

GREEN FROM THE GROUND UP

A homeowner designs a hillside house that's green from its concrete piers to its recycled roof shakes



This homeowner-designed residence incorporates many sustainable technologies and building techniques, including a well-insulated shell, energy-efficient heating and cooling equipment and appliances, solar electric power, high-volume flyash in the concrete and an array of finishes made with recycled or sustainably harvested materials.

The 2,746-square-foot house is constructed on a drilled pier and grade beam foundation on a sloping lot. Canyon Construction built the shell of this three-story, three-bedroom house, while the owner, Gary Wolff, acted as the general contractor for all other phases of construction. Designed to take advantage of views to the east, the house has no south-facing roof slope on which to mount solar electric panels, so Wolff had the panels installed on poles on the hillside above the house.

“Our energy and water bills are less than half of those in our old house, although the new house is 50% larger.”

—Gary Wolff, homeowner

ENERGY EFFICIENCY

Structural insulated panels. The walls and roof were constructed using structural insulated panels, or SIPs. A SIP has a polystyrene foam core sandwiched between two sheets of oriented strandboard. SIPs fit together snugly, providing excellent insulation and greatly reducing air infiltration. The SIP walls were wrapped with a double layer of ribbed Tyvek building paper and finished with three coats of stucco. The result is a home that's energy efficient, comfortable and quiet.

INDOOR AIR QUALITY

Heat recovery ventilation. Because the SIPs create such a tight shell, Wolff installed an air-to-air heat exchange ventilator unit to provide ventilation, balance interior and exterior pressure and reduce interior moisture. Installed in tandem with the furnace fan and equipped with a HEPA air filter, the unit introduces fresh air into the home while capturing and reusing heat from stale air that's vented from the home.

GREEN at a GLANCE

ENERGY & SYSTEMS

- 2.8-kW grid-connected photovoltaic system (Sharp panels, Sunny Boy inverter)
- Structural insulated panels (R-Control)
- Blown-in cellulose floor insulation
- Low-e windows with fiberglass frames (Milgard)
- 92% efficient natural-gas forced-air furnace (Amana)
- 14-SEER air conditioner (Amana)
- Air-to-air heat exchange ventilator with HEPA air filter (Honeywell)
- Heat exchanger preheats cold water by capturing heat from wastewater (GFX)
- Energy Star® dishwasher (Bosch)
- Energy Star® refrigerator (Amana)
- High efficiency fluorescent lighting with full-spectrum lamps

MATERIALS & PRODUCTS

- Concrete piers and grade beams contain 50% flyash
- Engineered wood: floor trusses, glulam beams supporting vaulted ceiling, OSB for subfloors
- FSC-certified framing lumber
- Recycled-content deck and rails (Trex)
- Roof shingles are 100% recycled vinyl and cellulose fiber (Eco-Shake)
- Recycled glass tile (Oceanside)
- Recycled glass vanity top (Counter Production)
- Bamboo entry floor
- Cork floor (Durodesign)
- Salvaged red gum eucalyptus flooring (CA Hardwoods)
- Natural linoleum floor (Armstrong)
- 25% recycled-content nylon carpet; wool carpet
- Storage/utility room carpeted with remnants from previous home

OTHER GREEN FEATURES

- Dual-flush toilets (Caroma)
- Catalytic wood stove (Vermont Casting)
- Low-VOC interior paint (Kelly-Moore Enviro-Cote)
- Water-based floor finishes

GREEN PRODUCTS

Green flooring materials. The owners selected a variety of eco-friendly flooring products. Bamboo, a rapidly renewable grass and a durable flooring material, is used in the entry. The kitchen, pantry and half-bath floors are cork; besides being sustainably harvested, cork is popular for kitchen floors because it's warm underfoot and easier on the back than hard-surface flooring. The dining area floor is salvaged red gum eucalyptus from local trees removed to control fire risk. Natural linoleum is used in an upstairs bathroom, with seagrass in the master bedroom. The bedroom hall and stairwell have recycled-content nylon carpet, with wool carpet in other areas.

BUILT: 2003

SIZE:
2,746 SF

DESIGN:
Owner

GENERAL CONTRACTOR:
Owner

CONTRACTOR:
CANYON CONSTRUCTION (shell)



*“The house is so quiet we
can’t hear a car
come up the driveway.
And it has no drafts
in a winter storm.”*

—Ruth Hartman, homeowner

