
risd views
possibilities | spring 2005

Sunny Outlook

Above & right
Students conceived of this 800-sf house as the ideal combination of high- and low-tech elements and designed it to be part of an urban aggregate of connected dwellings.

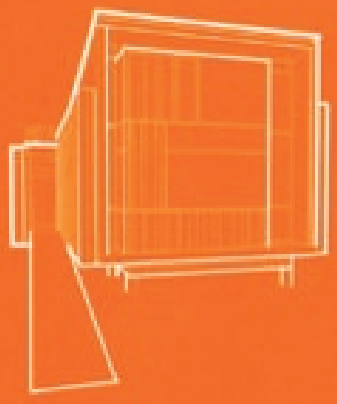
WITH GAS PRICES ON THE RISE in the US, fuel emissions compromising our air quality and ongoing political tensions in the oil-producing regions of the world, it's hardly too soon to be developing serious alternatives to America's traditional energy dependencies. Two years ago a team of RISD students and faculty got involved with the Solar Decathlon 2005, accepting a challenge from the US Department of Energy (DOE) to design a small solar-powered home. Sponsored by the DOE's Office of Energy Efficiency and Renewable Energy, the Decathlon is a competition among college and university teams meant to inspire young designers to experiment with emerging technologies, develop new building processes and introduce renewable materials and energy sources into the mainstream.

The idea is also to demonstrate to consumers "how well solar energy can be integrated into our lifestyles," explains Architecture faculty member Jonathan Knowles, who is leading student involvement in the project. Based on its original proposal, RISD is among 18 colleges worldwide invited to develop full-scale prototypes of their designs, which will be open to the public from October 7–16 on the National Mall in Washington, DC.

Through three semester-long studios and one Wintersession seminar, dozens of RISD students have researched the potential of solar and responded to the challenge with innovative designs. Students in last spring's studio winnowed the options down to three finalists and then agreed to refine the overall best design solution this year in preparation for building RISD's 800-sf prototype. This spring students in a Graphic Design studio created a website for the RISD team (http://solar.risd.edu), while others in Textiles and Furniture Design got involved by designing a fabric wall that can also function as furniture.

"We've learned a lot about new materials and mechanical systems already on the market, which, if applied inventively, can change the paradigm for heating and cooling buildings," notes Ryan Hammerschmidt MAR '05, one of the student managers of the project. "I've also been surprised that, in spite of the advanced technology of these products, the concepts are really simple." In terms of the long-range potential of solar, he notes that although the technology is "advancing at a faster rate than ever and prices are coming down, in the future I suspect that the average American household may never go totally solar due to developments in other sustainable energy sources such as wind, hydrogen and newer options still to be discovered."

The title "Solar Decathlon," while alluding to the Olympic proportions of the competition,



also points to the fact that it tests performance in 10 discrete areas. Teams can earn as many as 200 points (towards a total optimal score of 1100) for architectural considerations such as structural soundness, functionality and aesthetics. But they are also judged on the integration of energy-saving appliances and the efficiency of lighting designs as well as HVAC, insulation and water heating systems. In addition, each house is expected to generate enough power to run a "street-legal" electric car. And there are categories for how well each project is documented and promoted to the public. Once a panel of architects and design professionals has judged each contest, the team with the highest point total will be the overall Solar Decathlon winner.

Perhaps one of the biggest challenges of the Decathlon is one worth no points at all – raising the funds needed to build the prototype. Knowles puts estimates for the RISD house at $250,000 in high-tech systems, gadgetry and materials, and another $100,000 to truck the prototype from Providence to Washington. It's a high price to pay, perhaps, but by pooling support from individual donors and businesses interested in this type of R&D, the RISD team hopes not only to build their house but to lead the way toward a new era in residential living.

1 – a window wall lets in plenty of natural light and drops down to seamlessly connect interior and exterior living spaces

2 – a consciously low-tech concept, this roof garden of ornamental grasses provides passive insulation and a private refuge

3 – light-sensitive louvers shift position relative to the sun, helping to keep the house cool in summer and warm in winter

4 – high-efficiency photovoltaic panels are positioned on the roof to collect the solar energy, which is stored in roughly 16 standard batteries

5 – a radiant heating and cooling system in the ceiling uses advanced technology developed by Arden Engineering

6 – all prototypes must be wheelchair accessible and sit on stanchions to minimize damage to the exhibition site; a layer of thermal blocks positioned under the house helps heat and cool the space efficiently