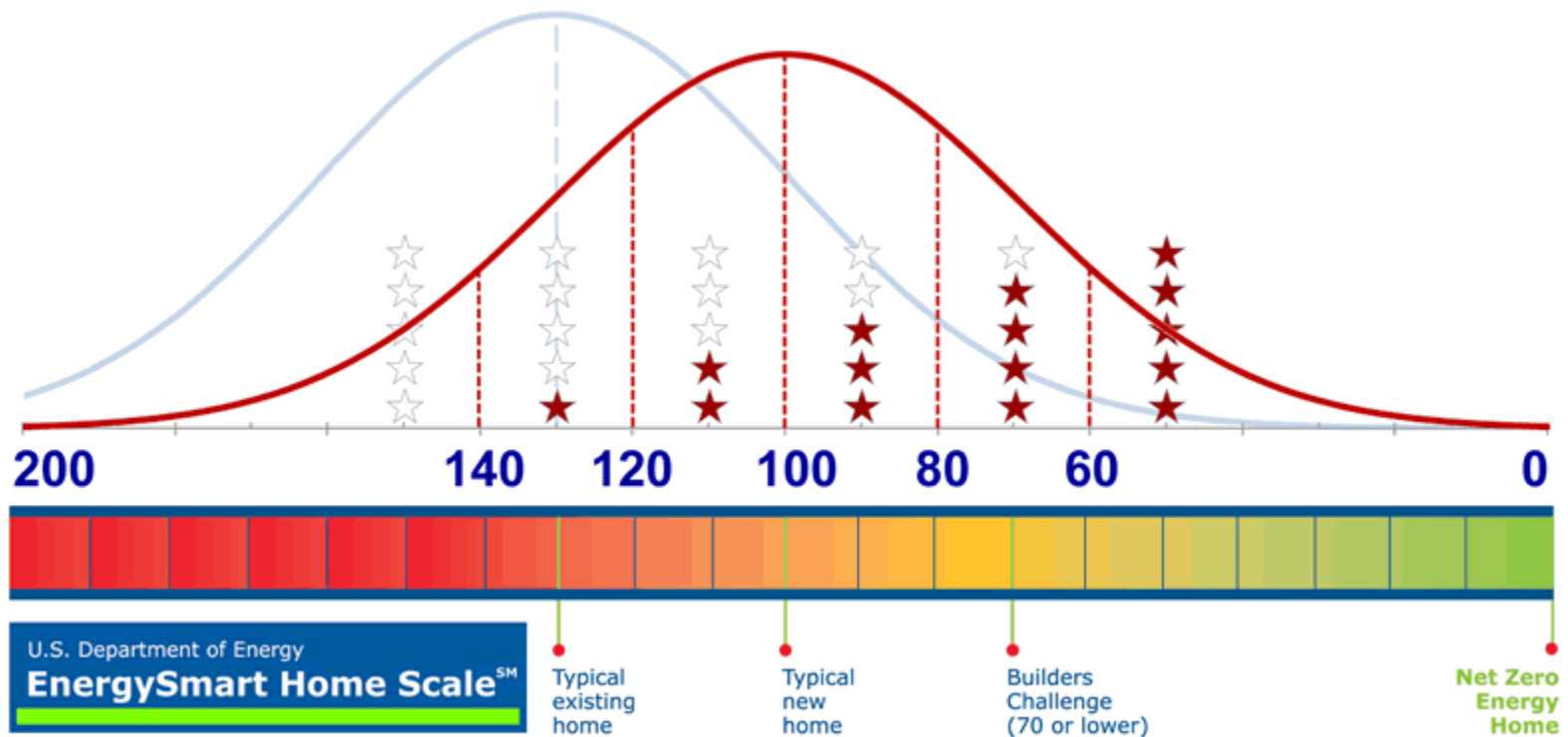
Goal: move the normal distribution of energy efficiency to 100 (typical new 2006 home)

Establish Bins for “Grades”



Make it hard to get ‘A’ and make ‘C’ correspond roughly to 2009 IECC code compliance

Or Use a 5-Star System




5-star system in wide use – virtually everywhere on the Internet for ratings of all kinds.

EnergySmart "Rating"

U.S. Department of Energy
EnergySmart Home ScaleSM

Estimated annual energy usage: Electric (kWh) 8019 Natural Gas (ccf) 100	Estimated annual energy bill: \$95
Conditioned floor area (sq. ft.): 1508	




123 Main Street, Sunny, FL 33333
 Rated by **My Home Energy Rater**
 Rating conducted **February 15th, 2010**

www.buildingamerica.gov/challenge

Meets The Builders Challenge
Recognizing the best energy performance, quality, comfort, health and safety in the market.

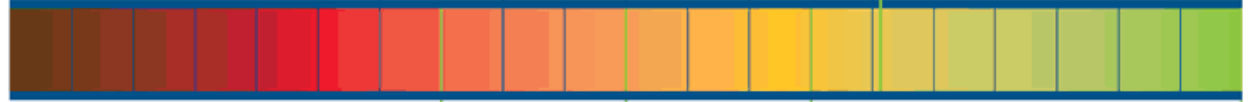
Your Home!



59

Poorest Energy Performance **Best Energy Performance**

200 180 160 140 120 100 80 60 40 20 0




Typical existing home


Typical new home


Builders Challenge (70 or lower)


Net Zero Energy Home



U.S. DEPARTMENT OF
ENERGY








EnergySmart "Label"

U.S. Department of Energy
EnergySmart Home ScaleSM



Estimated annual energy usage:
 Electric (kWh) 9,000 - 12,000
 Natural Gas (ccf) 100 - 130


Estimated annual energy bill: \$95 - \$130

123 Main Street, Sunny, FL 33333
 Rated by **My Home Energy Rater**
 Rating conducted **February 15th, 2010**

Conditioned floor area (sq. ft.): 1508

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Your Home!




Typical existing home

Typical new home

Builders Challenge (70 or lower)

Net Zero Energy Home



U.S. DEPARTMENT OF
ENERGY

ADBuilder

ADBuilder

ADBuilder

Many Remaining Questions

- What will be minimum data requirements?
 - ✓ Will square footage, # stories, # bedrooms, foundation type, wall type, window area estimate, year of construction and climate location suffice?
 - ✓ What else should be required: HVAC, hot water?
- What will be standard modeling assumptions?
 - ✓ What will be assumed for: ceiling height, window-floor-area ratio, window distribution, length-to-width ratio, roof/attic type?
 - ✓ How will orientation be handled? Actual, worst case, or average of all orientations?
 - ✓ What will be the standard HVAC and hot water system assumptions?

Tuesday Session

“Streamlining Energy Analysis by
Standardizing Assumptions . . .”

1:30 – 3:00

Capitol Ballroom F



Thank You