

# The house as laboratory



Bee/Dick Schmidt

Design features such as overhanging roofing will provide summer cooling for this experimental, energy-sav-

ing house in Rocklin, while the house's southern exposure will attract sun in the winter.

## Homing in on energy efficiency

### PG&E project tries to show conservation can be comfortable

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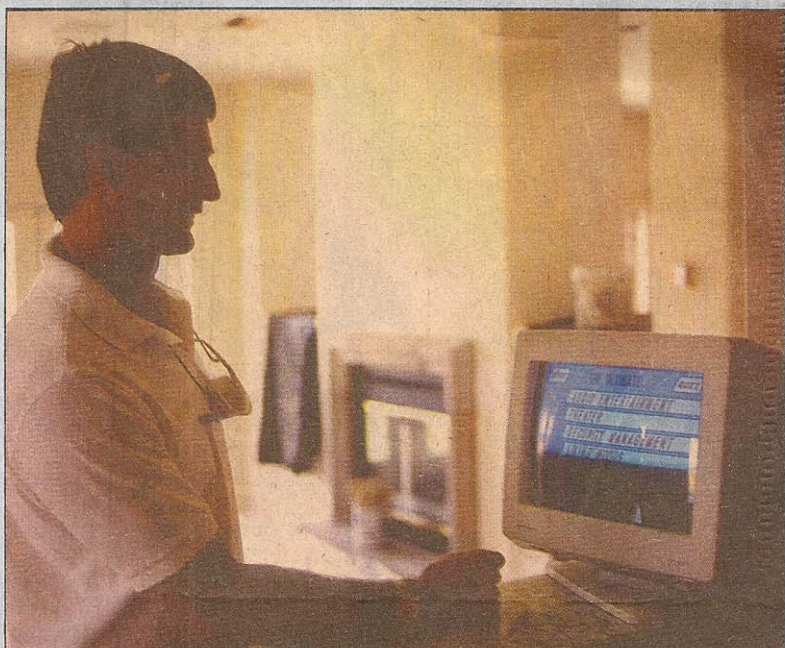
Later this summer, a computer will flick on and sensors will come to life at a Rocklin house in what its sponsors call the most comprehensive project ever to study residential energy use in California.

The goal, said project architect Jeff La Fetra of Studio Four, "is to demonstrate that energy use can be cut significantly at the same time comfort is increased."

The house is more than just a laboratory for studying energy-saving technologies and building techniques, he said. It offers concessions to popular tastes such as fireplaces and high ceilings, which aren't renowned for their energy efficiency.

"This setting gives us the opportunity to find how well fireplaces perform," he said. "And the same is true of high ceilings. People seem to love them, but we don't really know how much difference they make in heating and cooling a home."

Pacific Gas & Electric Co. is managing and funding the project, which will be open only to visits by members of the



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**A home-management computer system controls fire safety, security, climate, sound, light, entertainment systems and appliances.**

building industry. Two other sponsors — the California Energy Commission and the Building Industry Association of Superior California — are providing technical assistance.

PG&E is leasing the house, called

"The E<sup>3</sup>," which stands for energy-efficient environment. The builder, Garen McCune of GLM Custom Homes Inc. of Roseville, has estimated site and con-

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# Energy: House offers creature comforts

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struction costs of the recently completed dwelling at \$450,000.

In addition, the utility has spent close to \$150,000 to outfit the house with special energy-saving features, said PG&E's Paul Ward. Among them are special ventilation and lighting systems and an array of monitors designed to keep the house at peak energy efficiency.

Most of that money was spent to purchase and customize a sophisticated home-management computer system that can be activated by voice command or by touching displays on a video screen. The system is linked to sensors that automatically control fire safety, security, climate, sound, light, entertainment systems and appliances.

Other computer programs and hookups enable the utility to monitor energy use and eliminate the need for meter readers. They also demonstrate how occupants can receive and pay their energy bills electronically.

Miles of wires and scores of environmental sensing devices have been embedded in the walls, attic and foundation to measure changes in air flows and temperatures. The sensors are attached to computer equipment, most of which has been fitted into a large entry closet.

PG&E has budgeted up to \$2 million for staff, equipment, testing and promotion of the program over the next two years, Ward said.

The 2,900-square-foot, four-bedroom, 3½-bath research house sits atop a ridge in Stanford Ranch, overlooking the Sunset-Whitney Golf Course. From the street, the tile-roofed and stucco-clad, two-story structure gives an appearance of affluence. There is no hint of its underlying purpose.

From the rear, the reason for its creation becomes apparent through its passive solar design. Most of the windows and French doors face south to capture the sun's heat in winter.

In summer, a wide-roof overhang protects the second-story windows from the glare of the high sun, while a trellis — to be covered with grapevines — shields the doors and windows below.

Other energy-saving features are less obvious. Among them are 8-inch-thick walls — packed with insulation — and specially treated windows to cut solar radiation.

A special ventilation system was installed around the eaves to allow hot air to escape from the attic, while inside there is a radiant barrier to reflect heat.

The house is equipped with low-energy appliances and ultra-efficient heating and cooling systems. The heating and cooling systems are zoned to allow temperatures to be controlled in four areas of the house — two upstairs and two downstairs.

Conventional, incandescent light bulbs have been eschewed in favor of longer-lasting, low-watt fluorescent and quartz halogen bulbs, which are recessed in ceilings or secured in wall fixtures.

The Rocklin residence, which was designed by Studio Four architect Vance Graham, also has a pair of two-sided fireplaces. The one downstairs opens to the family room and the dining room; the other is on the second floor and is visible from the master bedroom and bath.

Ceilings are mostly 9 or 10 feet high, except in the living room, where the ceiling is 20 feet to the second floor. Return air vents have been installed in the ceiling to reduce heating and cooling costs.

Just how well the vents and the other energy-saving products and systems perform will be determined in the months ahead.

PG&E plans to use the house as a testing laboratory and demonstration unit for at least a year. Then, before it's returned to the builder, a family will be invited to live in the house to enable researchers to gather data in a more typical domestic environment.