



## Building America Case Study Technology Solutions for New Homes

# Insulating Concrete Forms

Fort Myers, Florida

### PROJECT INFORMATION

Project Name: Sandalwood

Location: Fort Myers, FL

Size: 1,964 ft<sup>2</sup>

Partners:

Pacific Northwest National Laboratory  
[www.pnnl.gov](http://www.pnnl.gov)  
Greencastle, Inc.  
[www.greencastleinc.com](http://www.greencastleinc.com)  
Energy Smart Home Plans  
[www.energysmarthomeplans.com](http://www.energysmarthomeplans.com)

Building Component:

Insulated Concrete Forms

Application: New single-family

Year Tested: 2012

Climate Zone: Hot-Humid

### PERFORMANCE DATA

HERS Index Rating: 51

Projected Annual Savings: \$1034

Cost of Energy-Efficiency Measure  
(including labor): \$4,000

Incremental Annual Mortgage  
(30-year, 7% interest): \$280

Annual Cash Flow: \$754

## Florida Builder Offers ICF Homes at Low Incremental Cost

Insulating concrete forms (ICFs) are durable and highly insulating. These qualities are helping them gain wider use in both residential and low-rise commercial building wall applications. R-values ranging from R-20 to R-45 are now available and create a wide range of options for builders, particularly in areas where durable construction with high storm resistance is desirable.

ICFs used for this case study are made up of interlocking units of insulating foam (usually expanded polystyrene). Steel reinforcement bars are fixed in the area between the walls, and concrete is poured into the cavity to create the building's structural envelope. The foam walls are then covered with stone, brick, stucco, or cladding to give the wall a finished appearance and provide an exterior rain barrier. The foam creates a tight air barrier which, accompanied by high insulation levels and structural integrity, produces a complete, high-performance envelope.

The cost for ICF walls typically runs higher than for masonry block or wood framing. A 2001 report by the U.S. Department of Housing and Urban Development estimates that ICF construction generally costs about 5%-10% more than a traditional wood-frame home, or about \$2 to \$4 per square foot of floor area. The report also states "First, and foremost, the cost of ICF construction...is very dependent on the familiarity of the contractor and trades people with the product."

For example, Shawn Harvey of Greencastle, Inc. has been working with Building America and its partner, Energy Smart Home Plans,

The picture below shows an approach to ICFs in which rebar-reinforced concrete is poured between a sandwich of polystyrene foam. Thickness of both the foam and the concrete can vary to meet varying needs for structural integrity and insulation.



An ICF envelope can be finished with stucco, brick or other materials to produce a desired appearance and add to the aesthetic appeal, as shown below. However, due to the increased wall thickness, the building's footprint is greater than with some other types of framing.



to build ICF homes near Naples, Florida, within 3% of the price for masonry block housing, which is common in hot humid climates. Because building with ICFs is a practiced skill, interested homeowners should work with a builder familiar with ICF construction or builders should seek training in ICF construction practices to keep costs reasonable and to help ensure high quality construction.



Interlocking pieces are used to create the ICF wall. Concrete is poured onsite into walls of polystyrene foam. Varying thicknesses and materials typically result in R-values between R-20 and R-45. Many times furring strips are used to allow cladding to be easily attached to the exterior.

## Lessons Learned

- ICF construction takes practice. To ensure a cost effective and high quality installation, homeowners should look for builders who have some experience with ICFs.
- In Greencastle's Sandalwood home, the air tightness and high thermal performance of ICF construction help achieve monthly utility bills of about \$64, or about half of the amount of other new homes in the area.
- Increased R-value for ICF walls will have the most effect on energy efficiency in areas with high heating or cooling demand. In addition, the high thermal mass of ICFs will lead to greater benefits in areas with wide variations in daytime and nighttime temperatures and for homes using passive solar features.

## Looking Ahead

The combined advantages of structural integrity, low air leakage, and high insulation value make ICF construction an attractive option in many building applications. Interested builders and homeowners should consider cost and the need for contractor experience in their decision making. The U.S. Department of Energy has more information on ICFs at their Energy Savers website, which can be found at <http://www.energysavers.gov/>. Promotional information is available at the EPS Industry Alliance website at <http://www.forms.org/>.

"It works and is cost effective, too!"

*Sean Harvey, President, Greencastle, Inc.*