

The New American Home® 2011

Orlando, Florida

Performance Features

Thermal Shell

- Concrete block exterior walls insulated to R-16 using a wood-framed assembly and open-cell spray foam insulation on the interior
- Unvented and air sealed attic with average R-30 open-cell spray foam insulation on underside of roof deck
- Aluminum-clad wood-framed windows and patio doors with low-e coating and argon gas fill to limit solar heat gain (SHGC = 0.14 to 0.25, U-value = 0.38 max)

Airtightness

- Openings and penetrations sealed to achieve 0.80 natural air changes under blower door testing at 50 Pa
- Open-cell spray foam insulation creates airtight attic space

HVAC

- Air source heat pump systems with average 18 seasonal energy efficiency ratio (SEER) and 9.2 heating season performance factor (HSPF)
- One heat pump system receives up to 700 Watts of electricity from dedicated PV panels
- Two-stage compressor in outdoor heat pump units adds efficiency and quietness
- Ultra-violet light air treatment system improves indoor air quality
- Mechanical ventilation provided by two efficient energy recovery ventilators (ERVs)
- Space conditioning system located entirely within conditioned space
- Ductwork sealed for airtightness to have less than 3% leakage to outdoors

Hot Water

- Solar thermal hot water system with 80-gallon storage tank provides most of hot water
- Natural gas-fueled tankless water heater (EF = 0.82) provides remaining hot water

Electrical

- 60% of all interior and exterior lamps are energy-efficient compact fluorescent lamps (CFLs), linear fluorescent lamps (LFLs), and LEDs
- ENERGY STAR®-rated appliances, including dishwasher, refrigerator, freezer, and clothes washer
- Electricity from solar-assisted heat pump system can be used for household purposes when the system does not require it



The New American Home® 2011, Orlando, Florida

Overview

The New American Home® (TNAH) is built annually as a showcase home for the International Builders' Show® to demonstrate innovative technologies, construction techniques, products, and design trends for the homebuilding industry to use in any new or remodeled home. Now in its 28th year, TNAH continues to keep up with the increasing demand for energy and resource efficiency by including the latest breakthroughs in green building and construction technology and using a state-of-the-art energy efficiency package. Co-sponsored by the National Council of the Housing Industry (NCHI) and *BUILDER Magazine*, TNAH is the official show home of the National Association of Home Builders (NAHB). TNAH continues to be one of the NAHB's most successful and visible programs in the industry. IBACOS, a U.S. Department of Energy (DOE) Building America team specializing in home quality and performance, provided technical support for the design and implementation of energy efficiency features in the home.

The New American Home 2011 is an 8,500-ft² home on Lake Davis near downtown Orlando, Florida. Built on an urban infill lot in an older neighborhood, the home boasts panoramic views of Lake Davis and the Orlando skyline. This year, TNAH 2011 is a custom residence built for specific homeowners by Continental Homes and Interiors of Winter Park, Florida. The home has two stories and four bedrooms, as well as features like an "in-law suite," which has its own kitchen, laundry, bathroom, living room, and bedroom; a swimming pool; an outdoor kitchen and entertainment area; and a "palm courtyard." Tailored to the hot-humid climate of Florida, the single-family home marries state-of-the-art technology to an American Empire design with Greek Revival elements. As with past New American Homes, TNAH 2011 offers builders a model for producing energy-efficient homes without sacrificing style.



LED lighting around the edge of the dining room ceiling uses less energy than other lighting sources; each lamp uses 1 Watt.



Open-cell spray foam insulation in the walls offers R-16 thermal performance and acts as an air sealer.



Four PV panels harness the sun's energy to generate electricity that feeds the master bedroom's space conditioning system.



The solar thermal hot water system includes an 80-gallon storage tank with an electric element for backup.



The windows and doors have very low solar heat gain coefficients to help significantly reduce the cooling load.



Two energy-efficient ERVs pretreat outdoor air to provide ventilation for the home.

Energy Efficiency and Innovation

As the NAHB's official show home, The New American Home is a symbol of energy efficiency and innovation. The home exhibits cutting-edge products from manufacturers all over the world and illustrates DOE's Building America strategies to conserve energy and building materials. For instance, instead of performing a traditional demolition of the existing homes on the site, the builder deconstructed them, recovering the maximum amount of materials for their highest and best reuse.

TNAH 2011 is designed to meet or exceed the requirements for DOE's Builders Challenge and dual certification to the Emerald level of the National Green Building Standard™. The home is also designed to meet or exceed certification to ENERGY STAR®. Its energy-efficient features can be used in homes in a hot-humid climate at any price point with similar energy savings.

IBACOS worked closely with NCHI to ensure energy efficiency and innovation in TNAH 2011. The home is expected to consume 42% less energy (44% less with electrical generation) than if it were built to code (2009 IECC). At this level of energy efficiency, the home is designed to provide \$2,058 (\$2,165 with electrical generation) in annual energy savings to the homeowner.

Key Energy Features

The New American Home achieves a very high level of energy efficiency. The most noteworthy features of TNAH 2011 include the airtightness of its thermal shell and the use of solar energy for space conditioning and hot water production. Under blower door testing, the thermal shell achieves 0.80 air changes at 50 Pa, an amount that is considered very airtight and keeps unwanted outdoor humidity from entering the home. Open-cell spray foam insulation is used on the inside of walls and underside of the roof deck, as well

as around any penetrations, to prevent air leakage.

The home uses solar energy to power a portion of its space conditioning and hot water systems. A new offering from the HVAC manufacturer bundles the space conditioning system with four dedicated photovoltaic (PV) panels. When the system is not running, other electrical devices in the home can use the solar power instead. Overall, the home uses approximately 77% less energy for heating and 83% less energy for cooling compared to a similar home in the same climate zone. In addition, a solar thermal system, which includes an 80-gallon storage tank, heats water for most of the home. In this system, a circulating pump sends water from the storage tank to a solar panel on the roof; the sun heats the water as it passes through the panel and then returns to the storage tank for use in the home. A natural gas-fueled tankless water heater satisfies any remaining water needs.

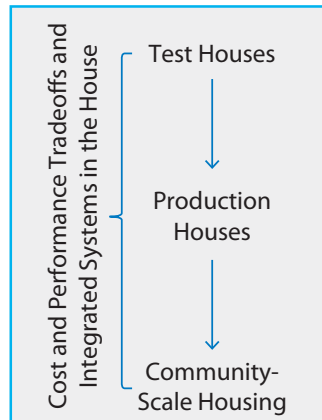
Systems Engineering Approach

Building America’s systems-engineering approach unites segments of the building industry that have previously worked independently of one another. Building America forms teams of architects, engineers, builders, remodelers, equipment manufacturers, material suppliers, community planners, mortgage lenders, and trade contractors.

The concept is simple: systems-engineering can make America’s homes cost effective to build or retrofit and energy efficient to live in. Energy consumption of new houses can be reduced by as much as 30% with little or no impact on the cost of construction. Similar performance can be achieved in existing homes.

To reach this goal, Building America teams work with their building partners to produce houses that incorporate energy and material saving strategies from design through construction or retrofit.

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 other high-performance features to further reduce energy use.

The “pilot” or “test” home is the field application of solution design. Teams assist builders in building 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, reanalysis, and design alteration facilitates ultimate home performance once a design or retrofit strategy 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



Open-cell spray foam insulation on the underside of the roof deck provides up to R-30 thermal performance, bringing the attic into the conditioned space.



All ductwork is within the conditioned space and well-sealed using mastic.

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.



Builders Challenge

Recognizing Energy Leadership in Homebuilding

Spearheaded by the U.S. Department of Energy (DOE), Builders Challenge allows participating homebuilders to easily differentiate their best energy-performing homes from other products in the marketplace and to make the benefits clear to buyers. Homes that qualify must meet a 70 or better on the EnergySmart Home Scale (E-Scale) and meet Builders Challenge Quality Criteria. The E-Scale is an easy-to-understand tool that helps homebuyers and homeowners

make smart energy decisions when purchasing, renting, or updating a home.

Builders Challenge establishes a framework for continuous improvement that will help propel the market toward highly energy efficient homes. The program aims to increase use of existing proven and cost-effective technologies that reduce energy consumption, provide resources and case studies on field

implementation of these new technologies in homes, and spur strong consumer demand. Builders Challenge is based on lessons learned from the Building America Research Program—a private/public partnership that develops energy solutions for new and existing homes. For more information, visit www.buildingamerica.gov/challenge.

Visit our Web
sites at:

www.buildingamerica.gov

www.buildingamerica.gov/challenge

www.energystar.gov

www.nahbgreen.org



Builders Challenge

Recognizing Energy Leadership in Homebuilding



NAHB National Council
of the Housing Industry



For more information on
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