

# **Kansas Project Solar House**

## **(Kansas State University and University of Kansas)**

The team from Kansas chose their building materials carefully, with an eye toward celebrating their state and being ambassadors to represent Kansas. The house features reclaimed wood from a deconstructed barn that the students tore down themselves, recycled-glass Enviroglas terrazzo concrete, and sustainably harvested wood flooring and exterior decking. The home's extensive use of structural insulated panels made it very low labor—the team built it in just eight days.

### **What's Different?**

- The team built the home in just eight days.
- On the way back home from the competition, the team will be stopping at major cities in Kansas to display the home. It can be unloaded from the truck and set up in a matter of hours. It's final destination will be Greensburg, Kansas, which was devastated by a tornado in May 2007.

### **Architecture, Interior Comfort**

- The team's extensive use of structural insulated panels made the house very “low labor.”
- The home's sophisticated monitoring and control system, developed by Siemens Building Technologies, directs all utility systems, turning systems off when they are not needed or if the home's energy supply is low. As a backup though, batteries hold three days worth of energy.
- The house features extensive use of recycled and reclaimed materials. Finishes include reclaimed wood from a deconstructed barn that the team members tore down themselves, recycled-glass Enviroglas terrazzo concrete, and sustainably harvested wood flooring and exterior decking. These building material choices reflect the team's central mission statement point—“to celebrate this place, to be an ambassador to represent the state of Kansas.”
- The design features systems that integrate the building and the landscape. In conjunction with the Department of Horticulture and the LAND Institute, the students formulated native seed mixes for the shallow planters used in the green roof.

### **Heating and Cooling Systems**

- Members of the Kansas Project's mechanical team performed an exhaustive survey of potential cooling strategies. Based on this, they selected a standard heat pump with a dehumidifier and economizer cycle as the best option.
- The mechanical team worked closely with a professor, Dr. Warren White, to develop a high-efficiency control system for the mechanical equipment.
- While the heat from the electronics equipment (mainly associated with the solar power system) is normally vented out of the house, the team can also divert the heat into the house during the heating season.

### **Lighting (including Daylighting)**

- A translucent polycarbonate north window wall and insulated aerogel skylights provide daylighting.
- Indirect fluorescent lights blend with the daylighting, with only a few LED can lights for task lighting.

### **Appliances**

- A centrifugal clothes dryer uses a fraction of the energy of a conventionally heated dryer.
- An induction cooktop heats only the cookware and the food inside it, never getting hot to the touch.

### **PV and Solar Thermal**

- A facade of solar panels attached to standing-seam metal roofing covers most of the south wall, located right at eye level and tilted at 64° to maximize winter sun, when energy demand is at its highest. The panels are integrated into the exterior face of the building.
- The tilt of half of the solar array is adjustable to optimize its orientation to the sun year round.
- A backup water heating system uses electricity to heat the water at the point of use, just before the faucet and showerhead. This avoids the need to keep a separate storage tank full of hot water.

**Communications**

- Students in a Kansas State University Science Journalism class wrote articles and developed content for the Web site, house tour, and a video feature about the project.

**Budget****Future Plans**

- The house will be relocated to Greensburg, Kansas, to serve as a model for green and sustainable building. The house will also be employed as a research and learning tool to teach other cities about green building concepts.

**Kid's Corner**

- This house took only eight days to build.

**Team Information**

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