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Beyond green: a net-zero college community

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Designing buildings that leave a lighter imprint on the environment has become the de facto standard these days. The target for many is zero net energy use, meaning that a building makes as much energy as it uses over the course of a year.

Noteworthy net-zero-energy homes, commercial buildings and government structures are regularly built. But none have matched the scale of West Village, a net-zero community at the University of California, Davis, that its developers describe as the largest project of its kind in the country.

Stretching over 130 acres on the campus, which is just west of Sacramento, the initial phase of this $280 million project officially opened last weekend with the completion of 315 apartments, 42,500 square feet of commercial space and a recreation center. Once it is completed in 2013, the development will be home to about 3,000 students, faculty and staff in apartments and single-family houses.

The university collaborated on the project with the private developers Carmel Partners and Urban Villages, real estate development firms that specialize in sustainable design.

Reaching net zero energy for such a varied collection of residential and commercial spaces combines two approaches, according to Nolan Zail, project manager for Carmel Partners.

"First you have to find ways to reduce energy consumption for the development and then meet that consumption by generating energy on-site from renewable sources," he said.

Using techniques like solar reflective roofing and extra insulation will reduce the heating and cooling demands of the buildings. Designs that make the most of natural light so that overhead lights can stay turned off will reduce electricity costs. Aside from those passive energy-saving methods, residents can manage their energy use by turning off lamps and plugged-in electronics remotely through a smartphone app.

All these techniques should result in energy consumption that is about 50 percent lower than that of other projects built to meet the current building codes, according to Mr. Zail.

A four-megawatt photovoltaic solar power system provides power for the community. And for future energy needs, a biodigester is being considered that uses technology developed at the university. A biodigester produces biogas from animal and plant waste that is used to generate electricity and heat.

The innovations are notable considering the constraints imposed on the project, said Sid England, the university's assistant vice chancellor for sustainability. "Working with a private developer, the project must provide a return for its investors," he said. "At the same time, we had to build high-quality affordable housing for students and staff while still accomplishing the goal of zero net energy."

"We've proven it can work on a very large scale within those constraints," said Mr. England. "We want this to be replicable, so others can see what we've done and know they can do it too."

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