

Solar Log Home for Snowy Winters

Near the old gold mining town of Virginia City, Montana's winter sun provides most of the heat for Stephanie Wood's log house. "Even when it's 30 below outside, if the sun's shining, it'll be too warm for a fire," Stephanie said. "I burn about 1 cord of wood a year.

"The only back-up heat is in my bathroom ceilings. I have two radiant heating panels— one upstairs and one downstairs, but I don't use them very often— usually only when I leave for several days or more. Then I set the thermostat to operate the downstairs bathroom ceiling panel to keep the bathroom above freezing. My electric bill runs between \$15 and \$20 a month which includes everything— refrigerator, range, washer, dryer, the heating panels, and lights. And I use lots of lights during the winter."

Not By Sun Alone

But there's more to harnessing free heat than just inviting the sun inside. It has to stay put. Thick insulation, double-glazed windows, concrete thermal storage, and over a mile of chinking trap heat in the 24-foot X 32-foot house. In the attic, fiberglass and Thermax insulation stop heat from drifting out the top of the house.



At 5,700 feet elevation, cold winters are the norm for Virginia City, but that doesn't bother Stephanie Wood. She gets most of her space heat from the almost-daily sunshine coming through her large south-facing windows.

Each pine log, 10 to 12 inches in diameter, was carefully shaped with a chainsaw to fit down tightly on the one beneath. Sill Seal between logs and acrylic caulk chinking in the joints inside and out reduce infiltration. Stephanie noted it took her one full year to chink the logs, one of the jobs she'd delegate to someone else if she had it to do over.

A concrete floor in the front half of the living area soaks up heat from the sun and wood stove and releases it as the house cools. "The sunspace is actually part of my living area," Stephanie said. "It would be nice if it were separate, but I couldn't afford the extra square footage." An insulated rock bin beneath the concrete floor was constructed to provide more thermal storage. A wooden 1-foot x 2-foot 'chimney' will run from the bin to the upper reaches of the large open living space. The plans call for a fan to pull hot air down from the ceiling through the box to the rock storage. A plenum and fan on the west side of the concrete floor will channel warm air back into the room.

At winter solstice the sun's rays creep 18 inches up the back of the living room wall, but overhangs on the front of the house keep the sun out during the summer. "The house overheats sometimes in fall and spring," Stephanie said. "Draperies would help that."

Under the back half of the living area, a walk-out basement provides space for washer and dryer, cross-country skis, saddles, and other necessities. Fiberglass batts were installed between the floor joists above the basement. One-inch extruded polystyrene was installed on the outside of the basement walls. The 6-inch basement slab rests on a moisture barrier of 6-mil polyethylene over a layer of gravel. "I've never had anything freeze in the basement," Stephanie said.

<i>Owner</i>	Stephanie Wood
<i>Location</i>	Virginia City
<i>Designer</i>	Owner
<i>Builder</i>	Pat Sandon and Bob Erhdall 103 West Jefferson Virginia City, MT 59755 843-5352
<i>Style</i>	Log 2 Story
<i>Insulation</i>	Ceiling • R40 10- to 12-inch Log Walls - Approx. R8 Basement Wall - R5 Basement Slab - R5
<i>Square Feet</i>	Upper - 768 Main • 768
<i>Special Features</i>	Thermal Storage Economical Construction
<i>Heat</i>	Passive Solar, Wood, Electric Panels
Completed	March 1984



Combining living space into one large room allows for good air circulation. A concrete floor stores heat from the sun and wood stove.

wanted to be able to leave and be gone for periods up to several months and not have to worry about a thing. One of the strategies I used was to put all the plumbing on the inside wall between the kitchen and bathroom to prevent any frozen pipes."

The house passed the test. "I was heading for New Zealand for a month one winter," Stephanie said, "I put the house plants in the bathroom, set the electric ceiling panels in that room for 50 degrees, and closed the door. My friend who looked after things checked the thermometers I had around the house. It never dropped below freezing in any part of the house although it got down to minus 30 outside. My electric bill for that period was \$27."

Sunsets Balance Lightning Storms

Because her house is perched on a mountaintop overlooking Virginia City, Stephanie had to think of other natural elements besides cold and wind. A length of thick copper cable runs from rooftop to ground, fending off any effects from lightning strikes. "The storms get a bit close at times," she said, "but the view, before building, including the ones the space, and the incredible sunsets are worth it. And, I'm totally sold on solar, and anyone who doesn't take advantage of it is crazy. I read books for two years DNRC published on active and passive solar heating. That's where I learned to turn the house 7 degrees west of south for the best solar gain in this area." □

If she were building again, Stephanie would do a few things differently. She would provide better ventilation for the downstairs and more heat for the upstairs, for example. Only two windows open on the main level— one in the bathroom and the other on the west of the living room. "I really need one on the east wall of the kitchen to get a good cross breeze," Stephanie said. "And I thought the upstairs would overheat in winter, but sometimes it's too chilly. Eventually I'll put a ceiling fan above the stairway to pull heat upstairs."

A Shoestring House Budget

Scrounging, salvaging, and buying used material enabled Stephanie to build the house. "It's amazing what can be done on a shoestring," she said with a laugh. "Every time I saw a bargain, I took advantage of it." She pointed out the windows. "All those are patio door blanks. The dealer wanted to get rid of them so I bought them at half-price two years before I started building. I bought all the logs peeled and delivered for \$2,000."

Built to Leave

The house reflects more than tight-fisted cost control, however. It was built to take care of itself when its owner is away. Stephanie, a range technician with the U.S. Forest Service, is gone periodically. "When I built this place, I would literally stand here and wonder what problems could arise during my absence," she said. "I



The house reflects the owner's liking for curved structures. A curving log staircase leads to the spacious bedroom and bath occupying the second floor. Crooked Douglas fir log uprights support the main beams. Outside, curved railings surround the deck wrapping the south and west sides of the house.