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Sun

power

Purdue University Solar Decathlon team pairs with area businesses to build a sustainable home.



McKenna J. Regan, a member of the Purdue Solar Decathlon team, stands next to the solar house service panel.

For the 200 students, 13 faculty members, and 60 businesses working on the Purdue University Solar Decathlon team, the project is a timely chance to demonstrate—in materials and in cost—how a home using solar energy and a lot of other sustainable products can be built in Greater Lafayette.

The team is part of the larger U.S. Department of Energy Solar Decathlon, an international competition involving 20 teams representing universities and colleges from all over the world that are competing for first prize in building a sustainable home. The teams will display their finished homes on the National Mall, West Potomac Park in Washington, D.C., from Sept. 23 through Oct. 2.

The Purdue team is the first Indiana team that is competing in the decathlon.

The process and final products will, in a sense, be a look into the home of the future, as the public is invited to tour the homes in Washington, D.C. In August, the solar decathlon team also plans to have open house tours of the Purdue home for Greater Lafayette residents before the home is disassembled to transport to Washington for the competition. The house is located in West Lafayette behind the Purdue West shopping center.

From a business standpoint, one of the primary target audiences of the Purdue project is builders, says Kevin Rodgers, a Purdue College of Technology graduate student, who is the Solar Decathlon project manager.

"We want a builder to be able to walk through the house and see the practicality of our design, realize that they can build it, and make a profit because that is really how these homes are going to be built. There has to be a business decision behind it," Rodgers says.

The idea of every home in a neighborhood being solar and otherwise sustainable is still too expensive for most people to conceptualize. Projects like this one, which uses research on getting state-of-the-art products into homes, is one way to help the business community and the buying public move closer to that goal.



Purdue professor of mechanical engineering technology Bill Hutzel is a lead faculty advisor on the project, and is the one who championed the idea of entering the competition to the Purdue community when he first saw it in 2007 while working in the U.S. Senate.

"When I came back to Purdue, I wanted to make college students and the general public aware that low-cost energy-efficient homes using solar power are available now," Hutzel says. "I would say my major role is building a university-wide team to tackle this."

In addition to the solar aspect of the Purdue home, known locally as IN Home, the house is expected to have as many sustainable materials as it possibly can. The idea is to give the public more examples of how to incorporate sustainability, or green products, into their homes, says Sarah Miller, who is an undergraduate student in interior design and the architecture and design manager of the Purdue solar decathlon team.

Homeowners who want to make their houses sustainable need not do everything at once, and in fact, it's a good idea to make the transition to sustainability gradually, notes Rodgers.

The first issue a homeowner should address on the road to energy efficiency is to evaluate the exterior of the home and the insulation, such as the roof, walls and any crawl spaces.

Eric Holt, the construction manager for the solar decathlon home and a Ph.D. student in building and construction management, recommends something called a blower door test.

"Basically, it is putting a big fan in the door and measuring how leaky the house is," explains Holt. "You can actually feel the air blowing in, and we depressurize it, so in an older home, for example, they probably leak a ton of air, and you can feel it with your hand."

Next address the doors and windows, and replace any that aren't energy efficient, such as single-pane, very thin windows, which are outdated, explains Rodgers. Then start looking into the interior of the house, beginning with the appliances, and replace any that aren't up-to-date for energy efficiency. Evaluate the lighting and the heating and cooling systems to make sure they are modern enough and as energy efficient as they can be,

Rodgers adds. Look into installing a solar attic fan, which keeps the cool air inside.

After all of this has been done—perhaps years later—look into installing solar photovoltaic panels for supplying the electricity for your home or a solar hot water heater, or both. Every year, the price of solar panels is coming down, inching toward making it an affordable choice for any homeowner.

Alex Jarvis, president of Solar Systems of Indiana, Inc., was chosen to work with the students to guide them in the installation of the solar panels on the IN Home. Jarvis's business is based in Bloomington, where he and his wife, who is an artist, both have home offices that operate by solar power. He concedes, however, that installing solar is not an easy task for a homeowner because there are hurdles to cross, such as meeting all specified local building codes, working with the utility in a residential area, and coordinating the proper electrical functions so that nothing goes haywire when the transition is made. Jarvis is one of a small number of NABCEP (North American Board of Certified Energy Practitioners) credential solar installers in Indiana.

"For most people to do the work, they would need an electrician to have the permit and have the authority to go ahead and install a solar electric system," says Jarvis.

But the Purdue decathlon is based on the premise that solar will become a viable option for families in the not-too-distant future.

Cost is an integral part of the competition because the idea is to create a house that is practical for an ordinary family to use, so according to the competition rules, the maximum cost for the house is \$250,000.

After the competition, the plan is for the solar home to live on in a Lafayette neighborhood, with the definitive location still to be determined. The Purdue team and the Greater Lafayette business community want to continue the idea of the home as an example of how to do solar, and that will require monitoring the house to observe how well the solar power and the sustainable materials work—with an ordinary family of the future living inside. ☼

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Susan Benedict (right) of Design Alternatives with a Purdue Solar Decathlon team member, Sarah Miller.

Sky's the limit with solar opportunities

For the Greater Lafayette business community, Purdue's participation in the U.S. Department of Energy Solar Decathlon is a green opportunity for more publicity and, ultimately, more business.

At least 60 companies are participating in some way in the project, notes Kevin Rodgers, solar decathlon project manager. Many of the companies have stores in Greater Lafayette, others are regionally based in the Midwest, and at least one comes from as far away as California.

Susan Benedict, the owner of Design Alternatives in Lafayette, has been instrumental in getting the local business community involved with the project. Benedict is a certified kitchen designer through the National Kitchen and Bath Association (NKBA). Design Alternatives is a distributor of Grabill Cabinets, which will be used in the Purdue IN Home, as the solar home is called in Greater Lafayette. The goal is to make the home using as many sustainable materials as possible, Benedict notes.

"I am partnering with Grabill as a sponsor to supply the cabinetry for the kitchen, bath and laundry areas," she says. Grabill is located in Grabill, Ind.

Benedict, who says she finds that more and more of her customers want to incorporate green concepts into their kitchen and bath designs, has also been working with the students on the project.

"I have kind of acted as a sounding board when the Purdue team has questions, and they want to get my opinion on what I think of different design concepts that they have," she says. "Questions like, 'Does it fit in the real world? Will people like this? Is it sustainable?'"

The project is giving students of all disciplines, including business, real world experience in building and publicizing a sustainable home of the future.

McKenna Regan, an undergraduate student in the Krannert School of Management at Purdue, is coordinating the public relations for the IN Home.

"Yes, it has definitely given me an opportunity outside of Krannert, where I can develop more skills," she explains. "The experience is kind of outside of what I have learned in school, so this gives me an opportunity to see it through."

Another Lafayette company working on the project is ARKOR, which is an architectural and engineering company. ARKOR is providing consulting services to make sure that the home complies with all local codes and ordinances from a structural and building standpoint, says Rodgers.

Kirby Risk also is participating, having supported Purdue University with numerous projects, says Sue Ramsey, commercial and institutional specialist at the company. The project is an opportunity for Kirby Risk to showcase products that the general public may be unfamiliar with seeing.

"We do a lot of business with Purdue as a customer; the university is very big on supporting the community, and so are we," says Ramsey. "In a situation like this, when you are talking about sustainability, it is an area of growth, it's a very hot topic."

So while solar powered homes are perceived as homes of the future, the economic benefits to the community are happening now.

"We are fast coming to the place where our consumption patterns are non-sustainable," notes Benedict, "so if we can get the general public to understand that we have got to start doing something about it now, what Purdue is doing will be driving buying patterns and decisions that are made in the near future back to the state of Indiana."

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