

The New American Home® 2006



Spine3D

The New American Home® 2006, Orlando, Florida

The New American Home® is a “real-world” laboratory demonstrating concepts, materials, designs, and construction techniques that can be replicated—in whole or in part—in housing built any place and in any price range. Since its inception in 1984, The New American Home® has the unique distinction of being both a show house and a for-sale product, balancing architectural freedom and the bottom line. It is a collection of ideas for the industry to take away and put into hundreds of thousands of homes across the country each year.

TNAH '06 serves as the official showcase house of the annual International Builders' Show. The National Council of the Housing Industry (NCHI) of the National Association of Home Builders (NAHB) cosponsors the home along with BUILDER Magazine. TNAH '06 was built by Hannigan Homes Inc. in southwest Orange County, FL on the shores of Windermere's Lake Burden with architectural design by WCI Architecture and Land Planning Inc. and interior design/merchandising by Saxon-Clark. This location influenced the design of a long, shallow, two-story house with a British-Caribbean flair that offers a lake view from nearly every room. The middle section of the 9,500-ft² house (7,100 ft² A/C) is only one-room deep. A variety of points of interest were incorporated to guide the eye across the home's front elevation, including a two-story tower with a spiral staircase.

To ensure efficiency and innovation, Building America team member, IBACOS Inc., provided design and engineering support and performance testing and monitoring. As a result, the home is conditioned by high-efficiency heat pump units (SEER 15 average) and uses zone control to maintain ideal temperature settings in the home's six zones. Each unit and its associated ductwork are within conditioned space. This is because the attic was sealed at the underside of the roof deck with spray foam insulation to prevent outside air from entering. Additionally, specially coated windows help preserve a comfortable indoor climate.

The New American Home® 2006 demonstrates the “green” philosophy, making the home friendly to the environment by using as many earth-friendly materials as possible. With the implementation of the Florida Green Building Coalition Green Home Designation Standard, the home is the first certified “green” house in the history of The New American Home® program. The design is ideal for cross ventilation when the air conditioning is turned off. Other energy and conservation features include HEPA filtration for clean indoor air, a roof gutter system that will collect rainwater to irrigate the landscaping, and mulch made from recycled construction materials.

The energy features in The New American Home® can be used in homes at any price point with equivalent energy savings.

Primary Project Goals

- Build a high-profile show home for the International Builders' Show by implementing Building America strategies to conserve energy and materials
- Introduce production builders to advanced HVAC strategies and advanced insulation and airtightness detail

Specifications

- Four high-efficiency heat pump units
- Average 15 SEER for cooling
- All air-handling equipment and ductwork within conditioned space
- Attic unvented, sealed, and indirectly conditioned
- A thermal (R-30) and air barrier at the underside of the roof sheathing (Icynene™ spray foam insulation)
- Fully ducted return system, with the exception of jump ducts that maintain a balanced pressure region in bedrooms
- High-performance windows with a spectrally selective low-emissivity coating reduce cooling and heating loads
- Air distribution systems with performance targets of 100, 120 (2), and 200 cfm with leakage rates of, respectively, 65 cfm (3%), 67 cfm (6%), 85 cfm (7%), and 47 cfm (5%)
- Tankless water heaters provide water heating in a timely fashion with no standby losses
- 38% total whole-house energy savings

Performance Features

Thermal Shell

- Exterior concrete block walls, R-5 extruded polystyrene insulation on inside face
- Roof/ceiling, R-30 polycynene low-density spray-foam insulation
- Attic venting eliminated preventing the entry of unwanted outdoor hot moist air

Airtightness

- The airtightness of the concrete block exterior wall increased by placing extruded polystyrene insulation directly against it without any gaps between joints
- Airtight spray-foam insulation at the underside of the roof decking and wall transitions; foam sealing around penetrations through the building enclosure

Moisture Control

- Windows and doors effectively flashed to shed water
- Flashing integrated with the drainage plane system to increase home durability
- Extruded polystyrene insulation on the inside face of the concrete block exterior wall controls moisture diffusion from the outside to the living space

HVAC

- Electric air-source heat pumps (SEER 15, HSPF 7.8)
- Air handlers and ductwork located in conditioned attic space
- All joints and connections within the air distribution system sealed with approved water-based mastic
- Dedicated, fully ducted return air ductwork integrated into each air distribution system

Hot Water

- Tankless water heaters (EF = 0.82) minimize piping and reduce standby losses

IAQ

- Bath vents and the kitchen fan ducted to the outside; ventilation system supplied to each air handler

For more information contact

- Hannigan Homes – 407-843-5858
- National Council of the Housing Industry – 1-800-368-5242 ext. 8519
- IBACOS – 1-800-611-7052

Energy Features and Benefits

Among the top benefits of The New American Home® 2006 is energy efficiency. The home uses 61% less energy for heating and cooling and 50% less energy for water heating compared to a house of comparable size in the hot and humid climate zone. Each component of the home was selected and integrated into the project through a systems approach of designing, testing, and redesigning.



At this beautiful location, the slab-on-grade foundation is only a stone's throw away from picturesque Lake Burden.



R-5 extruded polystyrene panels are mounted continuously inside the exterior walls, contributing to the home's insulation qualities.



The use of spray-foam insulation underneath the roof deck offers a more hospitable area for ductwork and air handlers by turning the attic into a sealed, unvented, and conditioned space.

All of its components work together to achieve maximum home performance. The home's thermal qualities, for example, are achieved through a combination of proper sizing of the mechanical equipment, insulation materials and specifications, and designing the ductwork to fit within the conditioned space.



The two-story design incorporates an assortment of building materials, including wood-fiber siding, exterior stucco, and concrete roof tiles.



High-performance windows with impact resistant properties were installed throughout the home to limit solar heat gain.



All openings and penetrations are sealed to keep the home airtight and prevent moist hot air from entering the house.



IBACOS/PIX14232

Overhanging roofs provide shade and reduce solar heat gain.



IBACOS/PIX14233

Three propane, direct-vented fireplaces guide smoke away from the house.



IBACOS/PIX14234

Open-web floor trusses eliminate obstructions, allowing efficient installation of ductwork and other services.

Each year for the International Builders' Show, The New American Home® transforms from a graded plot into a truly unique home in style and function. The one characteristic shared by each home since the Building America Program has participated in the project is energy efficiency. This year's home achieves high levels of efficiency through advanced HVAC equipment, careful installation of insulation and air sealing, high-performance windows, and a zone control system. Among its interesting features is a hot water system that taps energy from solar thermal panels. The home's overall achievements in energy use are 61% reduction in heating and cooling and 50% reduction in hot water when compared to a similar home.



IBACOS/PIX14235

Craftsmanship and attention to detail create a visually stunning interior.



IBACOS/PIX14236

Spray-foam insulation was carefully installed in the top of the two-story entrance tower to prevent air movement and to insulate the home.



IBACOS/PIX14237

Conditioning was applied to the area accompanied by decorative wood trim, which completes the beautiful tower ceiling.

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Advantages to the Consumer

- Increases quality without increasing cost
- Increases comfort and performance
- Reduces utility bills
- Allows greater financing options



IBACOS/PIX12942

Advantages to the Builder

- Reduces construction costs
- Improves productivity
- Improves building performance
- Reduces callback and warranty problems
- Allows innovative financing as a result of predictably lower utility bills
- Gives builder a competitive advantage



IBACOS/PIX14238

Systems Engineering Cost Saving Trade-Offs

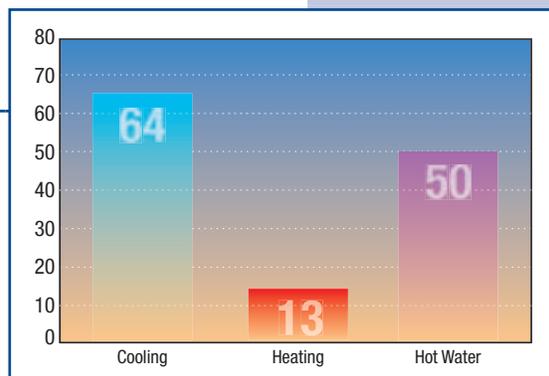
- Advanced framing systems
- Tightly sealed house envelopes
- Shorter, less costly ductwork
- Engineered and planned infrastructure
- Smaller, less expensive mechanical systems
- Modular construction



WCI Architecture and Land Planning, Inc.

Percentage of Energy Reduction

- 64% reduction in cooling energy use
- 13% reduction in heating energy use
- 50% reduction in hot water energy use



Systems-Engineering Approach

Building America's systems-engineering approach unites segments of the building industry that have traditionally worked independently of one another. Building America forms teams of architects, engineers, builders, equipment manufacturers, material suppliers, community planners, mortgage lenders, and contractor trades.

The concept is simple: systems-engineering can make America's new homes cost effective to build and energy efficient to live in. Energy consumption of new houses can be reduced by as much as 50% with little or no impact on the cost of construction.

To reach this goal, Building America teams work to produce houses that incorporate energy- and material-saving strategies from design through construction.

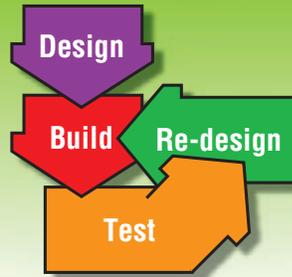
First, teams analyze and select cost-effective strategies for improving home performance. Next, teams evaluate design, business, and construction practices within individual builder partnerships to identify cost savings.

Cost savings can then be reinvested to improve energy performance and product quality. For example, a design that incorporates new techniques for tightening the building envelope may enable builders to install smaller, less expensive heating and cooling systems. The savings generated in this process can then be reinvested in high-performance windows to further reduce energy use and costs.

The "pilot" or "test" home is the field application of solution design. Teams build prototype homes according to strategic

design, then test each system for efficiency, and make any necessary changes to increase efficiency and cost effectiveness. Before additional houses are built, these changes are incorporated into the design. This process of analysis, field implementation, re-analysis, and design alteration facilitates ultimate home performance once a design is ready for use in production or community-scale housing.

Understanding the interaction between each component in the home is paramount to the systems-engineering approach. Throughout design and construction, the relationship between building site, envelope, mechanical systems, and other factors is carefully considered. Recognizing that features of one component can dramatically affect the performance of others enables Building America teams to engineer energy-saving strategies at little or no extra cost.



Testing and monitoring the home's energy use ensures that the home meets its goals for energy savings.



An energy-recovery ventilator ensures good indoor air quality.

Achieving High Performance Using a Systems-Engineering Approach



Air-flow testing ensures that the home's comfort meets the standards set during the design process.



High efficiency water heaters save heating energy while still providing ample amounts of hot water.



Home airtightness is tested with a blower door.

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

Research and Development of Buildings

Our nation's buildings consume more energy than any other sector of the U.S. economy, including transportation and industry. Fortunately, the opportunities to reduce building energy use—and the associated environmental impacts—are significant.

DOE's Building Technologies Program works to improve the energy efficiency of our nation's buildings through innovative new technologies and better building practices. The program focuses on two key areas:

• Emerging Technologies

Research and development of the next generation of energy-efficient components, materials, and equipment

• Technology Integration

Integration of new technologies with innovative building methods to optimize building performance and savings

For more information contact
EERE Information Center
1-877-EERE-INF (1-877-337-3463)
www.eere.energy.gov



U.S. Department of Energy
**Energy Efficiency
and Renewable Energy**

An electronic copy of this publication is available on the Building America Web site at www.buildingamerica.gov



IBACOS/PIX14230

Installation of housewrap provides a drainage plane, which prevents moisture problems.



IBACOS/PIX14231

Installing open-web floor trusses requires careful structural integration with the block wall construction.

Visit our Web sites at:

www.buildingamerica.gov

www.pathnet.org

www.energystar.gov



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