

# ENERGY-WISE REMODEL

*How one family expanded a traditional house in Oakland while slashing their energy bills*



Linda Svendsen

## GREEN at a GLANCE

### ENERGY & SYSTEMS

- Solar water heater
- Tankless gas-fired water heater (Bosch Aqua Star)
- 1.9-kW photovoltaic system (Kyocera modules, Sunny Boy inverter)
- Hydronic radiant-floor heating with high-efficiency boiler (Munchkin)
- Recycled cellulose insulation
- Recycled cotton insulation (UltraTouch)
- Double-pane windows (Marvin)
- Fluorescent lighting
- Whole house fan (Tamarack)
- Attic fan (Solar Star)
- Front-loading washing machine

### MATERIALS & PRODUCTS

- Fiber-cement exterior siding (Hardiplank)
- FSC-certified kitchen cabinets (Mueller Nicholls)
- Kitchen counters made with FSC-certified wood fiber (Richlite)
- Low-VOC paint

When Judi Ettliger and Carl Gardeman began remodeling their Oakland home in 1999, they made energy efficiency a top priority. They knew it would mean lower utility bills and greater comfort. They were also motivated by the environmental benefits of energy efficiency: less air pollution, fewer greenhouse gas emissions, and reduced reliance on fossil fuel-based energy production.

The project initially involved expanding an unfinished area at the back of the house to include a family room, laundry, guest bedroom, half kitchen, one and a half baths, and areas for exercise and study. The couple completed that work in 2002, and recently embarked on an extensive remodel of their cramped and inefficient kitchen.

At this point, Ettliger and Gardeman know a lot more about green building, and are focusing not just on energy efficiency but on green material selection. "Having been involved with green building for several years now," Ettliger says, "we found that with the kitchen remodel it has become relatively easy to find alternative materials with mainstream suppliers. That was not the case five years ago when we were constructing our addition."

*"We increased our home's size by 1,000 square feet, yet overall our energy use dropped by about 25%."*

— Carl Gardeman, homeowner

## ENERGY EFFICIENCY

**Whole house fan.** A whole house fan draws in cool night air through open windows, and expels hot air through the attic and roof. An average whole house fan uses one-tenth the electricity of an air conditioner. "After a hot day, we open the windows, turn on the fan, and the upstairs is cool in 15 minutes. It's really remarkable," says Ettliger.

**Radiant-floor heating.** A hydronic radiant-floor system heats the addition. A high efficiency boiler provides hot water that circulates in tubes below the ceramic tile floor, providing gentle, quiet warmth.

## RENEWABLE ENERGY

**Solar water heating.** Gardeman installed a 50-gallon solar water heater consisting of a collector box and a series of copper pipes. Cold water enters the pipes and moves through the collector on the roof, where the sun heats it and keeps it hot until needed. It's a simple system with no pumps or moving parts, and it operates automatically. A tankless water heater fueled by natural gas provides backup heat when the sun isn't shining.

**Solar electric system.** A few years after completing their energy-efficient remodel, the couple went a step further and put in a 1.9-kW photovoltaic (PV) system that's connected to the local electricity grid. On an annual basis, they've actually been able to zero out their electricity bill thanks to PG&E's time-of-use rate. This special rate earns them credit for the kilowatts they produce during the day when electricity rates are high; after dark, when their PV system isn't generating electricity, they buy it from the grid at lower nighttime rates.

## GREEN PRODUCTS

**Fiber-cement siding.** The home's original siding included wood shingles and redwood planks. For the addition, they used fiber-cement siding. It's more durable than wood, termite resistant and noncombustible. The couple can attest to its fire resistance: when their addition was nearly finished, a fire started next door on a wood deck only about three feet from their house. While portions of their house with the old wood shingles were severely damaged, the fiber-cement siding didn't burn.

**Insulation.** For wall and joist cavities, the couple selected spray-in cellulose insulation that adheres to surfaces, reducing air infiltration. For crawl spaces and other areas they couldn't spray cellulose into, they used a batt insulation product made from recycled denim and other cotton textile trimmings.

**ORIGINALLY BUILT:** 1906

**REMODEL & ADDITION COMPLETED:** 2002

**KITCHEN REMODEL COMPLETED:** 2005

**ORIGINAL SIZE:** 1,600 SF

**SIZE AFTER REMODEL:** 2,600 SF

**ARCHITECT/CONSULTANT (ADDITION):** ANN MARIE CELONA

**DESIGNER/CONSULTANT (KITCHEN REMODEL):** URBAN STRUCTURES

**CONTRACTOR:** OWNER



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*“The fiber-cement siding probably saved our house from burning down.”*

— Judi Ettlinger, homeowner