

# DOE Zero Energy Ready Home

2014 Building Technologies Office Peer Review



U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

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# DOE Zero Energy Ready Home (ZERH) Summary

## Timeline:

Start date: 2013

Planned end date: 2022

## Key Milestones

1. 2014: 1,500 Certified Homes (Lift-off)
2. 2022: 50,000 Certified Homes (Hand-off)

## Budget:

Total DOE \$ to date: \$1.35 million  
(cumulative from FY 2012 to 2014)

Total future DOE \$: \$3.6 million  
(projected FY 2015 thru 2022)

## Target Market/Audience:

Target Market: Residential New Homes  
Core Customer: U.S. Home Builders  
End Customer: Homebuyers

## Key Partners:

Meritage Homes	HouZE
New Town Builders	Carl Franklin Homes
Palo Duro Homes	Lifestyle Homes
Garbett Homes	Streetscape LLC
Stapleton Development	Nexus Energy Homes

## Project Goal:

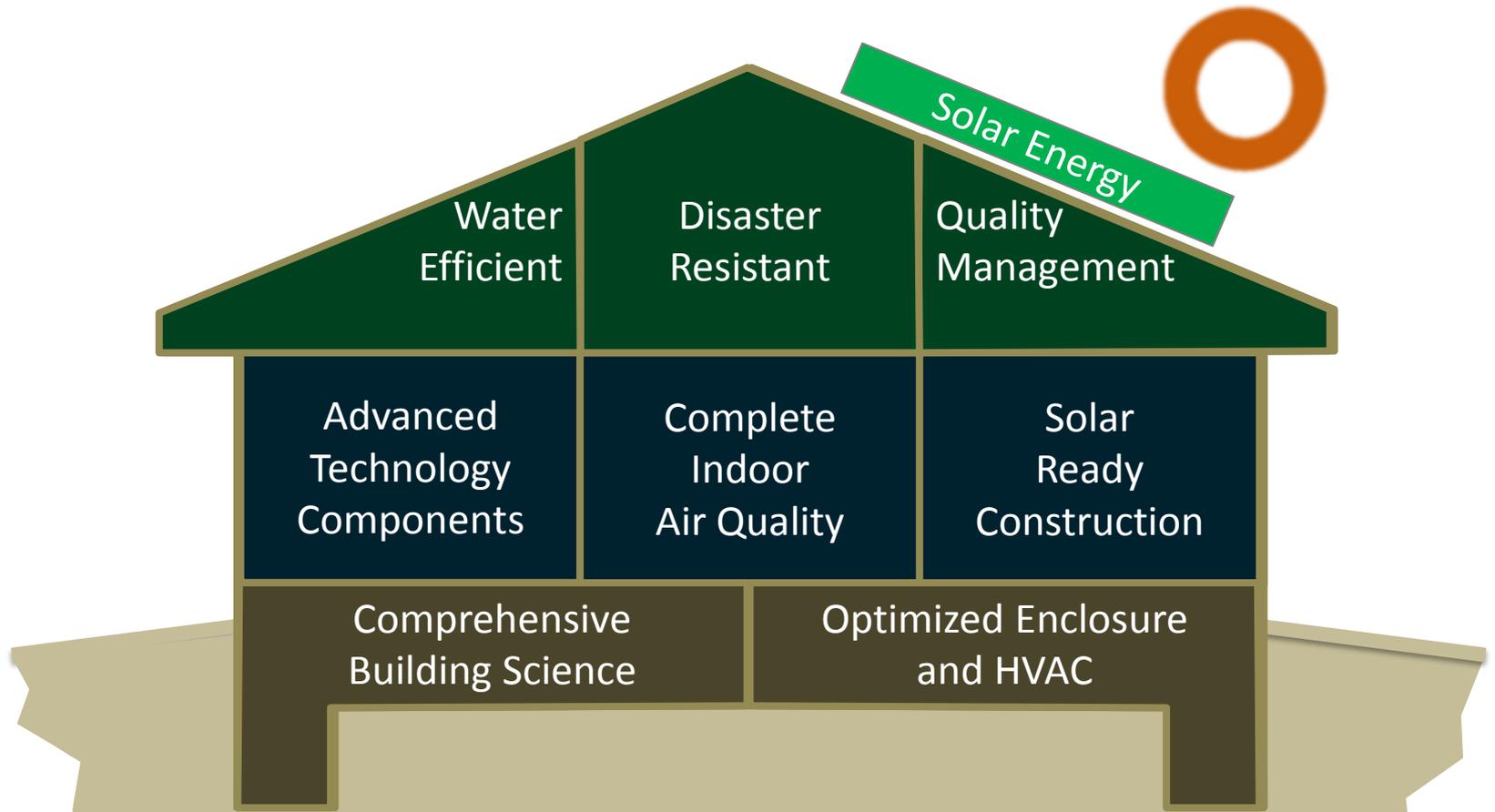
Transform the housing market to high-performance homes so energy efficient they can offset most or all annual energy consumption with renewable energy. This will be achieved by effectively delivering proven innovations from the DOE Building America Program that deliver 40 – 50% savings above 2009 IECC while effectively managing builder and homeowner risks.

# DOE ZERH Problem Statement

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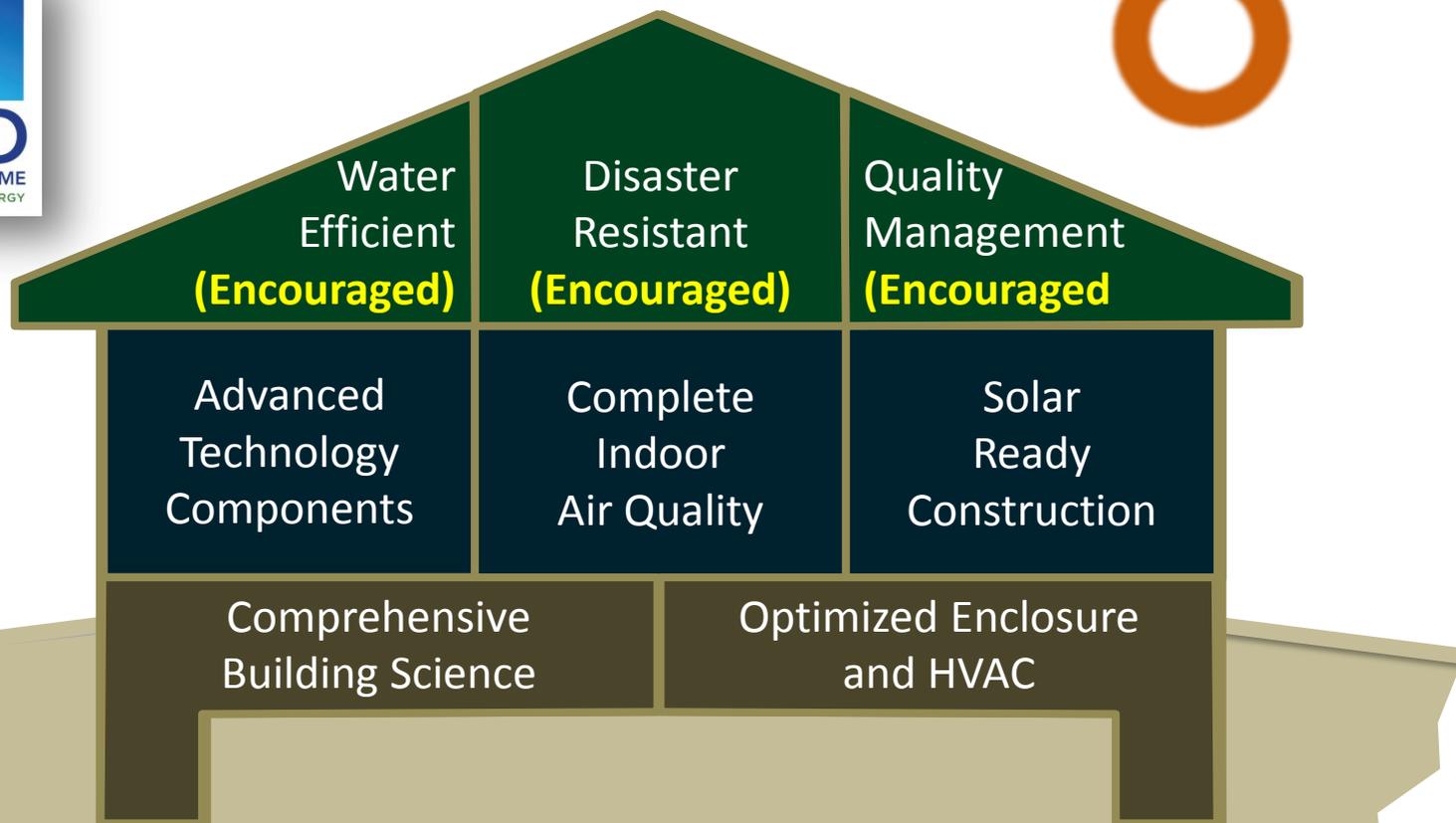
The U.S. Housing industry is extremely slow to adopt **proven innovations** from DOE's Building America program that provide compelling **benefits to homeowners, builders, and our nation.**

# DOE ZERH Purpose



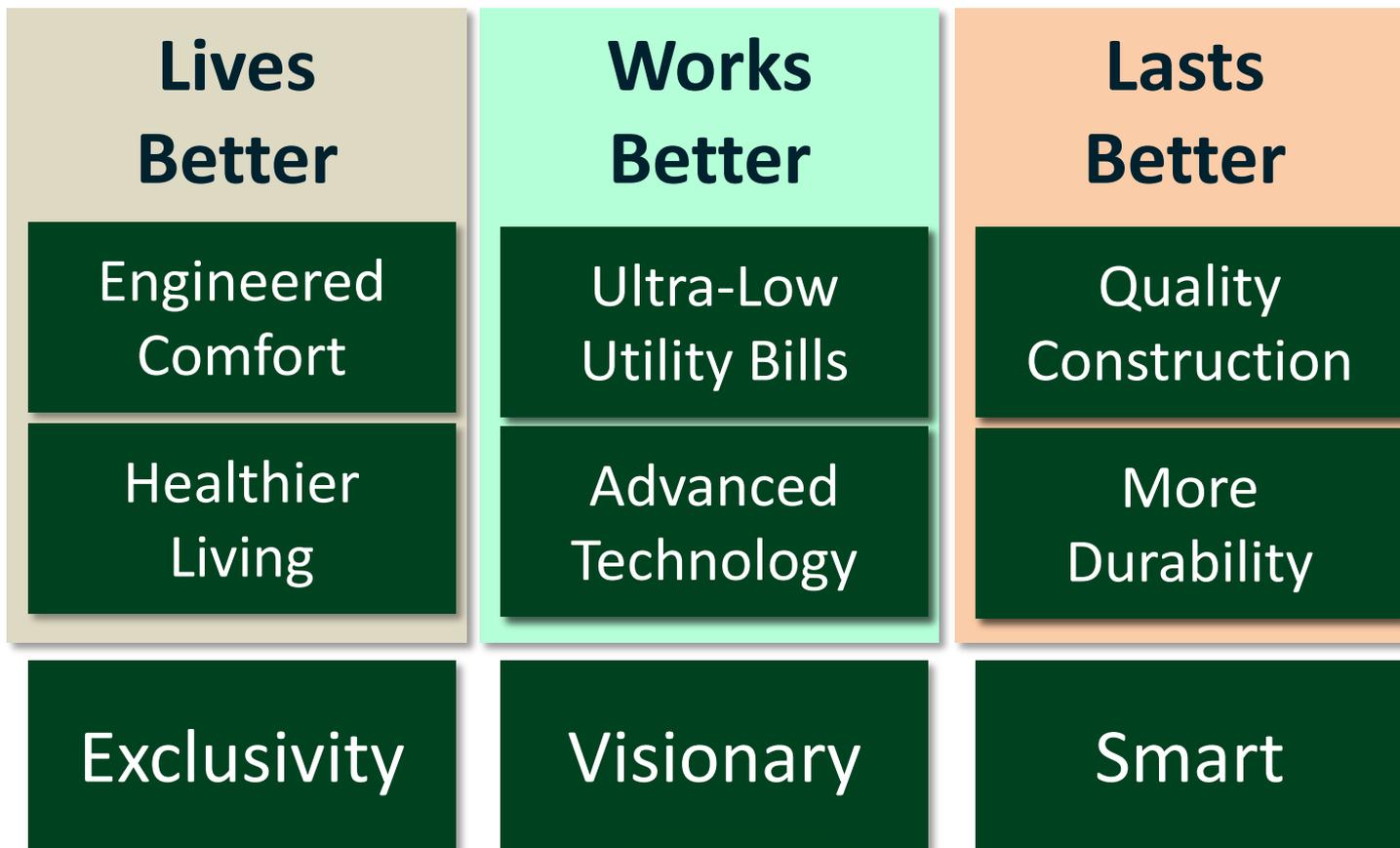
DOE Zero Energy Ready Home will transform new housing to eight complete systems critical to ensuring comfort, indoor air quality, durability, and safety along with energy efficiency.

# DOE ZERH Purpose



DOE Zero Energy Ready Home will transform new housing to eight complete systems critical to ensuring comfort, indoor air quality, durability, and safety along with energy efficiency.

# DOE ZERH Project Impacts: Homeowners



**Less Risk**

**Greater Differentiation**

**Exceed Consumer Expectations**

# DOE ZERH Project Impacts: Nation

**~\$250 Billion** utility bill savings

**~2.3 Million** job years created

**~2,000 MMTOE** carbon savings

**~80 Million** barrels imported oil saved/yr.

\* Internal DOE study of Challenge Home Market Transformation to 30% market penetration

# DOE ZERH Target Market and Audiences

## Target Market:

- Top 100 Largest Production Builders (60%+ of market up from 17% in 1994)
- Affordable Housing

## Audiences:

- Home Builders (core customer)
- Homebuyers (end customer)
- HERS Raters (sales force)
- Regional Home Builder Associations (sales force)
- Utility and State Programs (distributors)

# DOE ZERH Project Milestones

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**2013: Launch** – Fully Vetted Specification

**2014: Lift-Off** – 2,000 Homes

**2016: Traction** - 10,000 Certified Homes

**2019: Growth** - 25,000 Certified Homes

**2022: End** - 50,000 Certified Homes, 5% Mkt. Pen.

**Exit Strategy:** Hand-Off to ENERGY STAR for Homes

# DOE ZERH Approach: Energy Star for Homes (ESfH) Playbook



# DOE ZERH Approach: Apply ESfH Playbook - Lift-off

## Product:

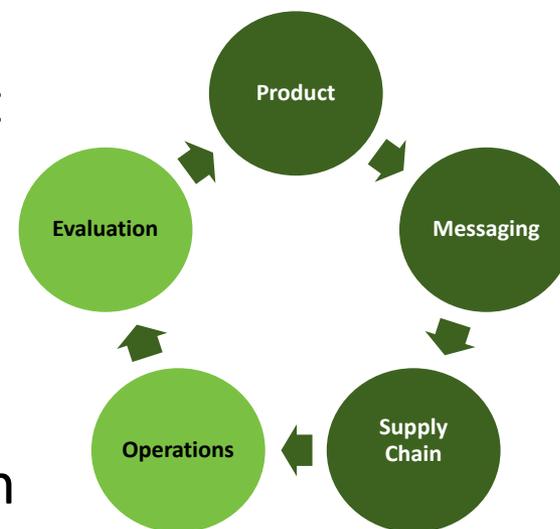
- Label that ensures proven Building America Innovations in every home.
- Label that ensures **high-performance** home so **energy efficient**, all or most annual energy consumption can be offset by renewable energy

## Messaging:

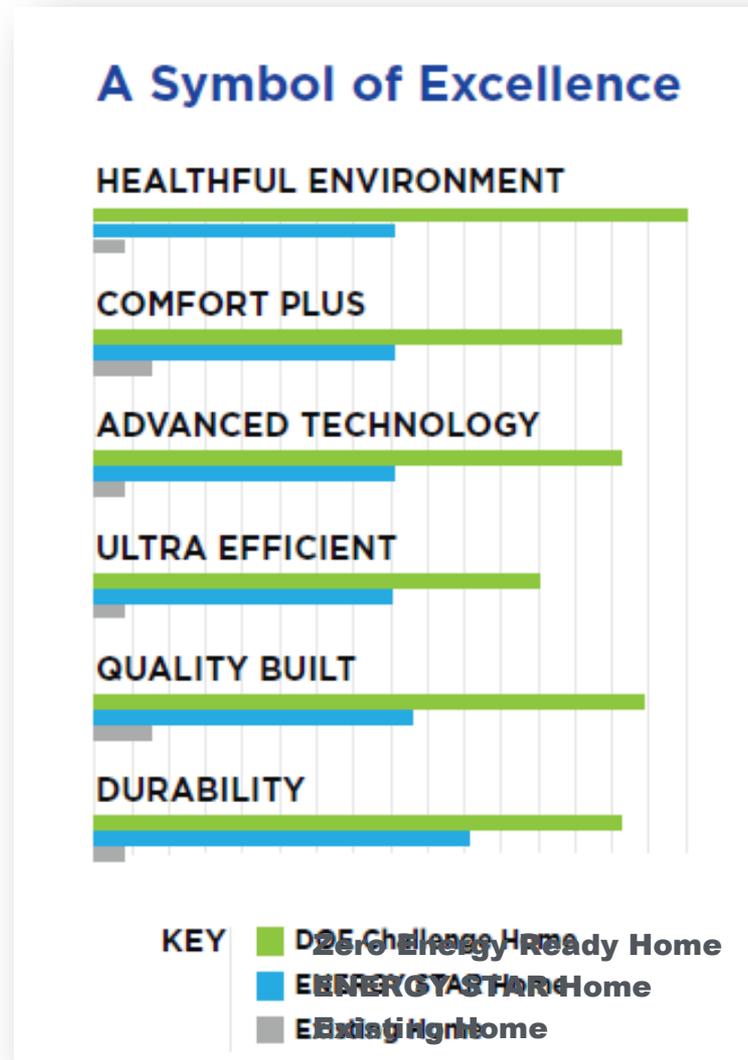
- Hard Trends point to ZERH with Certainty
- ZERHs is an easy jump from Energy Star providing profound market differentiation
- All techs./practices for ZERH are proven

## Supply Chain Strategy:

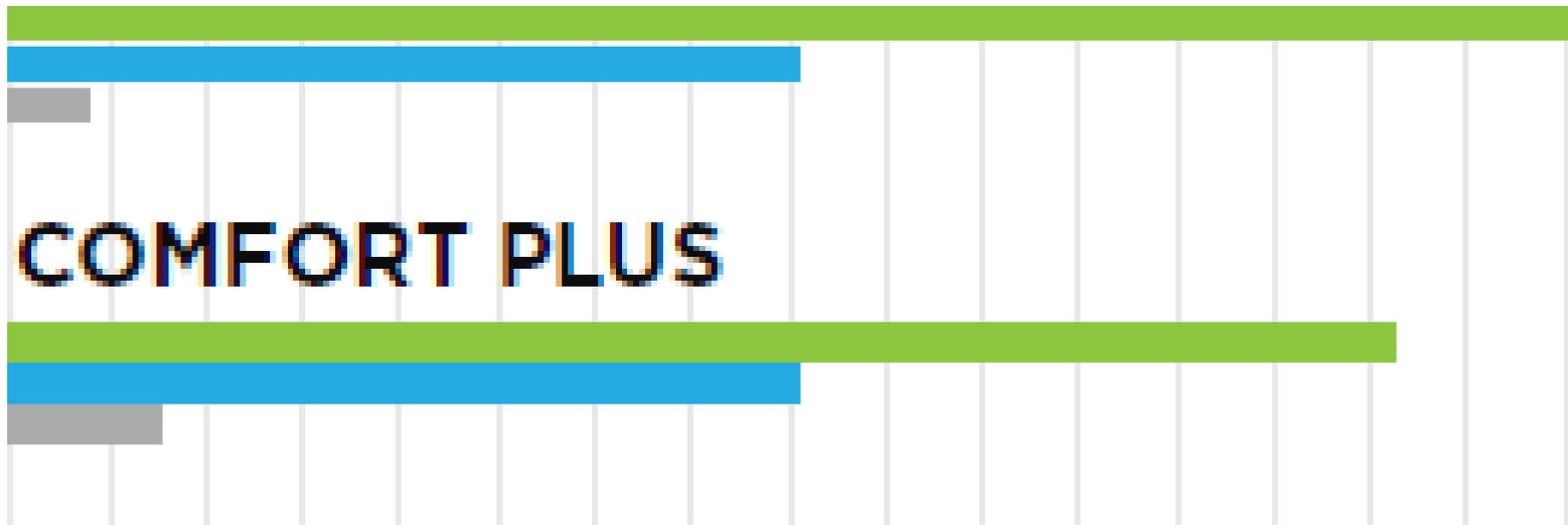
- Recruit leading builders/raters
- Regional Home Builder Associations
- Follow with utility/state programs



# DOE ZERH Approach: Messaging



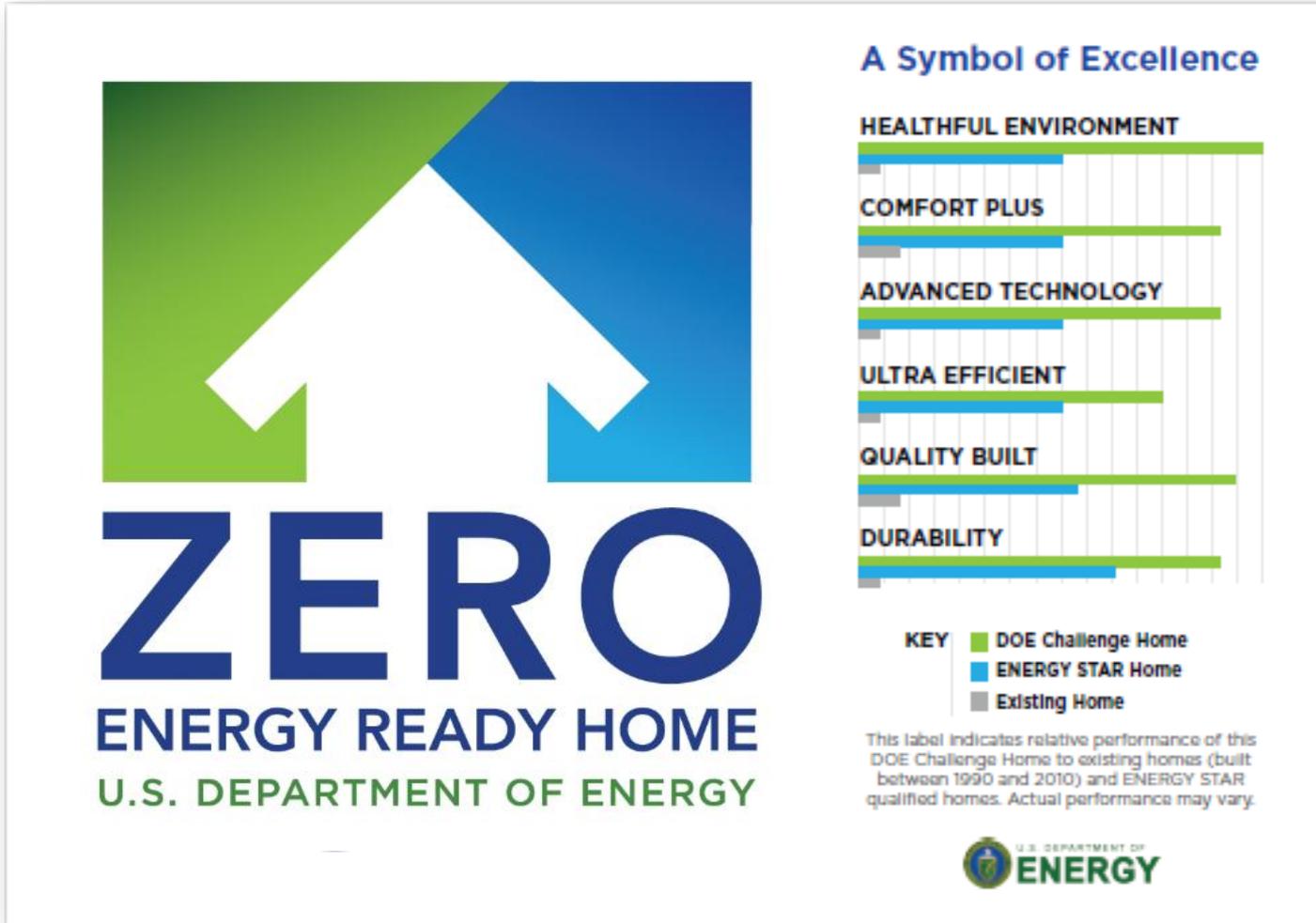
## HEALTHFUL ENVIRONMENT



**KEY**

- DOE Challenge Home
- ENERGY STAR Home
- Existing Home

# DOE ZERH Approach: Messaging

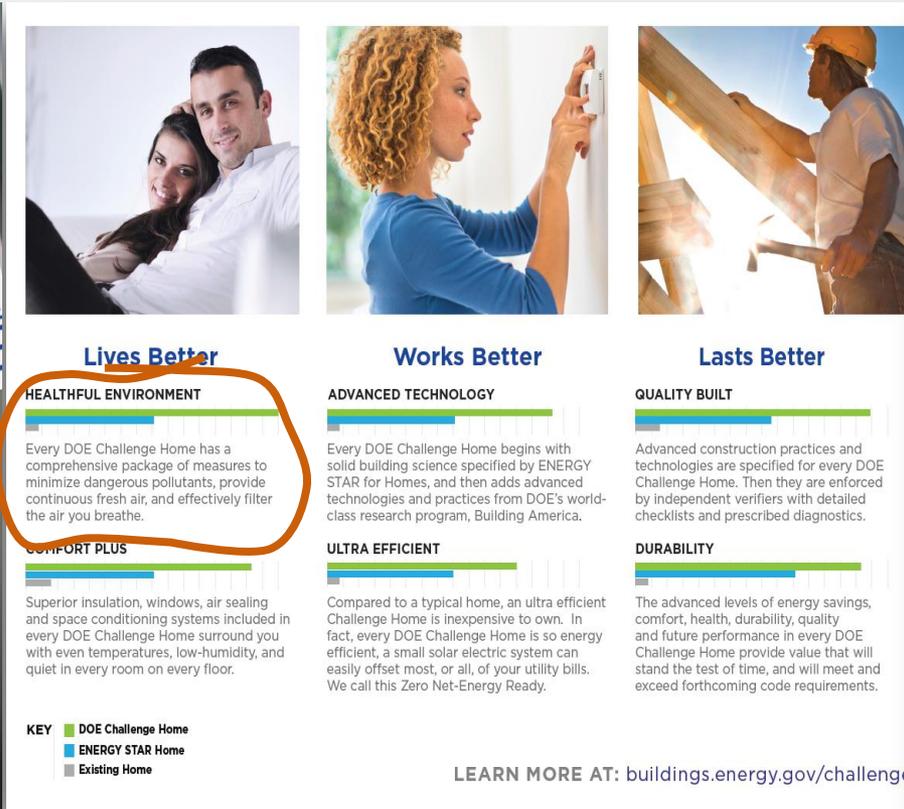


# DOE ZERH Approach: Messaging



**A Symbol of Excellence**

Every Challenge Home offers a cost-effective, high performance package of energy savings, comfort, health, and durability unparalleled in today's marketplace.



**Lives Better**

**HEALTHFUL ENVIRONMENT**

Every DOE Challenge Home has a comprehensive package of measures to minimize dangerous pollutants, provide continuous fresh air, and effectively filter the air you breathe.

**COMFORT PLUS**

Superior insulation, windows, air sealing and space conditioning systems included in every DOE Challenge Home surround you with even temperatures, low-humidity, and quiet in every room on every floor.

**KEY**

- DOE Challenge Home
- ENERGY STAR Home
- Existing Home

**Works Better**

**ADVANCED TECHNOLOGY**

Every DOE Challenge Home begins with solid building science specified by ENERGY STAR for Homes, and then adds advanced technologies and practices from DOE's world-class research program, Building America.

**ULTRA EFFICIENT**

Compared to a typical home, an ultra efficient Challenge Home is inexpensive to own. In fact, every DOE Challenge Home is so energy efficient, a small solar electric system can easily offset most, or all, of your utility bills. We call this Zero Net-Energy Ready.

**Lasts Better**

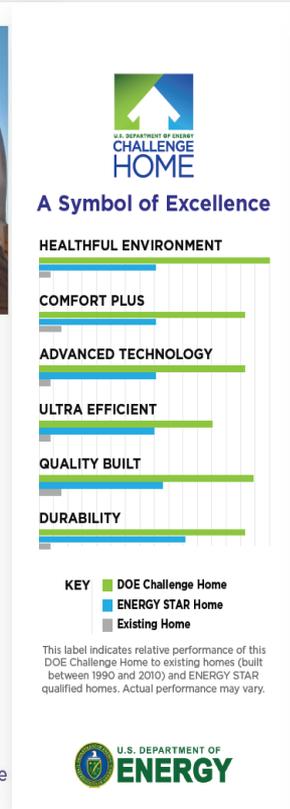
**QUALITY BUILT**

Advanced construction practices and technologies are specified for every DOE Challenge Home. Then they are enforced by independent verifiers with detailed checklists and prescribed diagnostics.

**DURABILITY**

The advanced levels of energy savings, comfort, health, durability, quality and future performance in every DOE Challenge Home provide value that will stand the test of time, and will meet and exceed forthcoming code requirements.

**LEARN MORE AT:** [buildings.energy.gov/challenge](http://buildings.energy.gov/challenge)



**U.S. DEPARTMENT OF ENERGY CHALLENGE HOME**

**A Symbol of Excellence**

**HEALTHFUL ENVIRONMENT**

**COMFORT PLUS**

**ADVANCED TECHNOLOGY**

**ULTRA EFFICIENT**

**QUALITY BUILT**

**DURABILITY**

**KEY**

- DOE Challenge Home
- ENERGY STAR Home
- Existing Home

This label indicates relative performance of this DOE Challenge Home to existing homes (built between 1990 and 2010) and ENERGY STAR qualified homes. Actual performance may vary.

**U.S. DEPARTMENT OF ENERGY**



**The Future of Housing—Today**

Only a select group of the top builders in the country meet the extraordinary levels of excellence and quality specified by U.S. Department of Energy guidelines

**U.S. DEPARTMENT OF ENERGY CHALLENGE HOME**

**LEARN MORE AT:** [buildings.energy.gov/challenge](http://buildings.energy.gov/challenge)

Front Cover

Inside Spread

Back Cover

Flap

# DOE ZERH Approach: Messaging



**My power bill is \$5.  
What's yours?**

- Heather Robbins, Garbett Homeowner

**garbettHOMES.com**  
Now you're living.



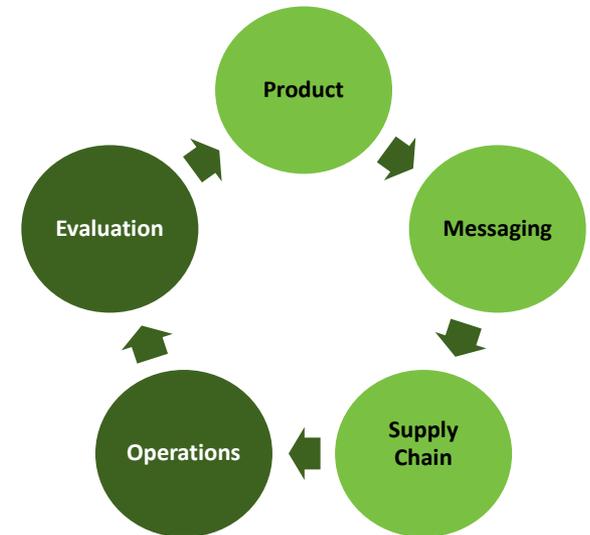
# DOE ZERH Approach: Apply ESfH Playbook - Growth

## Operations:

- Listen and respond promptly to early partners
- Implement program with low-cost solutions

## Evaluation:

- Significant vetting of product specifications
- Measure message effectiveness
- Secure feedback from leaders



# DOE ZERH Lessons Learned and Accomplishments

## Lessons Learned:

- Certified Homes on the ground taking longer  
[builders need time to ramp up product changes, marketing]
- HERS Rater sales force taking longer  
[Far more rater business opportunities competing with DOE ZERH]
- Housing industry is primed for DOE ZERH  
[220,000+ Homes HERS Rated in 2013 with an Average HERS Index of 64]

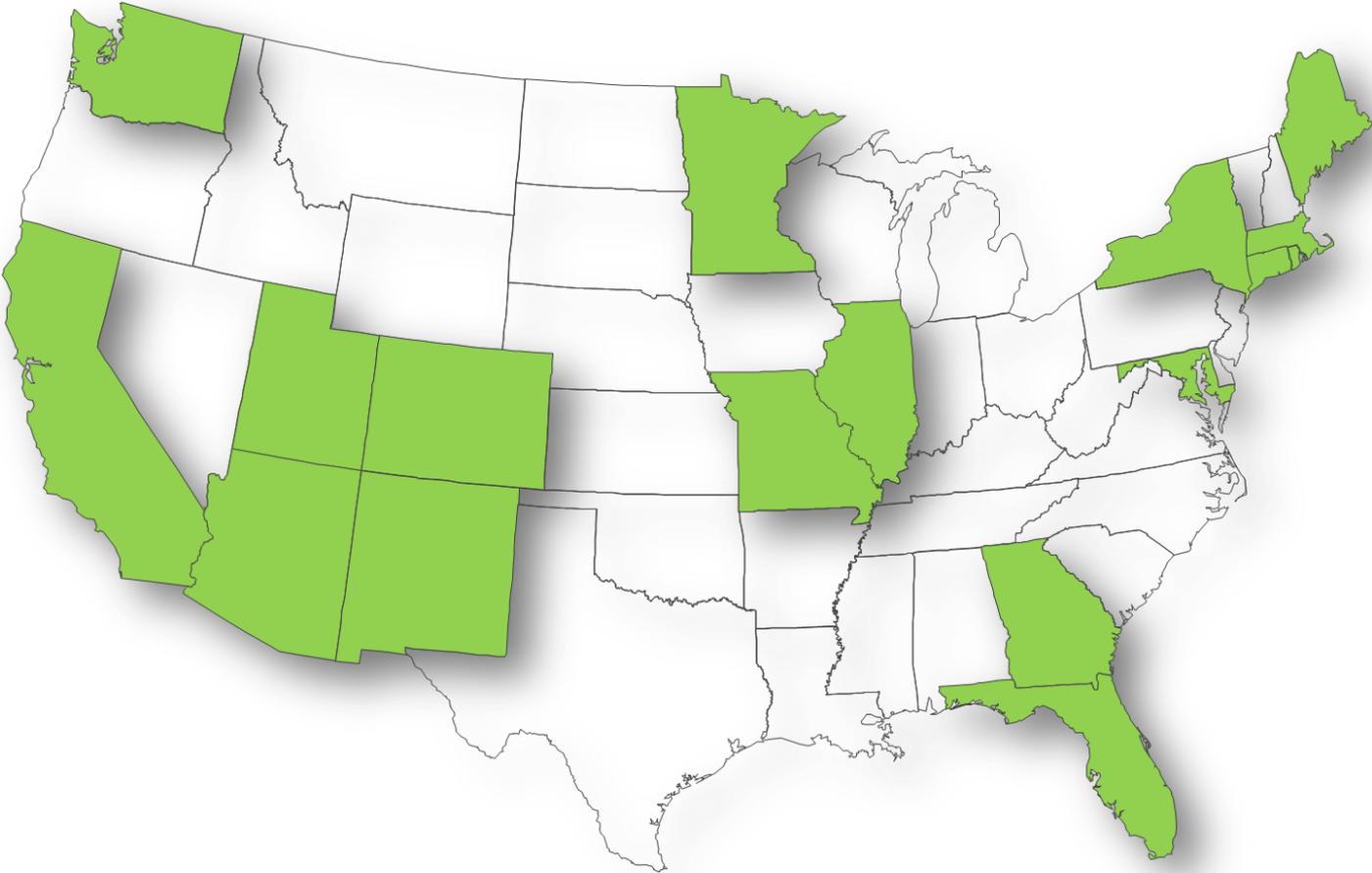
## Accomplishments:

- 8,000 Certified Homes committed to DOE ZERH  
[fraction of time compared to ESfH with  $\frac{1}{4}$  the Staff and  $\frac{1}{4}$  the Budget]
- First developer committing all homes to DOE ZERH  
[Stapleton, Denver , CO]
- 30+ Half-Day ZERH Training Seminars, ~1,500 Attendees  
[Evaluation Scores average 4.7 out of 5.0]

# DOE ZERH Market Impact – Just Getting Started

Quarter	Builder Partners	Verifier Partners	Training Partners	Certified Homes
FY12 Q3	43	81	0	0
FY12 Q4	31	18	0	0
FY13 Q1	7	7	1	0
FY13 Q2	24	17	6	3
FY13 Q3	23	30	15	82
FY13 Q4	26	19	5	29
FY14 Q1	16	10	1	17
FY14 Q2*	18	8	2	23
<b>TOTAL</b>	<b>168</b>	<b>190</b>	<b>30</b>	<b>154</b>

# DOE ZERH Market Impact – Certified Homes Beachheads



# DOE ZERH Integration and Collaboration

## Project Integration:

- NZEHC Ex-Officio Board Member
- EPA ENERGY STAR for Home Coordination Meetings
- DOE Challenge Home Student Design Competition

## Partners, Subcontractors, Collaborators:

- Newport Partners main subcontractor
- Building America Teams
- Financing Partnership with Lenders (proposed)

## Communications:

- 30+ DOE Zero Energy Ready Home Training Seminars
- 5+ DOE Zero Energy Ready Home Webinars
- 4 Keynote Presentations/10+ Conference Presentations
- 20+ Articles in Trade Journals, Media
- Housing Innovation Awards

# DOE ZERH Next Steps and Future Plans

- **Grow/Diversify Sales Force**
  - Proactively engage high-priority HERS Raters
  - Outreach to regional HBA's
- **Build Upon Successes:**
  - Nurture Leading Builder Partners
  - Continue Leading Builder Round-Table
  - Continue/Diversify DOE ZERH Seminars
- **Enhance Messaging:**
  - Transition to DOE Zero Energy Ready Home
  - Virtual ZERH Parade of Homes
  - Building America Building Science Translator
  - Introduce Sales Training Program

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REFERENCE SLIDES:  
DOE Zero Energy Ready Home

# DOE ZERH Project Budget

## Project Budget:

- Approximately \$450,000 annual support contract
- .5 PY from DOE

**Variances:** None

**Cost to Date:** \$1.35 million

**Additional Funding:** 1 PY Subcontractor Support

## Budget History

FY 2012 - FY2013 (past)		FY2014 (current)		FY2015 – 2022 (planned)	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
\$900,000	\$0	\$450,000	\$0	\$3,600,000	\$0

# DOE ZERH Project Plan and Schedule

- **Slipped Milestones:**

- Building Sales Infrastructure much more difficult than with ESfH
- Builders need more time to transition to ZERH

- **Go/No-Go Decision Point:**

- 2,000 Certified Homes by 2015

**Certified DOE Zero Energy Ready Homes Projected Growth**

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
ZERH v1	600	2,000	5,000	10,000						
ZERH v2					5,000	10,000	25,000			
ZERH v3								15,000	25,000	50,000
<b>Total</b>	600	2,600	7,600	17,600	22,600	32,600	57,600	72,600	99,600	149,600

**ENERGY STAR for Homes  
Hand-Off**