Tufts
UNIVERSITY

School of
Engineering

Tufts and the Solar Decathlon

Tufts is making its debut this year in the fourth biennial Solar Decathlon sponsored by the U.S. Department of Energy (DOE). Together with collaborators at the Boston Architectural College, Tufts students (and some faculty advisors) are part of Team Boston, a group of entrepreneurial, design-savvy, and environmentally aware practical idealists who are putting their concerns about ecologically sound living to the test by creating a highly energy efficient house.

"This project is focusing on how people should live their lives," according Christopher Swan, associate professor of civil and environmental engineering who met weekly with the engineering members of the team over the summer. "Sustainability is as much a frame of mind as it is about how the house is built," said Swan.

Still, the house must be built, and the merger of theory and practice is what makes this competition a rich learning experience and at the same time a vital laboratory for innovation.

The way it works is the that National Renewable Energy Laboratories (NREL), which is part of the DOE, chooses 20 teams from around the world and gives them each $100,000 to get started. They then have almost two years to do everything that needs to be done in order to erect a fully functioning prototype of an 800-square-foot dwelling on the National Mall in Washington, D.C. Each house will be judged on 10 distinct criteria (hence "decathlon"), such as comfort, lighting design, hot water, architecture, and engineering.

Some of the judging is subjective and some of it is purely objective, the most heavily weighted being how much power the structure draws from (or better yet, contributes to) the grid. The goal for every entry is to show that it can average out to be a net zero consumer of externally supplied energy.

In addition to meeting the energy-use requirements, Team Boston has set itself a goal of creating a house that is affordable for low- to middle-income buyers. Antje Danielson, program manager of the Tufts Institute of the Environment, is playing a coordinating and mentoring role in the project. The 2007 winner came in with a final budget of well over a million dollars, said Danielson. She estimates that while the cost of construction is projected to be almost $400,000, the real costs of the Team Boston prototype, including transporting it to and showcasing it in Washington, will be closer to $650,000. The cash outlay will be less because that figure includes in-kind contributions, such the equipment the German company L-DCS is donating, to create a prototype Liquid Desiccant Dehumidification System for air

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BEYOND BOUNDARIES
The Campaign for Tufts

Better Living through Sunlight

When Matthew Thoms set out to be an engineer, he would have been hard-pressed to predict that part of his education was going to involve doing laundry in the shadow of the Washington Monument. But that is exactly what he will have to do when the Solar Decathlon's Team Boston is put through its paces in the nation's capital during the first three weeks of October. They will not only wash clothes, but cook meals, entertain guests, shower, and take out the trash. Put differently, they will be called on to demonstrate how their creation handles the tasks of quotidian life—and the energy consumed in doing the chores will be meticulously measured and compared to what their temporary neighbors on the mall are able to accomplish.

Thoms went to the first organizing meeting of the Tufts/Boston Architectural College group when he was a sophomore. He'll be a senior by the time he's done with a project to which he devotes an average of 15 hours a week for no academic credit. He is one of seven project directors (all students) who meet frequently as the concepts behind, and then the actual house, take shape.

The house was built on the Tufts campus in April and the team will move it to Washington in the fall to compete with entries from places like Penn State, the University of Arizona, and the Universidad de Puerto Rico. In addition to doing things like keeping the refrigerator in a certain temperature range and holding two dinner parties for neighbors, each team is required to wash and dry 10 loads of laundry during the week.

Thoms said it is "kind of mind-blowing" to work with such an interdisciplinary team that is so excited about a cause. As for his future? "I'm definitely going to stay in green energy," he said, "it's something I really care about."

conditioning. The team is paying $15,000 for a system valued at $60,000, said Danielson. They are currently working on getting deeply discounted state-of-the-art solar panels from companies that want to support them and at the same time show off their wares in a prominent setting.

One of the judging criteria is market viability, which requires the team to submit building plans that any qualified contractor could use. Something that sets Team Boston apart, said Danielson, is the inclusion of policy-oriented students from the Tufts Department of Urban and Environmental Policy and Planning and the Fletcher School of Law and Diplomacy. They are focused on "assessing the larger impacts of the house on the green building market," said Danielson.

Swan said he is especially impressed and gratified by the high level of coordination the project calls for. "The biggest growth is not just the technical knowledge that they pick up, but the professional and ethical skills, their ability to work and communicate as a team." said Swan, "I could not find a project that could do it better; it just fits so well."

THE BOTTOM LINE

A principle of sustainability guiding Team Boston is that there is no one measure of value but that a balance between sometimes competing, but often mutually reinforcing criteria tells a fuller story. Consider the following measures:

Economic factors. Cost matters because affordability means that access to innovative designs is more socially equitable, and wider replication means that the aggregate positive ecological impact will be greater.

Ecological factors. Optimizing energy use in both materials and power consumption leads to long term economic benefits and means that socially there will be more resources to go around.

Social Equity. Fairness counts: enabling more people to afford elegant and workable housing is what will eventually let us maximize the ecological and economic benefits of a green energy future.

HOW YOU CAN HELP

The 2009 Solar Decathlon team is trying to raise $750,000 in cash support and material donations. Here is a sampling of the ways your financial support can help:

- Your gift of $25,000 underwrites a lecture series for students and the public.
- Your gift of $30,000 furnishes the house exhibit on the Washington Mall.
- Your gift of $75,000 provides team members with lodging, meals, and transportation to Washington, D.C., for the assembly, competition, and disassembly.
- Your gift of $200,000 provides materials for the construction of the Team Boston house.