Building America
Efficient Solutions for Existing Homes

# Case Study:

# Habitat for Humanity South Sarasota County

Venice, Florida

## PROJECT INFORMATION

Construction: Deep energy retrofit

Type: Single-family, affordable, total interior rehab of foreclosed single story home

Builder: Habitat for Humanity South Sarasota County, FL
www.habitatsouthsarasota.org

Size: 1,814 $ft^2$

Total Rehab Cost: about $57,000

Date Completed: July 2011

Climate Zone: Hot-humid

## PERFORMANCE DATA

HERS Index: pre- and post-retrofit: pre-185 and post-57

Projected annual energy cost savings: $1,500

Projected annual energy reduction: >50%

Total cost of energy-efficiency measures: $32,550

Rate of return: 4.6%

Billing data:
Will be available in 2012

## Project Description

Building America researchers provided technical assistance to Habitat for Humanity (HFH) of South Sarasota County, Florida, to achieve a deep energy retrofit featuring an innovative way to air seal an entire home, which also moved its ducts and air handler inside the thermal boundary. This home (a 1978, single-story, three-bedroom, two-bath with attached-garage) is typical of many in central and south Florida, and Building America plans to use monitored utility data from the home to analyze the effectiveness of the energy retrofit measures.

Construction funding for this retrofit in Venice, Florida, was provided by the U.S. Department of Housing and Urban Development's State Housing Initiatives Partnership program. Technical assistance was provided by the U.S. Department of Energy's Building America Program, primarily through Calcs-Plus, a member of the Pacific Northwest National Laboratory (PNNL) team. The HFH of South Sarasota County, founded in 1992, has built more than 60 new homes and renovated 16. The lessons learned from this deep energy retrofit and from ongoing energy monitoring will help inform future retrofit construction and research.


HFH removed old drywall and filled numerous holes in the concrete block walls before insulating them with continuous R-7.5 foil-faced rigid insulation. Borate-treated furring strips were attached over the insulation to provide an air gap behind the new drywall. *(Photo Source: Calcs-Plus)*

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## KEY ENERGY-EFFICIENCY MEASURES

### HVAC:

- SEER 16.25, HSPF 9, 2-ton heat pump
- Well-sealed, R-4 to R-6 insulated metal and flex ducts inside unvented attic. Return air ducts in all bedrooms. Leakage to outside = 34 cfm @ 25 Pa
- 7-day programmable thermostat
- Positive pressure whole house ventilation system (run-time only) with electric damper that prevents entry of outside air when compressor shuts off
- Kitchen and baths vented to outside

### Envelope:

- White shingle roof over peel-and-stick impermeable underlayment
- R-21 open-cell foam insulation in unvented attic
- R-7.5 foil-faced rigid insulation on the inside of concrete block walls
- Double-pane, low-e, vinyl, impact-resistant windows. U = 0.33, SHGC = 0.22
- House ACH50 = 5.5 (pre-retrofit was 31.3)

### Lighting, Appliances, and Water Heating:

- 100% CFL
- ENERGY STAR® ceiling fans
- ENERGY STAR® refrigerator, dishwasher
- Heat pump water heater

For more Information, please visit:
www.buildings.energy.gov

Ceiling drywall was removed along the perimeters of the home to access the attic. Open-cell spray foam was sprayed along the underside of the low-pitch roof to provide an R-21 air sealed, insulated attic space to house the new SEER 16.25 heat pump. *(Photo Sources: Calcs-Plus)*

## Lessons Learned

- Uninsulated concrete block walls require removal of all interior wallboard to seal numerous holes and add continuous foil-faced rigid insulation *(see photo on first page)*.
- An unvented attic was implemented to air seal the whole house, bring the ducts and air handler inside the thermal envelope, and add insulation to the attic. An unvented attic was the best solution because of numerous large air pathways from the existing vented attic to the house. Perimeter ceiling drywall was removed and replaced after spraying the attic with open-cell foam *(see photos)*.
- All measures listed on the left sidebar were required to achieve 50% energy savings. The biggest contributors were the two measures in bullets above and the new heat pump and windows. All were installed to work as an integrated system solution to provide a comfortable, affordable energy efficient home.
- Water management details are a critical part of energy retrofits in hot-humid climates. For this project, all windows were sealed and properly flashed and a new white shingle roof was installed over an impermeable underlayment for added protection from rain- and solar-driven moisture in this hurricane-prone climate.

"The benefit for our homeowner is a lower energy bill. For our affiliate, going energy efficient, going green, using better building techniques, and better products was a no-brainer. We want to build homes that are healthy, durable, efficient, and sustainable."

Michael Sollitto *Construction Manager, HFH South Sarasota County*

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Energy Efficiency & Renewable Energy

EERE Information Center
1-877-EERE-INFO (1-877-337-3463)
eere.energy.gov/informationcenter

PNNL-SA-84343 November 2011

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