



The New American Home®

U.S. Department of Energy

Specifications

HERS 91.1, 0.35 natural ACH airtightness target

Low-E windows, U=0.33, SHGC=0.32

Draftstopping for building airtightness, particularly around second-floor child's loft

Housewrap weather barrier, building paper

Unvented crawl space and precast foundation

Energy recovery ventilator delivers fresh air to return plenum in each air handler

One air handler unit for basement and most of first floor, other serving first floor core and second floor

Ductwork leakage target 160 cfm each system

Lennox condensing units efficiency to 12 SEER, 9 tons total

Direct-vent gas furnaces, 93% AFUE

Zone control system with five zones

The New American Home®

Atlanta, Georgia – 2002

The New American Home®, an annual showcase project designed by committee and co-sponsored by the National Association of Home Builders' (NAHBs) National Council of the Housing Industry (NCHI) and *Builder Magazine*, was an extraordinary project for John Wieland Homes and Neighborhoods. This show home isn't unfamiliar to Wieland—they were the builder for The New American Home® at the 1989 International Builders' Show. With its 30-year history of building in Atlanta, Georgia, Wieland is a natural fit for the project. To design and build a home that is energy efficient, as well as attractive, John Wieland Homes teamed up with *Building America's* IBACOS Consortium and Southface Energy Institute, a nonprofit environmental building group based in Atlanta.




This new home for the 2002 International Builders' Show met the challenge of achieving the Home Energy Rating System (HERS) level of 91.1. The fact that this home has such a high level of energy efficiency, when it includes so many aesthetic features and lifestyle products, is a tribute to the construction efforts undertaken by John Wieland Homes. The Environmental Protection Agency and U.S. Department of Energy (EPA/DOE) will present John Wieland Homes with the ENERGY STAR® Award for their achievements in this home. Additionally, the home has qualified under the EarthCraft House program (www.earthcrafthouse.com), a green building program of the Greater Atlanta Home Builders Association and Southface Energy Institute.

The primary goal of John Wieland Homes for The New American Home® was that it should establish a level of energy efficiency not seen before at a display home for the International Builders' Show, while keeping upgrade costs within reason. A key element in meeting this goal was planning and designing for performance. Intricate and detailed duct design layout; heating, ventilating, and air conditioning (HVAC) optimization; and airtightness strategies were developed. The team at John Wieland Homes provided valuable input and participation at the design and implementation stages that lead to a very successful project.

Because John Wieland Homes created a very efficient envelope for this home, they were able to use two air handling units instead of four. The HVAC optimization strategy, which followed a detailed duct layout, is a model to demonstrate to other builders that heating, cooling, and ventilating of a very large home can be done economically and efficiently, without sacrificing performance or homeowner comfort.

Durability was of great importance in the design of The New American Home®. Particular attention was paid to airtightness in the cathedral ceiling, drainage and moisture control, and window flashing. A particular result of this attention to detail is that John Wieland Homes should experience benefits from reduced warranty and liability claims.

The New American Home® Primary Goals

-  Build a high-profile, uniquely designed showhome for the International Builders' Show, to *Building America* energy efficiency level (HERS 90)
-  Construct a home with greater attention to durability
-  Introduce production builders to advanced HVAC strategy and airtightness details



IBACOS/PIX10732

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The New American Home®

Features and Benefits

Performance Features:

Thermal shell

- o Superior Wall System® foundation (R-24)
- o R-15 walls

Airtightness

- o Sealed penetrations
- o Child's loft on second floor
- o Air barrier at exterior bathtubs and duct chases

Rain Control

- o Roof, wall, and window flashing well integrated into house wrap

Moisture Control

- o Air space maintained throughout vaulted ceiling at foil-faced roof sheathing
- o Drainage layer behind synthetic stone

Duct Air Leakage

- o Mastic sealant used on duct joints or UL181 tape on duct board

HVAC

- o HVAC in conditioned space
- o Zone control system

Ventilation

- o Energy recovery ventilator

Details

- o Sauna
- o Media Room

As the centerpiece display home for the International Builder's Show, The New American Home® (TNAH) sports qualities unlike that of any other show home. Energy-efficient design is a paramount characteristic of TNAH. The home will use 58% less energy for heating and 53% less energy for cooling than a home of comparable size. By improving various parts of the home incrementally, this goal was achieved with minimal cost impact. As an example, thermal performance of walls was maximized to the most practical extent and both HVAC units were positioned in conditioned space, instead of the attic, to reduce cooling loads.

This section highlights specific features and benefits unusual to The New American Home®.



IBACOS/PIX10731

Strategy of well-integrated window and door flashing with housewrap



IBACOS/PIX10743

Superior wall system contributes to a very high performance home with overall R value of 24



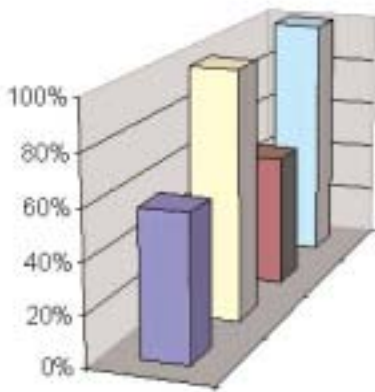
IBACOS/PIX10744

Indoor/outdoor tea room posed building airtightness and air distribution challenges for master bedroom above

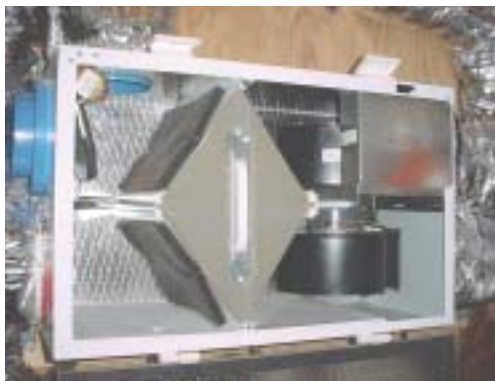


IBACOS/PIX10740

Child's loft utilizes unused attic space efficiently, but posed unique challenges in insulation and airtightness detail



- Heating, TNAH
- Heating, Comparable Home
- Cooling, TNAH
- Cooling, Comparable Home



IBACOS/PIX10733

Energy recovery ventilator tempers fresh outdoor air before delivering to HVAC equipment



IBACOS/PIX10742

IBACOS is extensively monitoring the home's performance for one year, while the house is occupied

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

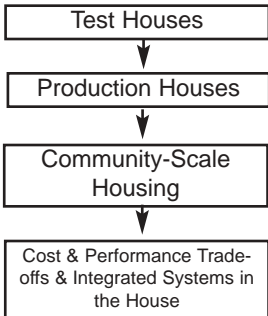
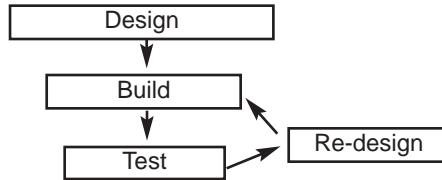
The concept is simple. The systems-engineering approach can make America's new homes cost effective to build and energy efficient to live in. Energy consumption of new houses can be reduced by as much as 50% with little or no impact on the cost of construction.

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

First, teams work to 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 that further reduce energy use and costs.

The "pilot home" or "test" home is the field application of solution analysis. The team builds this prototype home according to their 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 original design. This process of analysis, field implementation, re-analysis, and design alteration facilitate 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 the design and construction process, careful consideration is made to the relationship between building site, envelope, mechanical systems, and other factors. The recognition 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. System trade-offs, like tightening a shell to enable the use of a smaller HVAC system, can improve the quality and performance of a home without increasing cost to builder or consumer.

Advantages to the Builder



IBACOS/PIX10746

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

Advantages to the Consumer



IBACOS/PIX10736

- Increases quality without increasing cost
- Increases comfort and performance
- Does not detract from the home's aesthetic
- Reduces utility bills
- Allows greater financing options

Systems engineering cost-saving trade-offs include:



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



IBACOS/PIX10739

Advanced framing systems



IBACOS/PIX10741

Tightly sealed house envelopes



IBACOS/PIX10738

Shorter, less costly ductwork



IBACOS/PIX10737

Disentangling the infrastructure



IBACOS/PIX10734

Smaller, less expensive mechanical systems



IBACOS/PIX10745

Modular construction



BUILDINGS FOR THE 21ST CENTURY

Buildings that are more energy-efficient, comfortable, and affordable ... that's the goal of DOE's Office of Building Technology, State and Community Programs (BTS). To accelerate the development and wide application of energy efficiency measures, BTS:

- Conducts R&D on technologies and concepts for energy efficiency, working closely with the building industry and with manufacturers of materials, equipment, and appliances
- Promotes energy- and money-saving opportunities to both builders and buyers of homes and commercial buildings
- Works with state and local regulatory groups to improve building codes, appliance standards, and guidelines for efficient energy use
- Provides support and grants to states and communities for deployment of energy-efficient technologies and practices.

VISIT OUR WEB SITES AT:

WWW.EREN.DOE.GOV/BUILDINGS/BUILDING_AMERICA

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Building America Overview

The Program

The U.S. Department of Energy's *Building America* Program is reengineering the American home for energy efficiency and affordability. *Building America* works with the residential building industry to develop and implement innovative building processes and technologies—innovations that save builders and homeowners millions of dollars in construction and energy costs. This industry-led, cost-shared partnership program uses a systems-engineering approach to reduce energy use, construction time, and construction waste by as much as 50%.

The Approach

Building America's systems-engineering approach unites segments of the building industry that have traditionally worked independently of one another. It forms teams of architects, engineers, builders, equipment manufacturers, material suppliers, community planners, mortgage lenders, and contractor trades. There are five teams comprising more than 230 different companies.

The Results

Each *Building America* team is constructing test homes and developing community-scale projects that incorporate its systems innovations. More than 9,000 energy-efficient houses have been built by the teams to date.

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