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## **Budget solar: Making green building affordable in California**

*Although environmentally friendly construction is often associated with top-end properties, a US group called Habitat for Humanity is showing that providing sustainable housing for low-income families is not only possible, but enjoyable, producing stable communities and green homeowners.*

By Elisa Wood

Raising four daughters on a carpenter's salary made it impossible for John and Robyn Crowhurst to buy a home in California's pricey wine country. Never mind that they'd lived in the area for most of their lives. They were destined to be renters and found themselves packing up their young children six times in seven years to keep ahead of rising housing costs.

All that changed when John heard at church about Habitat for Humanity, a 31-year-old organization known worldwide for its push to make 'decent shelter a matter of conscience and action'. Through the group's local affiliate, the Crowhursts could own their own home. Moreover, the construction would be 'green', complete with solar panels, a feature generally confined to high-end real estate. This has meant electric bills as low as \$4 per month in their new four-bedroom house, compared to paying as much as \$150 per month in a cramped two-bedroom apartment.

'It's just been one blessing after another', said John Crowhurst. 'We thought we'd never be able to own a home'.

The Crowhursts paid only \$228,000 for their Habitat house, quite meager in a region where the median home price is \$650,000. Despite its affordability, the Crowhursts' 1530-square-foot residence (142 m<sup>2</sup>) is complete with not only solar electricity, but also a whole house fan, an extra thick foundation, exposed cement flooring, fluorescent lights, passive solar site orientation, native landscaping, and various other green features.

The house is part of an effort by Habitat's East Bay affiliate to show that there are ways to build sustainable structures without breaking the bank. Habitat is able to keep prices so low largely because it employs 'sweat equity'. Everyone who receives a Habitat house must work as a volunteer for a specific number of hours to help build other Habitat homes. The Crowhursts agreed to donate 500 hours of labour, but ended up putting in more, out of appreciation to the organization and a desire to help neighbours.

Habitat also offers families low-cost mortgages, with a minimal down payment. And it seeks donations from vendors for materials to minimize construction costs. For example, Pacific Gas & Electric (PG&E) donated the solar panels for the Crowhursts' house, as part of a larger grant programme the California utility has offered Habitat since 2005. The PG&E donation saved the Crowhursts a likely \$19,000 to \$27,000, according to Jennifer Langton, environmental resources specialist at Habitat's international headquarters in Americus, Georgia.



*The Freeda Court estate in Livemore, California CROWHURST FAMILY*

Of course, obtaining the panels was one thing, installing them - with a largely volunteer team - was another. That problem was solved with the help of Grid Alternatives, an organization in San Francisco that trains volunteers to do the work. Founded in 2001 by two engineering professionals, the group is working to create a model to bring renewable energy technologies to low-income communities. Grid Alternatives operates under the philosophy that these neighbourhoods not only need the cost savings, but also the air quality relief, since power plants

are typically sited in poor areas. Its volunteer teams do hands-on work at building sites and help homeowners find state rebates, tax incentive, and low-cost loans. Growth has been rapid for the non-profit organization, which completed 14 solar installations in 2005, 37 in 2006 and has more than 70 installations scheduled for 2007.

The Crowhursts' home is one of twenty-two built between 2005 and 2007 by Habitat in a two-acre neighbourhood, called Freeda Court, located in Livemore, the easternmost city in the San Francisco Bay Area. Livemore is known for its wineries and technology industry - the city is the home to a US Department of Energy Sandia National Laboratory facility.

All of the Freeda Court houses have solar panels, donated by utility PG&E. The neighbourhood is part of a larger environmental effort by Habitat's East Bay affiliate, which has dedicated itself to building green 'from now until eternity', said Kathryn Sparks McCarthy, public relations and marketing manager for the affiliate.



*'Sweat equity', where all the homeowners help to build the new houses, is an important part of the Habitat for Humanity business model CROWHURST FAMILY*

In all, East Bay has constructed 32 solar homes, and expects to construct an additional 20-29 this year, with the goal of increasing annual production to 40 solar homes by 2010. The affiliate uses a range of cost-effective, sustainable products and techniques. Homes can be found with cement board siding, permeable driveway materials, joists made from fast-growing trees, skylights for natural ventilation, low-waste modular framing, raised heel roof trusses, cellulose insulation, high fly-ash cement, recycled exterior paint, and interior paint with little or no volatile organic compounds. The group recycles 85% of its construction

waste, while city code requires only 51%.

The East Bay affiliate is particularly proud of Freeda Court because it received a GreenPoint Rated award from Build It Green, an organization that certifies when construction exceeds California's building codes for energy efficiency, resource conservation, indoor air quality and water conservation. Only 50 points are needed to receive the award; the Livermore development earned a score of 95.

For the past decade, Habitat's 1700 US affiliates have been focusing on more sustainable building, at the urging of its international parent. 'We've worked to get the message across at the grassroots level that there is a need to build more energy efficient housing. The need to reduce greenhouse gases is a core component of our sustainable building', said Jennifer

Langton, Habitat environmental resources specialists.



*Installing solar panels on the new East Bay houses HABITAT FOR HUMANITY*

In addition to California, Habitat has used solar construction in several other states, among them Colorado, Florida, Montana, New Mexico, New York and Oregon. Habitat affiliates also use ground water heat pumps and tankless water heaters or may emphasize erosion control, site orientation or water management, depending on local environmental characteristics and needs.

'The idea is to focus on what is affordable, practical and durable', Langton said. 'It is a struggle because we want to pick strategies

that don't add much to the initial cost. Strategies that have short payback are utilized most'.

On average, Habitat houses cost \$60,000 in the United States, although they can be much more expensive in areas where the outlay for land and construction are high, as witnessed in California. Habitat strives to keep costs as low as possible because eligible families earn no more than 60% of the median income for their area. The organization chooses families that have an evident need. That is, they must be living in substandard or overcrowded conditions, or pay a significant portion of their income to rent. The families also must be unable to qualify for a traditional mortgage, but have the ability to repay a no-profit mortgage. In addition to putting in sweat equity, the families must attend classes on budgeting, home maintenance, home building and other pertinent topics. Habitat also now emphasizes education about sustainable construction.



*The solar panels on the Livermore estate were provided by Powerlight HABITAT FOR HUMANITY*

'Studies within the general population found that homeowners don't always know much about their own heating and cooling system', Langton said. 'Education is even more critical with families who came from a renting history'.

As a non-profit, Habitat is always on the lookout for donations, and says it is open to

exploring new territory with renewable energy companies, such as the possibility of donors generating green tags or renewable energy certificates through Habitat construction.

For the Crowhursts, Habitat's green construction efforts mean more than low electric bills; the family has learned that a house can be both comfortable and environmentally sustainable. Although temperatures in Livermore sometimes reach 105 degrees Fahrenheit (40.4°C), the Crowhursts remain relatively cool in their house, thanks to the extra thick cement, ceiling fans and other features that allow them to forego costly air conditioning.

But beyond the practicalities of construction, the house has a strong sentimental value for the Crowhursts. Freeda Court has a sense of community that emerged from Habitat's requirement that neighbours assist each other with construction. As a result, the desire to offer a helping hand continues long-after families have completed their required sweat equity hours. 'It was a wonderful process because we were working with our neighbours before we were neighbours. We knew everyone's name and the kids' names', Crowhurst said.

Crowhurst added: 'A new family moved in last weekend. It seemed like the whole court showed up to help them. It was truly an experience to watch'.

The Crowhursts' four daughters, ages 4 to 11, now have nearly 50 other children to play with in their neighbourhood, and a grassy central area to gather. More importantly, says Crowhurst, they have a sense of stability - no more packing up nearly every year.

'We really don't plan on moving from here', Crowhurst said. 'We're looking to raise our kids in this house. And when they go off to college and get married, we'll still want to be in this house'.

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