Building America Case Study
Whole-House Solutions for New Homes

William Ryan Homes

Tampa Division, Tampa, Florida

PROJECT INFORMATION

Construction: New home

Type: Single-family

Builder: William Ryan Homes, Tampa Division, Tampa, FL
www.williamryanhomes.com

Size: 1,250 to 3,000 ft^2

Price Range: $129,900 to $319,000

Date Completed: 2011

Climate Zone: Hot-humid, IECC 2A

Team: CARB

PERFORMANCE DATA

HERS Index: 65-70

Projected annual energy cost savings: $1,615

Added first cost of energy-efficiency measures: $7,889

Annual mortgage increase: $699

Annual net cash flow to homeowner: $916

Billing data: Not available

Changes in the Florida Building Code and a company-wide "green" initiative launched in the fall of 2008 gave William Ryan Homes' Tampa Division the push it needed to implement energy-efficient measures as standard practice in all of its new homes. Building America's Consortium for Advanced Residential Buildings (CARB) analyzed nine new house designs by the builder and found all of the designs would achieve home energy rating (HERS) scores of 65 to 70. The homes also meet the requirements of ENERGY STAR for Homes Ver. 2.0 and the Florida Green Building Coalition's Florida Green Home certification.

The builder focused its efforts on an energy-efficient HVAC system including a properly sized SEER 15, 8.2 HSPF heat pump with a humidity control relay and variable speed motor. The heat pump is located in conditioned space. The ducts are mastic sealed and laid out in a compact engineered design although they are located in the vented, unconditioned attic.

The Florida homes use typical hurricane-resistant construction methods with slab-on-grade foundations, concrete block first-floor walls, and 2x4-framed second-floor walls that are constructed as shear walls. The homes' first-story masonry block walls are filled with foam for an R-8 insulation value. The second-story walls have R-11 fiberglass batt cavity insulation, 7/16-inch OSB sheathing, and corrugated draining house wrap. All seams and holes in the exterior envelope are sealed to prevent air leakage.

William Ryan Homes focused on an energy-efficient HVAC system, the heart of which is an air source heat pump (SEER 15/8.2 HSPF) with a humidity control relay and an electronically commutated motor that is inherently variable speed for greater efficiency. The heat pump is

(Photo top left) William Ryan Homes' Tampa Division, used high-efficiency heat pumps and an engineered duct design to achieve cost-effective energy savings in central Florida.

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KEY ENERGY-EFFICIENCY MEASURES

HVAC:

- Heat pump (SEER 15/8.2 HSPF) with electrically commutated motor and humidity control relay, air handler in conditioned space and MERV 8 return air filters
- Well-sealed ducts in vented attic, engineered duct layout, duct leakage tested with average leakage of < 4% to the outside
- Programmable thermostat with humidity controls

Envelope:

- R-38 blown fiberglass ceiling insulation in vented attic; attic kneewalls insulated with rigid foam
- R-8 foam-filled concrete block first-story walls and 2x4 wood-framed second-story walls with R-11 batt insulation, 7/16-inch OSB, and drain wrap
- Blower door test - 4 ACH50
- Double-pane, tinted, aluminum-framed windows. U = 0.68, SHGC = 0.53
- Blower door test average 4.0 ACH50
- Attic radiant barrier option
- Light-colored shingle roof option

Lighting, Appliances, and Water Heating:

- 100% CFL option
- ENERGY STAR® dishwasher
- 0.93 EF 50-gallon water heater, or optional gas tankless or electric heat pump hybrid water heater

For more information, please visit:
www.buildingamerica.gov

Hurricane-resistant construction includes slab-on-grade foundations, concrete block first stories, shear-resistant 7/16-inch OSB, and drain wrap housewrap.

right sized to provide adequate cooling and dehumidification. The variable speed air handler is located in conditioned space within the home. The ducts are mastic sealed and laid out in a compact engineered design to increase performance.

Lessons Learned

- Instead of increasing prices to cover the cost of energy-efficiency features, William Ryan Homes streamlined construction costs and trained employees and subcontractors for greater efficiency.
- Attic kneewalls are insulated with taped rigid foam to provide a continuous air barrier around attic rooms.
- Radiant barriers, light-colored reflective shingles, and tinted windows help reduce solar heat gain. Thermostatically controlled power roof vents also help reduce attic heat gain.
- A high-efficiency HVAC system helped cut annual cooling costs from a calculated $1,774 for a home built to code to $524 for the efficient home, reducing cooling use from 50% of the home's total energy use to less than 30%.

"The biggest surprise was that we were able to incorporate thousands of dollars in base home specifications and systems upgrades without raising the sales price of the homes one dollar."

Chris Nies, Tampa Division Manager

U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

For more information, visit:
www.buildingamerica.gov

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