Harvesting Sunlight at a Blue Ridge Retreat

by REX A. EWING

(originally published in *Log Homes Illustrated)*

Sitting on the front porch of Michael and Dianne English's custom solar-powered log home in the southern Appalachians outside Cashiers, North Carolina, it's easy to become lost in time. Without power lines, traffic noise, city lights, and only the dimmest glow from the homes of faraway neighbors—flickering through the oak and hickory forest like distant, tribal campfires—you can imagine a simpler time. Relaxing in one of the many rocking chairs on the porch of this mountaintop retreat nestled amidst a forest filled with rhododendron, mountain laurel and wild azaleas, you'll hear a choir of songbirds, sharply contrasting the trilled purrs and clucks of wild turkeys, and the staccato-like tapping of a medley of woodpeckers. And if you're quiet enough, you just might catch a glimpse of the black bear that likes to meander through the yard from time to time, startling the local grouse that wanders close to the house to feed on clover, and giving the squirrels pause to sit up and take notice.

It's only after you make your way to the back side of the property and sit in the gazebo perched on the side of the mountain that you are reminded of the home's true temporal setting. Gazing nearly ten heavily-forested miles to the north you can see the car lights on the Blue Ridge Parkway—a 469-mile asphalt ribbon connecting Shenandoah National Park with Great Smoky Mountains National Park—flashing sporadically on the distant peaks.

What does it take to live in efficient, mountaintop luxury, without the tethers that customarily connect a home to distant sources of power? For Michael and Dianne, it was a mixture of knowledge (much of it newly-acquired), hard work, and gumption. "When we started thinking about building, the nearest power pole was two miles away," Michael recalls. "Not even considering the costs, which would have been substantial, we didn't want to denude a wide swath of forest, or dynamite a 10,000-foot-long trench, just to connect to a nuclear power plant we're not especially fond of."

To hone the skills necessary to design an energy efficient, solar-electric log home, Michael, a process development chemist for the pharmaceutical industry, took night classes at North Carolina State University. There he learned enough of the fundamentals of home design to enable the couple to plan the layout and construction of their weekend home. Using the English's designs, Lincoln Log Homes, Inc., prepared the final blueprints for the 2,700-square-foot, two-level home, and recommended a contractor to set the outer walls, roof, and most of the interior partitions.

Dianne, a family nurse practitioner, is confident she and Michael made the right choice, saying, "The people from Lincoln Logs were knowledgeable of code issues and careful to incorporate the features needed in our high wind location, while maintaining

the essentials of our original design. Our local dealers, Helen and Peter Schultze from Blairsville, Georgia, were also great to work with. Even now they continue to stay in touch."

To learn the basics of solar energy, Michael and Dianne consulted with the Solar Center at NC State. "They were very helpful," Michael gratefully acknowledges. "By the time we contacted Sundance Power Systems in Mars Hill to do the installation, we had a good idea what it would take to power our home."

A better idea than most, perhaps, considering theirs is one of the very few off-the-grid homes capable of full-time operation without the safety net of a fossil-fuel backup generator. Says Michael, "We've lived here for weeks at a time, through all kinds of weather, and have never run the batteries down below 50 percent of capacity."

"All kinds of weather" is a normal occurrence. Located on the Cashiers-Highlands Plateau at 4,120 feet above sea level, the area is considered an alpine rain forest environment. This means Michael and Dianne can expect 75 to 80 inches of rain to fall on their 25-acre parcel in any given year. That much rain makes for a lot of cloudy days.

To make the most of the sun on those days when it comes around, a powerful 3,840-watt roof-mounted solar array, comprising thirty-two 120-watt Kyocera modules, provides all the electric power the couple needs to run the lights and appliances—including an efficient, but standard, Maytag electric refrigerator—as well as the pump which circulates water for the propane-fired, in-floor hydronic heating system.

To convert the 48-volt DC power provided by the solar array into usable house current, a Trace SW5548 inverter, capable of providing 5,500 watts of continuous 120-volt AC power, easily handles any load the English's might subject it to.

But power production is only half the equation. With such a preponderance of overcast days, the couple wanted to be able to store every precious watt they possibly could. To do this, they installed a pair of Deka 48-volt batteries—weighing in at an impressive 2,500 pounds apiece—consisting of 24 two-volt cells in each battery. Together the batteries can hold a whopping 76,800 watt-hours of electricity. Fully charged, such a storehouse could run a standard table saw for over 24 hours before falling to 50 percent capacity.

Finding a trouble-free way to provide water was the final major problem the English's faced. Compounding their difficulties was the fact that their source of water resided at a depth of 975 feet, beneath what geologists call a plutonic dome—a massive upwelling of impermeable granite, left over from when the Appalachians formed, nearly a half-billion years ago.

Rather than install a watt-gobbling 240-volt AC pump (that would have required either a second inverter or a 120/240-volt transformer), they chose instead to go with a Dankoff 48-volt DC pump. Wired into a float switch located in a 500-gallon tank in the home's half-basement, the low-volume pump—set at a depth of 500 feet—automatically provides water at the lazy rate of one gallon per minute, then shuts off when the tank is full. The house is then pressurized with a smaller DC pump that takes water from the storage tank to the pressure tank.

Clever.

Also clever is the couple's use of tile floors, and concrete block and stone interior walls to augment the natural thermal mass of the 8-inch milled logs. Designed to capture and hold heat—from the winter sunshine pouring through the large south-facing windows, as well as what's provided by the Jøtul secondary-combustion woodstove—the interior of the house acts as a huge radiator on cold winter

nights when the mercury can stray into the single digits.

Taken together, the myriad elements of Michael and Dianne's home blend into a seamless tapestry of efficiency and trouble-free living, far from the nearest power line. All that remains now is to make the transition from a part-time residence to full-time. Is Dianne ready for the big leap? "When Michael first mentioned building a solar home in such a remote location, I admit I was skeptical. However, as we progressed, I became absolutely sold on both the solar energy—I can still use my blow dryer!—and the location. And as I sit on the front porch and gaze at the beautiful mountains that surround us, I am filled with joy at the beauty God has given us, and feel thankful we can do our part in protecting our world for the future, while still living very comfortably."

Michael accepts that as a "yes."

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