

## A Bright Spot at the End of the Road

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In the mountains west of Fort Collins, Colorado, a narrow county road snakes lazily through a little-known canyon. At around 6,000 feet altitude a spur takes off steeply to the west. Here you leave the pavement and power lines behind as you navigate scores of twists and turns through conifer forest, grassy meadows where deer and elk eye you with scant curiosity, aspen-lined streams and jagged outcroppings of raw granite. Four miles back and 1,200 feet higher in altitude, you'll reach the end of the road; this is the place John Benshoof chooses to live and work.

Benshoof's solar-powered log home is nestled unobtrusively on his 40 acres in a clearing surrounded by a dense fir and ponderosa pine forest, dotted by an occasional copse of aspens. If you meander up the hand-crafted spiral stair to the glassed-in cupola above his cozy loft office, you can see a storm approaching from several miles away, and watch the tops of distant trees bend to the breeze long before the rush of air can be heard. It's a beautiful place to live.

When you ask Benshoof why his spacious, custom-built log home is not tied to the electrical grid, he'll tell you, somewhat scornfully, that the local Rural Electric Association (REA) wanted a whopping \$200,000 to run power to his end-of-road home site in the Colorado Rockies. But when you ask him how he likes depending solely on sunlight for his electrical power, the retired Forest Service law enforcement officer gives you a coy grin and admits he wouldn't have it any other way.

His reasons are as varied as they are numerous. "I enjoy the independence," he says. "I don't have to rely on outside sources for my power, and my electric bills are predictable—zero!" Nor does he miss the power outages everyone connected to grid power is forced to endure from time to time. "Last year's spring snows were particularly heavy, and the blackouts in this area were widespread," Benshoof recalls, "but I was as warm and comfortable as a bear in his den."

That's because his modest but expertly designed system is set up to run smoothly, even when heavy clouds and snow mute the 1,920-watt solar array mounted on poles in front of his home. "I have enough battery power to get me through two or three days of bad weather, but beyond that I may need a little assistance," Benshoof confides. By assistance he means the Kohler propane-fired generator that charges his bank of sixteen heavy-duty Trojan solar batteries whenever they get too low. Mounted in a permanent, inconspicuous enclosure beside his attached, two-car garage, the quiet-running generator is wired to start automatically when the batteries reach a preset level of discharge, and turn itself off, once the batteries are recharged. "It doesn't run often, but it's nice to know it's there when I need it," Benshoof says.

It fact, the generator can sit idle for months at a time before it's electronically called into service. Benshoof attributes this fact to a number of reasons, not the least of which is the tight

construction and open floor plan of his 4,000-square-foot home built by Log Knowledge, a custom log home builder from Fort Collins. “I had always heard that log homes were warm, but this is even better than I thought,” he happily relates.

In-floor hydronic (hot water) heat—provided by a propane-fired boiler—heats the basement and provides even heating in the upper levels for the rare times Benshoof needs a little more warmth than the wood stove in the great room can provide. Additionally, Colorado’s sunny climate is naturally suited to photovoltaic (solar-electric) applications. “Three straight days of clouds are rare around here, and the bad weather is usually followed by several days of sun,” Benshoof says. “On most days there’s enough sunlight to fully charge my batteries.” With large south-facing windows and an east-west orientation, Benshoof’s home is naturally suited to make the best use of the winter sun’s precious warmth; design features that help to keep the propane bills minimal and the wood pile stacked high.

The work horses of Benshoof’s system are a pair of ground-based solar arrays, located about 100 feet south of his spacious deck. Each array is comprised of eight Kyocera 120-watts solar modules. The 12-volt modules are wired four to a series, providing the 48 volts of direct current (DC) required by the Trace 4048 inverter. The inverter transforms the solar array current into 120-volt alternating current (AC) to power all the home’s appliances and pump water from a 500-foot-deep well.

“When I first started looking into the prospect of using solar electricity to power my home, I found it a bit intimidating,” Benshoof confesses, “but as I began to learn about it, I discovered it’s all really quite simple and logical. And, since all of my neighbors are on solar power, there was no shortage of first-hand advice.” Like many neophyte solar enthusiasts, Benshoof’s initial

misgivings were soon replaced with a boundless curiosity for how it all worked. Once he realized it was possible to live and work comfortably in a solar-powered home, he was able to fully appreciate the wonder of the technology. “Most things designed to make life easier just make it faster-paced,” he laments, before adding with a smile, “solar technology is just the opposite: it allows me to live simply and worry-free, far from hectic pace of city life.”

Not that the transition from limitless power to merely ample power was smooth and seamless. “I found out right away that I couldn’t just crank up the thermostat and forget about it,” Benshoof recalls. “The hydronic heat is my biggest electric load in the winter, but my wood stove significantly offsets both my use of propane and electricity. At first it was a bother loading the stove all the time; now it’s just a way of life.” And a fairly normal way of life, at that. His home includes modern, energy-efficient appliances, and he has the power to run them—most of the time. “Occasionally I’ll put off washing clothes or running the dishwasher until a change in the weather,” he explains. “I could use the generator, of course, but I’d rather not. It’s almost like cheating.”

Besides, when you live in a place so quiet you can hear the ghostly whisper of a raven’s wings caressing the sky high above the treetops, you soon realize life’s priorities are not quite what they used to be. Solar living has a way of doing that to a person.

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