

The New American Home[®] 2010

Las Vegas, Nevada

Performance Features

Thermal Shell

- Windows with low-e coating to limit solar heat gain (SHGC=0.25 or better)
- Unvented and air sealed attic with R-30 spray foam insulation on underside of roof deck and at gable ends
- Exterior walls with R-23 10"-thick insulated concrete form system
- Exterior insulation and finish system adds R-7 insulation to base wall system

Airtightness

- Penetrations and openings sealed to achieve 0.30 natural air changes under blower door testing at 50 Pa
- Spray foam insulation creates airtight attic space

HVAC

- Variable speed 95% AFUE gas furnace
- Variable speed dual-compressor condensing units with an average 17 SEER performance
- Air distribution systems located entirely within conditioned space
- Mechanical ventilation provided by an energy-efficient ERV
- Ductwork sealed for airtightness

Hot Water

- Solar thermal hot water system
- Natural gas-fueled tankless water heater (EF=0.82)

Electrical

- 10.5 kW photovoltaic (PV) system consisting of 54 solar panels
- ENERGY STAR[®]-rated dishwasher, clothes washer, and refrigerator
- 80% of all interior hard wired lamps comprised of energy efficient CFLs, LFLs, and LEDs



The New American Home[®] 2010, Las Vegas, Nevada

Overview

The New American Home[®] is built annually for the International Builders' Show[®] to demonstrate innovative new products, construction techniques, technologies, and designs to the housing industry. Most features and innovations in the home are accessible for builders and consumers to integrate in their own homes. Co-sponsored by the National Council of the Housing Industry (NCHI) and *BUILDER Magazine*, the home is one of the more visible programs of the National Association of Home Builders (NAHB). IBACOS, a U.S. Department of Energy (DOE) Building America team, provided technical support for the design and implementation of energy efficiency measures in The New American Home.

The New American Home 2010 is a 6,078 square-foot home set in the Kathryn Estates neighborhood of Las Vegas, Nevada. It is a single-family, custom-built home tailored to Las Vegas' hot-dry climate. The home has two stories and five bedrooms, as well as special features like an outdoor kitchen and fireplaces; a bridge connecting the family room, kitchen, and entertainment areas to the bedrooms; indoor-outdoor living areas; and a "grandparent's bedroom" with a coffee bar. The desert-contemporary home was designed by the architecture firm KTGy Group of Irvine, California, and built by Domanico Custom Homes of Las Vegas. The home is not only a showcase home but also a for-sale product.



Energy-efficient LED lighting serves as the main source of lighting for the home.



Added as part of the wall finishing system, expanded polystyrene insulation offers R-7 thermal performance.



Overhangs and roof extensions create shade to protect windows and exterior walls from the sun.



Most of the exterior walls consist of an airtight, energy-efficient insulated concrete form system made with recycled polystyrene.



Spray foam insulation on the roof's underside creates an airtight attic space and eliminates the need for strict airtightness around ceiling-mounted lighting fixtures.



Continuous spray foam insulation across the entire surface of this step ceiling promotes good energy efficiency.

Energy Efficiency

Each year, The New American Home is a model of energy efficiency and innovation. The project's goals include implementing DOE's Building America strategies to conserve energy and materials.

As with past homes, The New American Home 2010 offers builders an example for producing energy-efficient homes without sacrificing style. The home is designed to meet or exceed the requirements for certification to ENERGY STAR® and dual certification to the Gold level of the National Green Building Standard™ and DOE's Builders Challenge. Its energy-efficient features can be used in homes in a hot-dry climate at any price point with similar energy savings.

To ensure energy efficiency and innovation, IBACOS provided design and engineering support for NCHI. The University of Nevada, Las Vegas Center for Energy Research assisted

IBACOS on-site. As a result, the home is expected to consume 49% less energy (72% less with PV system contribution) than if it was built to code (2006 IECC). Because of its efficiency, it is expected to provide \$3,376 in annual energy savings (\$5,007 with PV system contribution).

Energy Features

The New American Home 2010 offers many noteworthy, energy-efficient features. Two in particular are the home's thermal shell and HVAC system. The exterior walls were constructed using a 10"-thick insulated concrete form system made with recycled polystyrene with R-23 thermal performance. All of the windows have a low-e coating to limit solar heat gain and perform at $U=0.34$ $SHGC=0.25$ or better. The sliding glass doors perform at $U=0.34$ $SHGC=0.17$ or better. The attic is unvented and air sealed with R-30 spray foam insulation on the underside of the roof deck and at gable ends.

The home's HVAC system also contributes significantly to energy savings. The ventilation system is a high-efficiency energy recovery ventilator (ERV) that helps ensure good indoor air quality by providing a controlled source of outdoor air. The space conditioning system is estimated to use 65% less energy for heating and 66% less energy for cooling than a home of similar size built to code (2006 IECC) in a hot-dry climate. Each air handling system is located entirely within the conditioned space and consists of MERV 8 air filtration, a variable speed 95% AFUE gas furnace, and variable speed dual-compressor condensing units with an average 17 SEER performance.

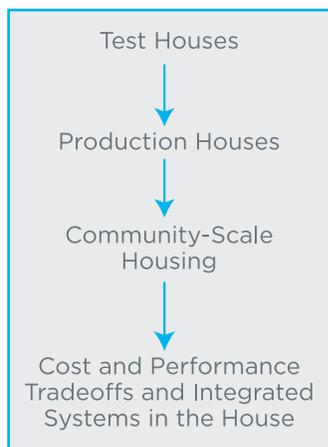
Systems-Engineering Approach

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 with their building partners 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 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 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



Energy efficient sliding glass doors and windows limit solar heat gain.



An extensive photovoltaic system generates electricity for the home.

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.



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.

DOE's ultimate vision is that by 2030 a consumer will have the opportunity to buy an affordable net-zero energy home—a grid-connected home that produces as much energy as it uses over the course of a year—anywhere in the United States. Builders Challenge establishes a framework for continuous improvement that will help propel the market toward zero energy performance.

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



For more information on this project contact:

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The New American Home 2010

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