



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



**Building
AMERICA** 
U.S. Department of Energy
Research Leading to Zero Energy Homes

Building America Program at FSEC: Highlights and Plans for the Future

Subrato Chandra - July, 2009



Special Thanks To:

- ✓ U.S. Department of Energy, Building America program, especially Mr. George James, Mr. Terry Logee, Mr. Ed Pollock and Mr. Bill Haslebacher for sponsoring our research for the past 20 years
- ✓ Co-PIs - Danny Parker, Eric Martin, Janet McIlvaine, Dave Chasar, Jim Cummings, Neil Moyer, Philip Fairey, Rob Vieira, Carlos Colon, Chuck Withers, Stephanie Thomas-Rees, John Sherwin, David Beal and Lixing Gu
- ✓ Subcontractors – WSU, RESNET, Oregon DOE, Florida H.E.R.O., Calcs-Plus and others
- ✓ Over 50 Site and factory Builder Partners throughout U.S.



Building America Goals

- ✓ Perform cost shared R & D towards Net Zero Energy Homes
- ✓ Provide technical assistance to builders that result in thousands of high performance homes – saving 30% - 50% or greater in whole house energy use while enhancing comfort, indoor air quality and durability
- ✓ **www.buildingamerica.gov**
- ✓ Builders Challenge – Deployment arm of BA



BAIHP Overview

- ✓ One of six and the only university based (UCF) prime contractor to US DOE Building America
- ✓ Initiated September, 1999: Re competed 2005, 2009
- ✓ BAIHP works in all U.S. housing sectors -- factory and site built, single and multifamily, new and retrofit housing.



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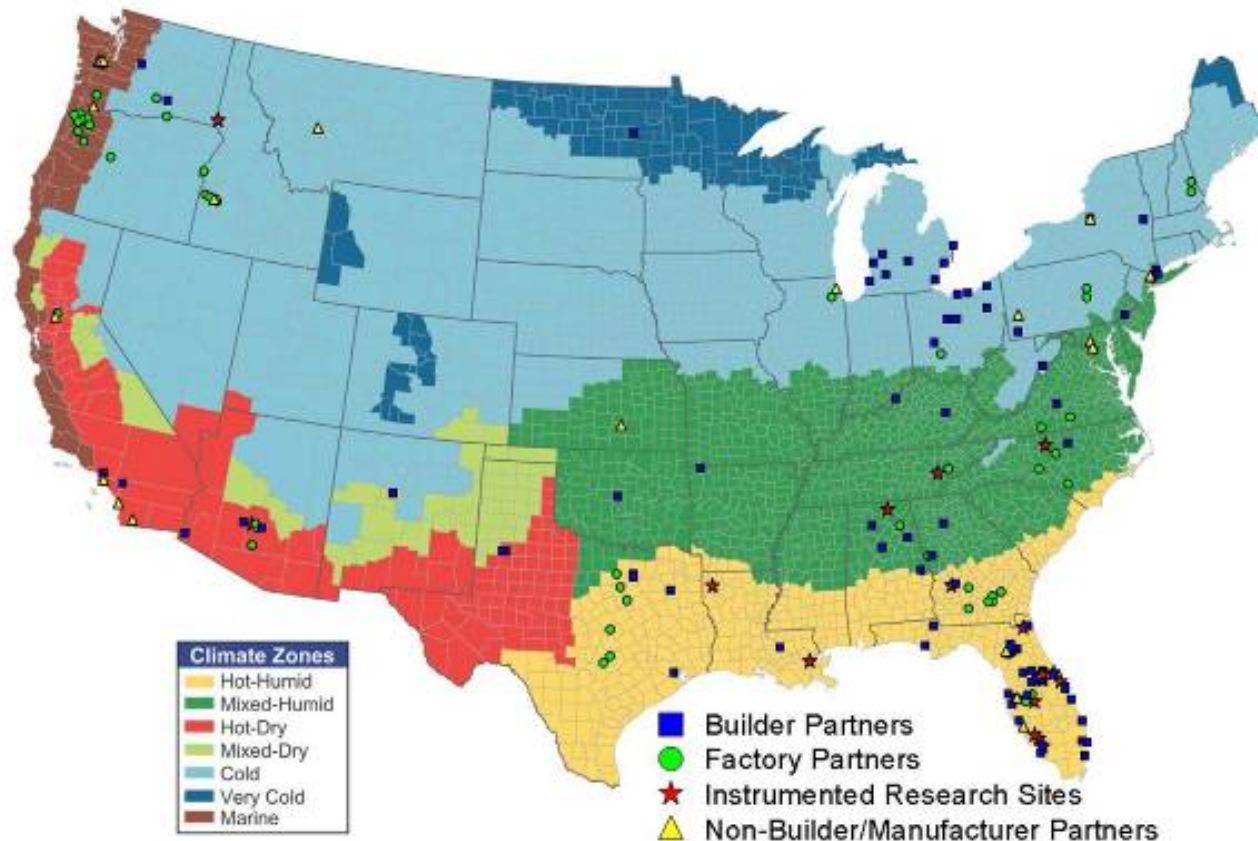
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BAIHP is estimated to save over \$18,100,000/yr in 184,500+ homes

BAIHP Research and Technical Assistance Sites





Builders Challenge Homes

- ✓ Must have E-Scale (i.e. HERS) <70
- ✓ Must Meet Quality Criteria
- ✓ Can be built by any builder. Sign up at <http://www1.eere.energy.gov/buildings/challenge/>
- ✓ Meet the highest energy standard of any Green or Energy Star program. Over 1,600 homes to date since inception on 2/14/08



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EScale = HERS Index. B-C homes are better than 99% of new construction.

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EnergySmart Home ScaleSM



Estimated annual energy usage:
Electric (kWh) 8019
Natural Gas (therms) 100

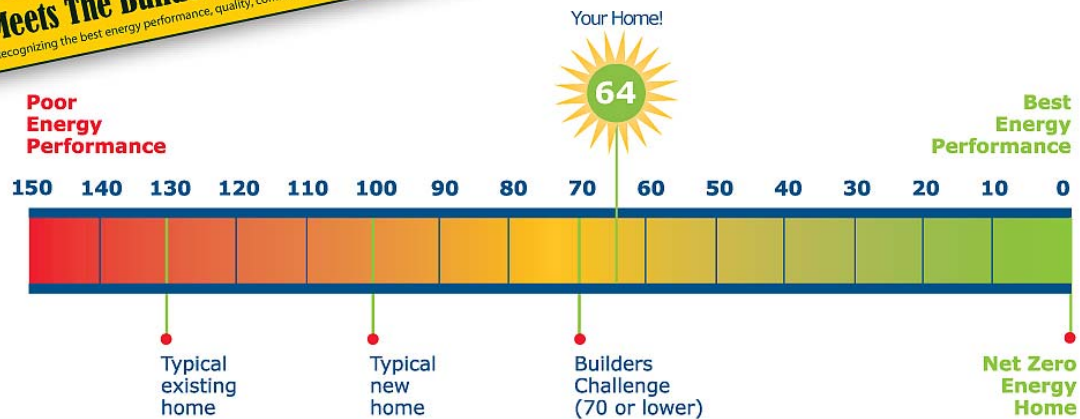
Estimated average monthly energy bill:
\$95

14479 NW 25th Street, Newberry, FL
Rated by Florida H.E.R.O., Inc.
Rating conducted **April 14, 2008**

Conditioned floor area (sq. ft.): 1508

www.buildingamerica.gov/challenge

Meets The Builders Challenge
Recognizing the best energy performance, quality, comfort, health and safety in the market.



08FL640000000673





Sample of required QC provisions:

- Whole-house mechanical ventilation
- Energy Star Thermal Bypass Checklist
- Building envelope moisture management practices
- Minimum load sizing and HVAC design criteria
- Duct sealing and leakage testing
- Minimum HVAC filtration specifications
- Reliable documentation

Builders Challenge Quality Criteria Resource Guide



Participating BAIHP Builders

- ✓ G. W. Robinson Builders, Gainesville, FL
- ✓ Tommy Williams Homes, Gainesville, FL
- ✓ Castle & Cooke, Winter Garden, FL
- ✓ Skobel Development, Gainesville, FL
- ✓ Lifestyle Homes, Melbourne, FL
- ✓ Schackow Realty and Development, Gainesville, FL
- ✓ Spain and Cooper, Gainesville, FL
- ✓ Dibros Corp., Gainesville, FL
- ✓ Palm Harbor Homes, FL and AZ
- ✓ Brownsville Affordable Housing Corporation, Brownsville, TX
- ✓ Habitat for Humanity Affiliates in FL , AL and LA.



Production Builder Example



- GW Robinson Builders, Gainesville, FL
- Over 75 B-C Homes to date



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Tommy Williams Homes (>30 B-C Homes)



Homes with Superior Comfort as well as Energy Efficiency



Systems Engineering Approach

- Understand builder desire
- Provide customized solutions including plan analysis, HVAC design, inspecting, testing and rating every home
- Progressively increase energy efficiency over time
- Consistently deliver homes that have E-Scale <70



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So, do these homes sell?

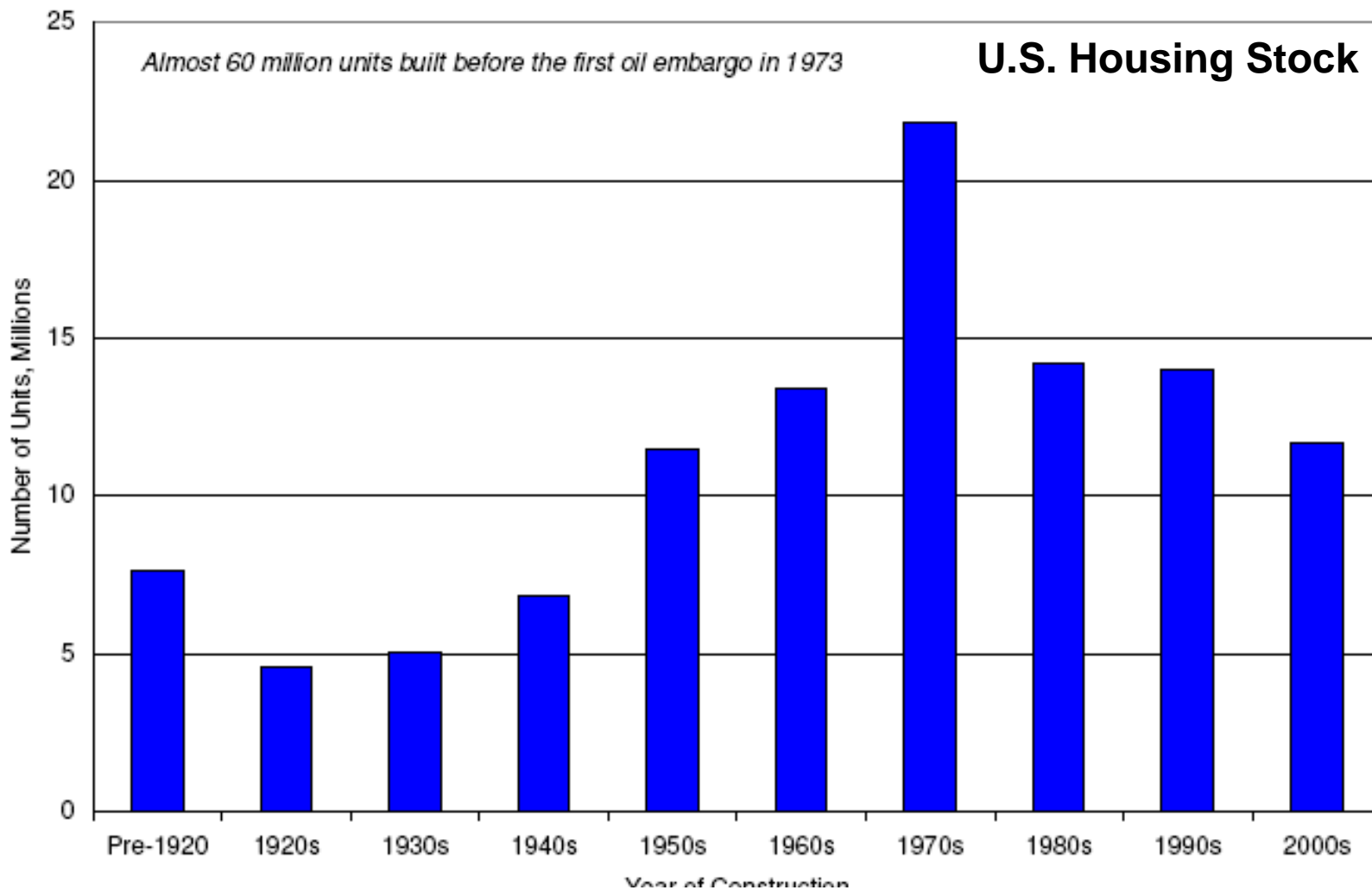


Tommy Williams Homes Sales Data, Longleaf subdivision, both builders have 275 lots each. Gainesville, FL.

| | TW | Competitor |
|--------------------|----------------|----------------|
| Sales Price | \$161/ sq. ft. | \$148/ sq. ft. |
| 12/06 – 5/08 sales | 44 homes | 22 homes |



Existing Homes – The Next Frontier





Current BAIHP work in retrofits

- Deep retrofits of foreclosed homes being bought by counties with HUD – NSP funds
 - Sarasota County
 - Brevard County
 - Alachua County
 - Orange County
- City of Sanford
- Broward County Habitat
- Lakeland Habitat



Two FPL Co- Funded Projects;
Wind Washing and SEER 22+



Jim Cummings, PI

Current Funding

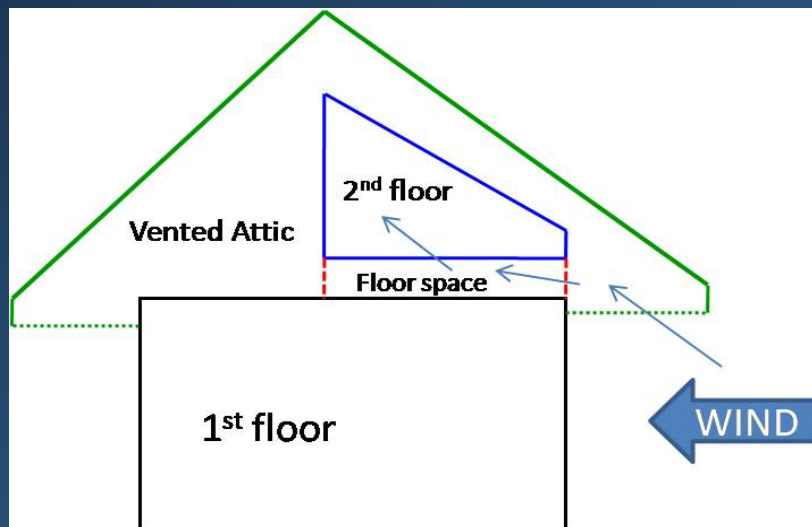
Wind Washing - \$74,000

SEER 22 - \$40,000



Wind Washing in Two-Story Homes

- Primary focus: air flowing from attic spaces to open floor cavities.
 - Hot attic air penetrates into the interstitial cavities of the home, side-stepping the thermal boundary of the building
 - Field testing in 32 homes; repair in 6 homes





Proposed Targeted and Phased Retrofit Project for Florida

Danny Parker, PI

- What are the levels?
 - I. Immediate survey: audit and mass measures (non-tailor made, but large implementation).
 - II. Tailored implementation: Evaluation for specific home and occupants; home owner & computer driven evaluation

Strategy

- **Implement measures with cost share funding from non – BA sources (per RFP)**
- **Monitor all homes and use sophisticated statistical analysis to isolate peak demand and energy impacts of individual measures for Utility RIM and TRC analysis and possible incentive levels**
- **Presentation to FPL managers this Monday 27 July.**



The Next 5 years

- Preparing a \$25,000,000 proposal for work to be conducted during 2010 – 2014
- Proposals due August 24, 2009
- “DOE seeks 25% cost share while minimum acceptable is 11.11%”, “Other selection factors” talks about even higher than 25% cost share and leveraging?
- Will you please help ?



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Thank You

