

Show Home Targets Energy Efficiency in Hot-Humid Climate



Bloodgood Sharp Buster Architects & Planners, Inc./PIX13594

The New American Home® is an annual project focused on the future of homebuilding. Cosponsored by The National Council of the Housing Industry and *Builder Magazine*, the project teams up industry experts to design, build, and monitor a demonstration home that has been equipped with the latest marketable home technologies and products. Completed for the International Builders' Show, The New American Home® is a showcase of cutting-edge features and innovations that are accessible, in whole or in part, by builders and consumers across the country for application in their own homes.

Goehring and Morgan built The New American Home 2005® in Baldwin Park, a community a little more than two miles from downtown Orlando, Florida. The location influenced the traditional Southern design, which was created by Bloodgood Sharp Buster, architect, and Saxon-Clark, interior designer.

The home's outstanding performance qualities set it apart from other homes in the area. Energy efficiency weighs heavily among its innovations. The home is expected to reach total energy savings of 30% compared to a home of similar size and function.

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 four high-efficiency heat pump units and uses zone control to maintain ideal temperature settings in the home's eight zones. Each unit and its associated ductwork are within conditioned space. Additionally, specially coated windows will help preserve a comfortable indoor climate. For the health, comfort, and safety of occupants, two dehumidifier/ventilator systems draw air from the outdoors and dehumidify it before directing it inside, which improves air quality.

The two-story home is handicapped accessible. Its layout and amenities are targeted for a family with three to five children and are designed to support a lifestyle where family members can grow and age in comfort. It includes a master suite, four bedrooms, library, game room, private courtyard with a pool, and a spacious three-car garage. The Baldwin Park community lies on the former site of a naval training center and represents exemplary cleanup and reuse of a military area. This upscale community requires its homes to reflect architectural styles of central Florida before 1940 and has won awards for design and environmental stewardship.

Specifications

- Solar thermal panels provide most water heating needs, backed by an electrical element
- Four high-efficiency heat pump units
- Minimum of 14 SEER for condensing units
- All air handling equipment and ductwork within conditioned space
- Attic predominantly unvented with a small vented section to be used for testing
- A thermal (R-22) 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 situation in bedrooms
- High-performance windows with a spectrally selective low-emissivity coating to reduce cooling and heating loads
- Air distribution systems with performance targets of 80, 120 (2), and 160 cfm
- 30% 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, mechanical ventilation systems, and advanced insulation and airtightness detail.

Performance Features

Thermal Shell

- R-3 foam board insulation on the first floor concrete block walls
- Spray foam insulation (R-19 minimum) on the second floor exterior walls (2 x 8 wood framed) and underside of roof

Airtightness

- Increased airtightness of the building shell through the sealing of penetrations and openings
- Ductwork made of sheet metal and flex duct and sealed with UL-181 approved mastic on all connections

Moisture Control

- Proper drainage plane and flashing detailing

HVAC

- Four high-efficiency heat pump units
- Continuous and balanced air conditioned via dehumidifier/ventilator system
- Zone control system for the home's eight zones
- All mechanical equipment and ductwork located within conditioned space

Hot Water

- Solar thermal panels for water heating

The New American Home®

For more information contact:

Goehring & Morgan
407-650-2022

National Association of Home Builders
800-368-5242

IBACOS
800-611-7062

Energy Features and Benefits

Among the top benefits of The New American Home 2005® is energy efficiency. The home will use 47% less energy for heating and cooling, and 64% less energy for water heating, than a house of comparable size in this climate. Each component was selected and integrated into the project through a system of designing, testing, and redesigning. All its components work together to achieve maximum

performance. The home's good 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 conditioned space. Innovations such as thermal solar panels in the hot water system improve efficiency even more.



Insulated concrete forms the walls of the basement.



The roof is made of red clay tile that is characteristic of traditional Florida homes.



Dramatic 20-foot ceilings that have been carefully ducted show the marriage of pre-1940 style with modern efficiency.



The home reflects care for detail, such as the pattern in these floor tiles.



FERC/IBACOS/PIX13603

High foundation walls protect the home against groundwater and create an upscale profile.



FERC/IBACOS/PIX13607

The second floor is insulated with spray foam, minimum R-19.

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 airsealing, 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 70% reduction in heating, 43% reduction in cooling, 64% reduction in hot water when compared to a similar home.



FERC/IBACOS/PIX13604

Low-emissivity windows help to save energy on heating and cooling the home.



David Hoak, FSEC/PIX13591

Open web joists were extremely useful for allowing the passage of ductwork within conditioned space.



FERC/IBACOS/PIX13606

Spray foam insulation keeps the ductwork within conditioned space.



FERC/IBACOS/PIX13605

Sealing at all penetrations provides for airtightness in the building.

Advantages to the Consumer

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



IBACOS, NREL / PIX12942

Systems Engineering Cost Saving Trade-Offs

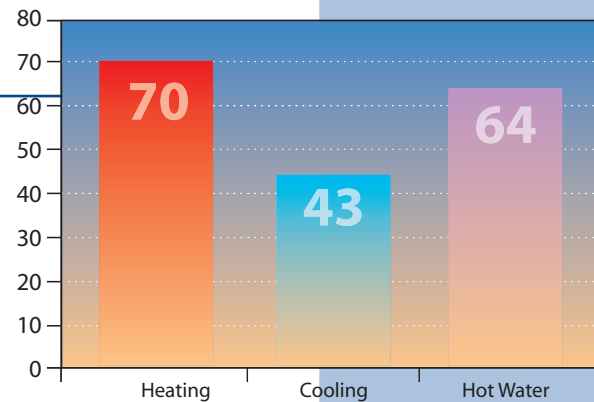
- Advanced framing systems
- Tightly sealed house envelopes
- Shorter, less costly ductwork
- Disentangled the infrastructure
- Smaller, less expensive mechanical systems
- Modular construction



Bloodgood Sharp Buster Architects & Planners, Inc. / PIX13595

Percentage of Energy Reduction

- 70% reduction in heating energy use
- 43% reduction in cooling energy use
- 64% reduction in hot water energy use



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



FERC/IBACOS/PIX13600

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.

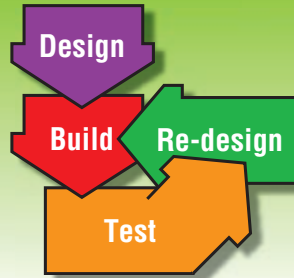
First, teams analyze and select cost-effective strategies for improving home performance. Next, teams evaluate design, business, and construction practices within individual builder partnerships to identify cost savings.

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. The team builds this prototype home according to strategic design, tests each system for efficiency, and makes 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 process. 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.

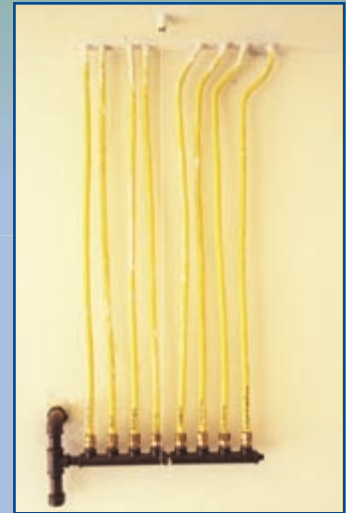


An energy recovery ventilator ensures good indoor air quality.

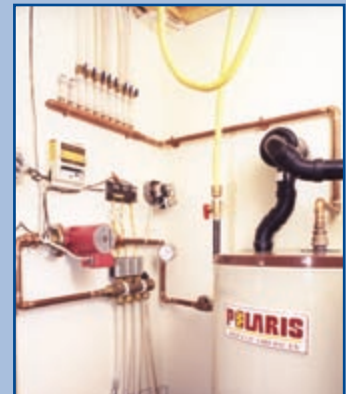


Open web trusses provide space within the building enclosure to run electrical wires and ducts.

Achieving High Performance Using A Systems-Engineering Approach



This manifold piping distribution system is easier to install than traditional systems.



High-efficiency water heaters provide ample hot water and use less energy.



Home airtightness is tested with a blower door.

IBACOS, NREL / PIX12935

IBACOS, NREL / PIX12912

IBACOS, NREL / PIX12910

IBACOS, NREL / PIX12937

IBACOS, NREL / PIX12906

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 factsheet is available on the Building America Web site at www.buildingamerica.gov



FERC/IBACOS/PIXT/3610

Dehumidifier/ventilator system filters outdoor air before it is distributed.



FERC/IBACOS/PIXT/3608

Sliding doors allow indoor and outdoor areas to merge as one. Monitoring of space conditioning equipment use under these conditions will be compared to design assumptions to verify proper equipment sizing.

Visit our Web sites at:

www.buildingamerica.gov

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www.energystar.gov



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
Lew Pratsch • Integrated Onsite Power • 202-586-1512 • fax: 202-586-8185 • e-mail: Lew.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

IBACOS Consortium

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

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

National Association of Home Builders (NAHB) Research Center

Tom Kenney • National Association of Home Builders (NAHB) Research Center • 400 Prince George's Boulevard • Upper Marlboro, MD 20774 • 301-430-6246 • fax: 301-430-6180 • toll-free: 800-638-8556 • www.nahbrc.org/

National Renewable Energy Laboratory

Ren Anderson • 1617 Cole Boulevard, MS-2722 • Golden, CO 80401 • 303-384-7433 • fax: 303-384-7540 • e-mail: ren_anderson@nrel.gov • www.nrel.gov

Tim Merrigan • 1617 Cole Boulevard, MS-2722 • Golden, CO 80401 • 303-384-7349 • fax: 303-384-7540 • e-mail: tim_merrigan@nrel.gov • 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

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