



**Building America  
Efficient Solutions for New Homes**

**Case Study:  
Manatee County Habitat for  
Humanity's Challenge Home**

Bradenton, Florida

**PROJECT INFORMATION**

Construction: New home  
Type: Duplex, affordable  
Builder:  
Manatee County Habitat for  
Humanity  
[www.manateehabitat.org](http://www.manateehabitat.org)  
Size: 1,143 ft<sup>2</sup>  
Price Range: \$110,000  
Date Completed: 2012  
Climate Zone: Hot-humid

**PERFORMANCE DATA**

HERS Index: 23  
Builder Standard Practice = 53  
Case Study House 1,143-ft<sup>2</sup>  
With Renewables = 23  
Without Renewables = 67  
Projected Annual Energy Cost  
Savings: \$947 (EGUSA)  
Incremental Cost of Energy-  
Efficiency Measures: \$17,008  
Incremental Annual Mortgage:  
\$850 (20 yrs @ 0%-typical HFH)  
Annual Cash Flow: \$97  
Billing Data: Not available

The start of a new development, Hope Landing, provided Manatee County Habitat for Humanity (HFH) an opportunity to rethink how they build homes for low-income families. Working with their architectural firm and an energy rater, they chose to move away from the wood-framed, low-cost material model to a highly energy efficient, sustainable, and safer home. Manatee County HFH reviewed programs like ENERGY STAR, USGBC LEED, and DOE Builders Challenge. New building methods and materials were examined that could be implemented using volunteer labor force but still allow Manatee County HFH to build cost-effective housing for low-income families. With these many factors in mind, Manatee County HFH developed a design/build plan using almost all new methods and products. By adding solar hot water and electricity to one of their new homes, Manatee County HFH built a home that complied with the new Challenge Home criteria.

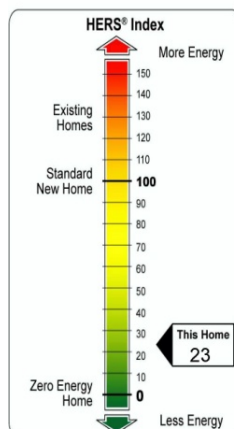
Manatee County HFH homes have received ENERGY STAR Version 3.1, FGBC, and USGBC LEED certifications. The Challenge Home was certified LEED Platinum. The Challenge Home also received the 2012 Southeast Building Conference Aurora Award in the Environmental Design category for Best Energy Efficient Home and a second award in the Affordable Housing Design category. Utilizing grant monies from the local utility, the Challenge Home also features a 2.5 kW photovoltaic (PV) system and a solar hot water heater.

U.S. DEPARTMENT OF ENERGY

**CHALLENGE HOME**

The symbol of Excellence for Peak Performance

Your home was designed, engineered, and constructed in conformance to U.S. Department of Energy (DOE) guidelines for extraordinary levels of excellence and quality.



RESNET ID: 649541108

This home built at  
**1639 38th Avenue East  
Ellenton, FL**

by Manatee Habitat for Humanity

has been verified by  
Karl Handley-White

an independent professional or organization to meet or exceed strict energy efficiency guidelines set by the U.S. Department of Energy on 7/30/2013

This home meets or exceeds the minimum criteria for the following:  
DOE Challenge Home  
EPA ENERGY STAR Version 3 Home

Manatee County HFH's Challenge Home certificate. The certificate shows the home's HERS Index of 23. Similar to a new car's miles per gallon rating, a HERS Index provides a yardstick to compare houses by their energy efficiency – a typical home built to code has a HERS Index of approximately 100 and a zero energy home has a HERS Index of 0 or lower.



## KEY ENERGY-EFFICIENCY MEASURES

### HVAC:

- SEER 16 HSPF 10 “Mini-split” Heat Pump
- Well-sealed R-6 flex ducts and air handler in unvented attic. Duct leakage to outside = 13 cfm @ 25Pa
- Positive pressure whole-house ventilation system (run-time only)
- Kitchen and bath fans vented to outside

### Envelope:

- Galvalum metal roof
- R-21 roof-deck spray-foam insulation in an unvented attic
- R-23 insulated concrete form (ICF) walls
- Double-pane, low-e, vinyl windows  $U = 0.32$ ,  $SHGC = 0.28^*$
- Tightly sealed house,  $ACH50 = 1$

### Lighting, Appliances, and Water Heating:

- 2.5 kW PV system
- 100% CFL
- ENERGY STAR® ceiling fans
- ENERGY STAR® refrigerator
- 40 ft<sup>2</sup>/80 gallon solar water heater

For more Information, please visit:

[www.buildings.energy.gov](http://www.buildings.energy.gov)

\*Challenge Home Exemption granted by D.O.E.



(Left) 40 ft<sup>2</sup> solar hot water and 2.5 kilowatts of PV panels. (Right) Insulated Concrete Form (ICF) walls prior to finishing.

## Lessons Learned

- Affordable housing can be cost-effectively built to Challenge Home standards.
- Significant material (and cost) savings can be obtained by designing the home to fit the construction materials; these homes are sized so that there are no cuts in the first and last courses of the ICF block. Interior walls are designed to utilize standard lumber sizes with minimal cutting. Waste has been reduced by 25%.
- ICF block and foam roof decking provide excellent wind load specifications, a plus in peninsular Florida.
- Depending on the price of concrete ICF, blocks are cost competitive with concrete block construction in the Sarasota, Florida market.
- Any innovative or different construction technique should be reviewed and approved by the local code jurisdiction. Recent IECC Codes recognize foam roof decks with sealed attics as a viable construction method, while some older codes mandate vented attic cavities.

“We undertook our new development at Hope Landing with the idea of changing the way we approach the need for low-income housing. We wanted to not only build homes that were affordable to purchase but also wanted homes that were affordable to live in.”

Bruce Winter, Construction Manager  
Manatee County Habitat for Humanity