



DOE Publishes Industry Sponsored Report Highlighting Advances In Manufactured Home Energy Practices

The U.S. Department of Energy's (DOEs) recently published report, "Field Evaluation of Advances in Energy Efficiency Practices for Manufactured Homes," highlights a three year project of the industry's research arm, the Systems Building Research Alliance (SBRA) and DOE's Building America Program.

Through field-testing and analysis, this project evaluated whole-building approaches and the contributions of select technologies toward reducing energy use. Three "lab" houses of varying designs were built and tested side-by-side under controlled conditions in Russellville, Alabama. The homes were built by MHI manufacturer member, Southern Energy Homes.

The three side-by-side, unoccupied lab houses included heating, ventilating, and air-conditioning systems that simulated normal energy use. Each house represented a commonly specified set of features that impacts the energy used for space heating and cooling. The homes had features that reflected the following levels of energy efficiency:

- Home A featured a design meeting the minimum standards of the HUD-Code;
- Home B was an ENERGY STAR home; and,
- Home C was a design meeting the DOE Zero Energy Ready Home. The Zero energy Ready Home is a high-performance home labeling program that includes all of the requirements of ENERGY STAR Certified Homes, EPA's *AirPlus* standard for indoor air quality; the hot water distribution requirements of the EPA *WaterSense* program; and the insulation requirements of the 2012 International Energy Conservation. This home was the nation's first certified as a DOE Zero Energy Ready Home.

David Brewer, General Manager for Southern Energy Homes, was impressed by the results of the study. "We're excited about the project," he said. "It will be highly marketable."

Below are highlights of the project results:

- Energy consumption: During the cooling period, House C used half the energy of the other houses. House B used slightly less energy than House A for cooling. House B and House C consumed about the same amount of heating energy, which was nearly one-third of the heating energy consumed by House A.
- Comfort: All three homes operated within indoor comfort guidelines specified by the Air Conditioning Contractors of America ($\pm 3^{\circ}\text{F}$ temperature variation from the temperature at the thermostat during the cooling period) when the interior doors were open. House C used one-third of the heating energy of House A with superior comfort results. Some bedrooms in House A and House B had difficulty maintaining temperatures within $\pm 2^{\circ}\text{F}$ of the set point.

- Propensity for moisture problems. Wood moisture content was slightly higher in House C than in House B, but it was still well within the safe limits. This was because of the addition of exterior foam insulation to the walls in House C. However, compared to House B, the use of foam sheathing on House C also resulted in an average higher temperature (5.5°F) during the heating season, mitigating condensation risk.
- Peak load performance. Peak demand in House C was significantly lower than it was in the other two houses throughout the year. House B had somewhat lower peaks than did House A during most months. House A and House B winter peaks were similar during the winter months, suggesting that House B's peak occurred when the heat pump was not operating and the house was relying solely on electric resistance backup. On average, during peak hours House B had an 18% lower peak demand than House A, and House C had a 69% lower peak demand than House A.
- Estimate of costs and benefits. The cost to the manufacturer (counting only the energy-efficiency measures) to build House C compared to House A and House B were \$2,060 and \$1,166, respectively. The price premiums for the homebuyer to purchase House C compared to House A and House B would be \$6,607 and \$4,339, respectively, assuming that the houses were in regular production. The simple paybacks to the homebuyer associated with building House C compared to House A and House B ranged from approximately 8.8 to 17.5 yr.

[Click here](#) to view a copy of the report.

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