

The New American Home® 2008

Orlando, Florida



Specifications

- Exterior walls are autoclaved, aerated concrete blocks (R-8) with R-4 rigid foam insulation on interior and R-5.7 insulation system on exterior
- The attic is unvented, sealed, and indirectly conditioned
- Thermal and air barrier at underside of roof sheathing (R-20 spray foam insulation)
- Three high-efficiency heat pump units with 16.6 SEER and 8.5 heating season performance factor (HSPF)
- Air distribution system is airtight and entirely inside conditioned space
- Solar thermal water heating and instantaneous water heaters, energy factor (EF) = 0.82
- 42% whole house 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 details.

Each year, The New American Home® demonstrates innovative building materials, cutting-edge design, and the latest construction techniques. It provides production homebuilders with an example for producing more energy-efficient, durable homes without sacrificing style. This year, The New American Home celebrates its 25th anniversary. Cosponsored by The National Council of the Housing Industry (NCHI) and *BUILDER Magazine*, the New American Home is not only the official showcase house of the annual International Builders' Show, but is also a for-sale product. Most features and innovations in the home are accessible to builders and consumers for integration into their own homes.

The New American Home 2008 is a 6,725 square-foot, plantation-style home in the prestigious Water's Edge at Lake Nona subdivision. This is a gated, 11-lot parcel along the banks of Lake Nona in Orlando, Florida. The first home to be built here, The New American Home 2008 is near a lakefront park, boat dock, and other custom-built homes. The home features luxuries inside and out. A family suite on the first level can accommodate an elderly parent or a long-term guest. There are also a first floor master suite, an open kitchen/nook/leisure room, and an upstairs club room complete with theater-quality entertainment, games, and other activities. The home's combined 2,950 square feet of covered outdoor spaces feature an outdoor kitchen and a solana (or salon) with a fireplace and arched openings to the lake view and a landscaped pool and spa. The project is a collaborative effort between home designer The Sater Group, builder Robertson Homes, interior designer Robb & Stucky, and landscaper Outside Productions. Several NCHI/leading

suppliers to members of the National Association of Home Builders (NAHB) will provide building products and systems, from the windows and appliances to insulation and structured wiring.

To ensure energy efficiency and innovation, two Building America teams have worked closely with NCHI. Integrated Building and Construction Solutions (IBACOS) provided design and engineering support, and the Industrial Housing Partnership provided performance testing. As a result, the home's two stories are conditioned by three strategically placed, high-performance HVAC systems. The heat pumps have a maximum of 16.6 seasonal energy efficiency ratio (SEER) performance and each unit and its associated ductwork are within conditioned space. A solar thermal hot water system serves half the house, and tankless water heaters, which are fueled by natural gas, serve the other half. These further add to the home's efficiency.

Other prominent features contribute to energy efficiency and durability. Exterior walls were constructed with autoclaved, aerated concrete blocks (R-8); R-4 rigid foam insulation was placed continuously on the interior, and R-5.7 insulation was integrated into the exterior finish system. The attic is unvented, sealed, and indirectly conditioned. A thermal and air barrier was constructed at the underside of roof sheathing with R-20 spray foam insulation. These combined features result in 42% whole house energy savings.

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



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

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

Building Technologies Program



Energy Features and Benefits

Performance Features

Thermal Shell

- Exterior walls are autoclaved, aerated concrete blocks (R-8) with R-4 rigid foam insulation on interior and R-5.7 rigid foam insulation system on exterior.
- The attic is unvented and sealed airtight.
- A thermal and air barrier was constructed at underside of roof sheathing and insulated to R-20 with spray foam insulation.

Airtightness

- Penetrations and openings are sealed to achieve 0.30 natural air changes.
- Aerated concrete blocks and exterior insulation system create airtight exterior walls.
- Spray foam insulation creates airtight attic space.

Moisture Control

- Windows and doors are effectively flashed to shed water.
- Flashing is integrated with the drainage plane system to increase durability.
- The wall system consists of expanded polystyrene insulation, aerated concrete blocks, and extruded polystyrene insulation to control moisture diffusion from the outside to the living space.

HVAC

- Three air source heat pumps, 16.6 SEER and 8.5 HSPF, serve the house.
- All ductwork is insulated and airtight within conditioned space.
- Outdoor air is supplied by a mechanical ventilation system.

Hot Water

- Half the house is served by a solar thermal water heater with electric backup.
- Propane-fueled, instantaneous water heaters (EF = 0.82) minimize piping and reduce standby losses.

Electrical

- ENERGY STAR®-rated dishwasher, clothes washer, refrigerator

For more information, contact:

- Robertson Homes: 407-892-8537
- National Council of the Housing Industry: 1-800-368-5242 ext. 8519
- IBACOS: 1-800-611-7052
- Industrialized Housing Partnership: 407-384-2048

Energy efficiency is among the top benefits of The New American Home 2008. The home uses approximately 62% less energy for heating and cooling and 57% less energy for water heating compared to a house of comparable size in the Hot Humid climate zone. Each component of the home was selected and integrated into the project through a systems approach of designing, testing, and redesigning. All its components work together to achieve maximum performance. For example, the home's thermal qualities are achieved by the right insulation materials and specifications, and the ductwork was designed to fit inside the conditioned space.



An innovative construction material, aerated concrete block provides R-8 insulation.

IBACOS



Where wood framing was needed it was easily filled with spray foam insulation.

IBACOS



Spray foam insulation gives hard-to-access areas an air and thermal barrier.

IBACOS



Continuous R-4 foam board insulation ensures even temperature conditions at the exterior walls.

IBACOS

Each year for the International Builders' Show, The New American Home transforms from a graded plot into a 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, and high-performance hot water equipment. Overall, the home uses approximately 62% less energy for heating and cooling and 57% less energy for hot water, compared to a similar home.



A solar thermal hot water system serves half the house.

IBACOS



The cathedralized attic means less worrying about the airtightness of penetrations in the ceiling.

IBACOS



The back of the house features gracious architectural design and plenty of shaded areas to relax on a hazy summer afternoon.

IBACOS



A view from the side of the home reveals its expansive design and rooflines topped with concrete roofing tiles.

IBACOS



Tall pillars and a cupola authenticate the plantation-style architecture of the home.

IBACOS

Advantages

Advantages to the Consumer

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

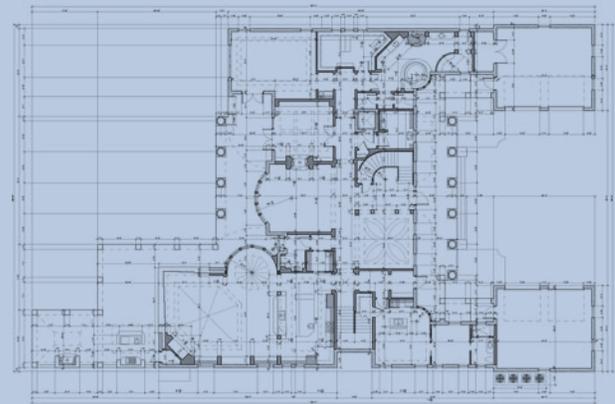


Advantages to the Builder

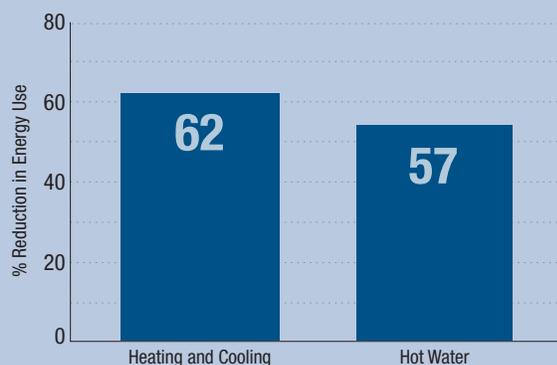
- Reduces construction costs
- Improves productivity
- Improves building performance
- Reduces callbacks and warranty problems
- Allows innovative financing as a result of predictably lower utility bills
- Gives builder a competitive advantage

Systems Engineering Cost Saving Tradeoffs

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



First floor plan for The New American Home 2008



Percentage of Energy Reduction

- 64% reduction in cooling energy use
- 55% reduction in heating energy use
- 57% reduction in hot water energy use

Systems-Engineering Approach

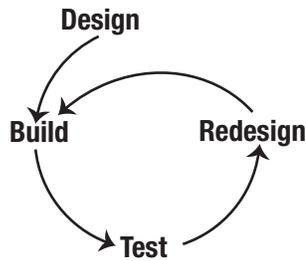
Building America's systems-engineering approach unites segments of the building industry that have traditionally worked independently of one another. Building America forms teams of architects, engineers, builders, equipment manufacturers, material suppliers, community planners, mortgage lenders, and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



IBACOS/PIX14228

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



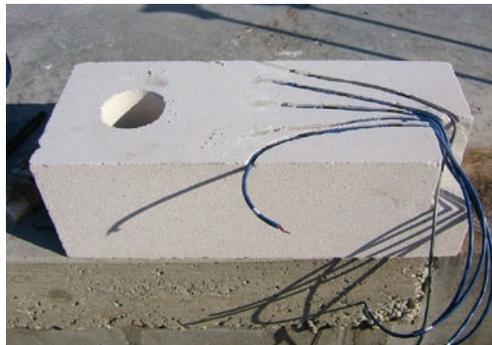
IBACOS/PIX14858

High-efficiency water heaters save heating energy and provide ample amounts of hot water.



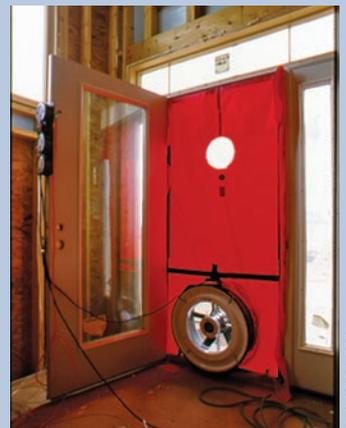
IBACOS

A supplementary humidity control system was added to the HVAC equipment to optimize comfort.



IBACOS

This section of aerated concrete block is outfitted with monitoring equipment that will provide information about its thermal properties.



IBACOS/PIX12906

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

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

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



IBACOS

Visit our Web sites at:

www.buildingamerica.gov

www.pathnet.org

www.energystar.gov



Research Toward Zero Energy Homes
Building America Program

George S. James • New Construction • 202-586-9472 • fax: 202-586-8134 • e-mail: George.James@ee.doe.gov

Terry Logee • Existing Homes • 202-586-1689 • fax: 202-586-4617 • e-mail: terry.logee@ee.doe.gov

Law Pratsch • Integrated Onsite Power • 202-586-1512 • fax: 202-586-8185 • e-mail: Law.Pratsch@hq.doe.gov

Building America Program • Office of Building Technologies, EE-2J • U.S. Department of Energy • 1000 Independence Avenue, S.W. • Washington, D.C. 20585-0121 • www.buildingamerica.gov

Building Industry Research Alliance (BIRA)

Robert Hammon • ConSol • 7407 Tam O'Shanter Drive #200 • Stockton, CA 95210-3370 • 209-473-5000 • fax: 209-474-0817 • e-mail: Rob@consol.ws • www.bira.ws

Building Science Consortium (BSC)

Betsy Pettit • Building Science Consortium (BSC) • 70 Main Street • Westford, MA 01886 • 978-589-5100 • fax: 978-589-5103 • e-mail: Betsy@buildingscience.com • www.buildingscience.com

Consortium for Advanced Residential Buildings (CARB)

Steven Winter • Steven Winter Associates, Inc. • 50 Washington Street • Norwalk, CT 06854 • 203-857-0200 • fax: 203-852-0741 • e-mail: swinter@swinter.com • www.carb-swa.com

Davis Energy Group

David Springer • Davis Energy Group • 123 C Street • Davis, CA 95616 • 530-753-1100 • fax: 530-753-4125 • e-mail: springer@davisenergy.com • deg@davisenergy.com • www.davisenergy.com/index.html

Integrated Building and Construction Solutions (IBACOS)

Brad Oberg • IBACOS Consortium • 2214 Liberty Avenue • Pittsburgh, PA 15222 • 412-765-3664 • fax: 412-765-3738 • e-mail: boberg@ibacos.com • www.ibacos.com • IBACOS provided technical support for TNAH '08

Industrialized Housing Partnership (IHP)

Subrato Chandra • Florida Solar Energy Center • 1679 Clearlake Road • Cocoa, FL 32922 • 321-638-1412 • fax: 321-638-1439 • e-mail: subrato@fsec.ucf.edu • www.baihp.org • IHP provided on-site support for TNAH '08

National Council of the Housing Industry (NCHI) of the NAHB

Tucker Bernard • NCHI • The Supplier 100 • National Association of Home Builders (NAHB) • 1201 15th St. NW, Washington, D.C. 20005 • 800-368-5242 ext. 8519 • e-mail: tbernard@nahb.org • www.nahb.org

National Renewable Energy Laboratory

Ren Anderson • Residential Buildings Research • 303-384-7433 • fax: 303-384-7540 • e-mail: ren_anderson@nrel.gov
Tim Merrigan • Solar Heating and Lighting Research • 303-384-7349 • fax: 303-384-7540 • e-mail: tim_merrigan@nrel.gov
1617 Cole Boulevard, MS-1725 • Golden, CO 80401 • www.nrel.gov

Oak Ridge National Laboratory

Pat M. Love • P.O. Box 2008 • One Bethel Valley Road • Oak Ridge, TN 37831 • 865-574-4346 • fax: 865-574-9331 • e-mail: lovepm@ornl.gov • www.ornl.gov

Pacific Northwest National Laboratory

Michael C. Baechler • 620 Southwest 5th, Suite 810 • Portland, OR 97204 • 503-417-7553 • fax: 503-417-2175 • e-mail: michael.baechler@pnl.gov • www.pnl.gov

Produced for the U.S. Department of Energy (DOE) by the National Renewable Energy Laboratory, a DOE national laboratory.
December 2007 • DOE/GO-102007-2538

Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 20% postconsumer waste.