

Case Study 6: Solar Prefab Phoenix House

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Students from three neighboring universities have teamed up to design and build a solar-powered home that could be deployed after a natural disaster hits a town. The prefabricated Phoenix House rises from the rubble and is designed to help build more resilient communities after a natural disaster. Built with durability and longevity in mind, the home can provide its own power and produce and also offers up a safe room in case of tornadoes. Team Kentuckiana (University of Louisville, Ball State University, and University of Kentucky) will showcase the Phoenix House this fall at the 2013 Solar Decathlon Competition.

Team Kentuckiana makes use of the engineering, business and communication skills from the University of Louisville, the architecture and construction expertise from Ball State University, and engineering support from University of Kentucky. The team joined forces in response to a common goal – helping communities recover after a natural disaster. Their work is inspired by the destruction and havoc that resulted from the EF-4 tornado that hit Henryville, Indiana on March 2, 2012. The team's goal is to design and build a home that can be used as permanent post-disaster housing to help communities rebuild and grow even stronger.

The Phoenix House, inspired by the mythical Phoenix bird that rises from its own ashes, is a prefabricated, modular home designed for a small family on a modest budget. Two modules built with SIPs are trucked to the site and installed into place. The roofs are raised and trusses are inserted to create a pitched roof perfect for a photovoltaic array and rainwater collection. Inside, the compact home has a spacious feeling open floor plan living, dining and kitchen area, with two bedrooms and a bathroom on one end. Lower ceilings over the bedrooms create a loft that can be used for additional storage and multipurpose furnishings allow the home to change on demand to accommodate guests.

The 7.8 kW solar system provides all the power necessary for the home and can operate off-grid in the wake of a disaster. Meanwhile, the home is constructed of durable and low-maintenance materials that can withstand time and severe storms. The bathroom is used as a safe room in the event of a tornado. Outside, ample deck space extends living areas to the out of doors and planters are used to grow food for the house. Rainwater is collected and wastewater is filtered and processed for irrigation use. Team Kentuckiana will compete in the 2013 Solar Decathlon in Irvine, CA this fall.



