



BUILDING AMERICA TOP INNOVATIONS HALL OF FAME PROFILE

INNOVATIONS CATEGORY:

2. House-as-a-System Solutions
- 2.1 New Homes with Whole-House Packages

Reduced Call-Backs with High-Performance Production Builders

When Grupe of Stockton, California, worked with Building America to build 144 energy-efficient homes in its Carsten Crossings development, the site superintendent said he had the lowest call-back rate of any community he had worked on. He credited the third-party HERS inspections and testing for keeping the quality of work high and catching problems before move-in (Dakin et al. 2008).

Building America results directly address the business interests of the housing industry. One Harvard study of program partners concluded there was on average a 50% reduction in call-backs. Moreover, Building America builders have ranked in the top three in all 17 markets in the JD Power customer satisfaction survey and their new-home quality study.



BUILDING AMERICA TOP INNOVATIONS

Recognizing Top Innovations in Building Science – The U.S. Department of Energy's Building America program was started in 1995 to provide research and development to the residential new construction and remodeling industry. As a national center for world-class research, Building America funds integrated research in market-ready technology solutions through collaborative partnerships between building and remodeling industry leaders, nationally recognized building scientists, and the national laboratories. Building America Top Innovation Awards recognize those projects that have had a profound or transforming impact on the new and retrofit housing industries on the road to high-performance homes.

It is essential to engage production builders to successfully transform the market to high-performance homes. Building America has effectively addressed this challenge by demonstrating the compelling linkage between high-performance homes and reduced call-backs.

A significant reduction in call-backs can save builders thousands of dollars, boost their reputations, and make homeowners more likely to recommend them. It's not surprising that Building America has noted a strong linkage between high-performance homes and reduced call-backs, with builders reporting big reductions in call-backs since the program began in 1995. Although few builders are willing to report exact call-back rates, since they consider the data proprietary, the many anecdotal reports are backed up by two studies.

In 2004, Harvard University's Energy Technology Innovation Project surveyed builders who partnered with Building America. On average, the builders reported call-back rates of 11% to 20% before adopting Building America standards. Afterwards, the average rate was 6% to 10% (Norberg-Bohm and White 2004).

“Across these projects, builders working with Building America reported lower warranty and call-back problems on their advanced designs,” the Harvard researchers reported. “One participating builder reported a 50-fold reduction in the incidence of pipe freezing, a 50% reduction in drywall cracking, and a 60% decline in call-backs.”

One Building America research partner, Building Science Corporation, has experienced significant call-back reductions among builders it assisted. According to a 1999 report in *Home Energy Magazine*, the 19 companies working with this partner had no call-backs on comfort-related issues, compared to a typical rate of 3% to 5% for homes built to code. For issues related to paint and trim, the companies reported a call-back rate of 1%, compared to the typical 5%. For call-backs due to drywall cracking, the rate was 10% versus the typical 50%. *Home Energy* also reported that companies in the cold climate zone that worked with Building Science Corporation and had adopted Building America standards saved on average \$200 per house because of reduced call-backs (Bodzin 1999).

“You really can't put a price on customer satisfaction. There's no better advertising than a homeowner who is satisfied with their investment.”

Tommy Williams, President, Tommy Williams Homes

Some builders have saved much more. Building Science Corporation and the Natural Resources Defense Council reported dramatic savings for Town & Country Homes. The large Chicago builder joined Building America in 1995; by 1999, warranty claims and call-backs had fallen more than 70%, saving the builder \$400,000 per year (Edminster et al. 1999).

Tommy Williams Homes of Gainesville, Florida, had frequent buyer complaints about uneven heating and cooling. In 2004 they consulted two Building America research partners: Florida HERO and the Florida Solar Energy Center.

“When we first began working together, almost 50% of their new homes had a call-back or complaint within 100 days of move in, most of them related to the HVAC,” said Ken Fonorow of Florida HERO. Tommy Williams implemented a broad set of recommendations and began constructing all homes to DOE’s Builders Challenge standards. The builder tightened the thermal envelope, right-sized the HVAC equipment, simplified the duct system, and reduced duct leakage to 4%. The builder also moved the air handler into conditioned space and installed a positive-pressure supply-ventilation system that is able to maintain comfort during high humidity weather conditions. “They went to 0% call-backs and complaints for HVAC issues,” Fonorow said.

Artistic Homes of Albuquerque, New Mexico, first consulted a Building America researcher in 1998 because of high call-backs. They started implementing the building science-based recommendations, which included moving ducts into conditioned space in a dropped soffit, careful air sealing, right sizing the HVAC equipment and installing a heat recovery ventilator. The company’s call-back and warranty costs dropped to near zero. “We haven’t had a house where we had to go back and modify anything about the HVAC system. It’s working,” said company vice-president Max Wade, as quoted in *Home Builder Magazine* (Andrews 2003).

After working with Building America, production builder Pulte Home’s Tucson Division went from customer complaints, call-backs, and lawsuits to a number one ranking in J.D. Power and Associates’ New Home Builder Customer Satisfaction Survey for the Tucson market in 2003, according to their Vice President of Construction Alan Kennedy. Nail pops were a common cause of call-backs for Pulte. Building America recommended they use advanced framing techniques, including 2-stud, rather than 3-stud corners, where drywall is hung with drywall clips, rather than being nailed to a third stud. The drywall clips allow a slight amount of movement as the wood dries and settles, reducing nail pops and drywall cracks. Advanced framing also leaves more room for insulation, reducing thermal bridging and the associated hot and cold spots in a home.

Builders Challenge, now the DOE Challenge Home, requires blower-door and duct-blaster tests for every home, and builders say this reduces call-backs. Texas Classic Homes already was building energy-efficient homes when it decided to follow this guidance. When the company brought in a third party for inspections and testing, it discovered ways to improve both home design and its work with subcontractors.

“Giving the subcontractors test data and feedback makes them want to do better,” said project manager Travis Pate. “Everybody is communicating with each other. We’ve gone from maybe one call-back every third or fourth house to one call-back a year.”



Texas Classic Homes had significantly fewer call-backs after adopting Building America’s research-based, whole-house approach to home building.

Lessons Learned

Builders cut call-backs by

- blower door and duct blaster testing every home
- using advanced framing including drywall clips
- using a whole-house approach to solving temperature and moisture issues.

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