

# **Building America**

George S. James Building America Program U. S. Dept. of Energy



2004 International Builders Show January 19 – 22, 2004



# The Program

The U.S. Department of Energy (DOE) Building America Program is:

- Research
- Development
- Technology implementation
- Cost-shared, technical support

#### This process develops:

- System engineered, sustainable, innovative building methods; and
- Integrated, cost-effective, advanced technologies



# **Benefits**

# Through research, Building America helps builders

- Lower customers' energy bills by 30–70%
- Improve comfort and indoor air quality
- Reduce construction costs and waste
- Reduce callbacks and warranty claims
- Offer cost-saving building system trade-offs
- Stand out in the marketplace
- Provide new product opportunities
- Learn from other builders



# Approach

Building America has teams of leading experts in building science and system engineering that offer production home builders, remodelers, and home builders integrating on-site power systems free technical information

- Design reviews
- Energy modeling
- Performance specification writing
- Training and workshops
- On-site consulting
- Access to Building AmericaSM research

#### Building America Industry-Driven Systems Engineering Research



#### Systems Engineering Research Consider Moisture and Thermal Climate Zones



# **Building America Communities**

- Over 270 builders and manufacturers
- More than 20,776 energy-efficient houses
- In 31 states







# Advanced Systems Target



Advanced Building Components R&D

> Existing Buildings

Residential Codes Research

Buildings Integrating On-Site Power

#### **Building America**

- Advanced industry-driven system engineering research
- Technical support through industry consortia
- Accelerated development of "production ready" housing systems

### **Whole-house Approach**

Local Building Climate Structure Building America<sup>sM</sup> considers performance and interactions of all building systems

Building<br/>ThermalHeating and<br/>Cooling<br/>Systems



### **Systems Engineering Research**

Phase I	Phase II	Phase III
200 30% Heating and cooling energy reduction	50% Heating and cooling energy reduction	70% Heating and cooling energy reduction
R&D	R&D	R&D
Demonstration	Demonstration	Demonstration
Deployment	Deployment	Deployment



### Average Energy Savings at Pulte-Tucson





NREL

### **Unvented Attics**





#### Resisting the Lateral Loading of Earthquakes Alternate Wood Shear Wall Panels



**Pulte Homes** used the basic panel configuration, first proposed by Building Science Consortium, to provide lateral resistance that did not interfere with the insulation sheathing.

The City of Tracy, CA, approved the use of 2x4 stud wall panels set inside a 2x6 frame to provide effective seismic resistance performance.



### Building Science Consortium Copper Moon



#### Tucson, Arizona

#### **Features**

- Unvented cathedral attic
- Low-E<sup>2</sup> spectrally selective windows
- Sealed ducts with mechanical ventilation
- Stack framing
- Blown cellulose wall and ceiling insulation

#### Cost Summary for Building America Metrics—Copper Moon, Tucson, AZ

Unvented roof	+ \$ 750
NOT installed roof vents	-\$ 500
High performance windows	+\$ 300
Controlled ventilation system	+ \$ 150
Downsize air conditioner by 2 tons	- \$ 1000
Sealed combustion furnace	+ \$ 400
TOTAL PREMIUM	+ \$ 100

### Building Science Consortium Village Green Community

#### 74 units of 1,700 sq ft



#### Sylmar, California

#### **Features**

- Solar control glazing
- Integrated ventilation system
- High efficiency framing
- Gas cooling to minimize electric less
  - minimize electric load
- Grid-connected
  - 1.4 kW photovoltaics

### National Renewable Energy Laboratory Van Geet Residence



Idaho Springs, Colorado

#### **Features**

- High mass construction
- Integrated mechanical system
- High efficiency appliances and lighting
- Active solar hot water system for DHW and radiant space heating
- Propane backup heat and generator
- Off-grid powered
  - 1.2 kW photovoltaics

### **Builders System Performance Packages**





# Visit Our Website

# www.buildingamerica.gov

# **Thank You**

