



our house going solar

By Pelle Bjorkman

For our family, the question of building a solar home has never been if, but when. After seeing buildings that took into account both energy and environment, suddenly the homes and businesses that didn't—well, they started to look just plain wrong, like plants growing upside down or birds flying backwards.

When the opportunity came up, it happened in the way many things will in New Mexico—all the stars were aligned and we could go for it. This was to be our one shot at building a place of our own, and it had to be right.

Affectionately called Mongolia, because of the much more intense weather compared to the leafy and sheltered heart of town, our spot was in a broad green meadow, with a spring and a stream. Design evolved over months and talks

among the family members. We started with minimalistic and whimsical. Finally, we settled on a reasonable 1350 interior square feet for a family of 4. Every bit of the floor plan was to serve a purpose; no dead spaces allowed.

My wife Lauren had a leg up on living in smaller spaces. Having grown up in the forecabin of an old wooden sailboat, with ropes and sails crowding the space with herself and her sister. Our first 5 years married to one another, we lived together in trailers. My wife's favorite climate was in Hawaii, so the thermal performance (ie. comfort in the cold season) would have to be hot for domestic bliss to continue.

Our builder Lafe Harrower was game for anything, with an eye for the artistic, and dealt with us directly and honestly. He worked off of my non-architectural drawings.

I pushed the envelope with unconventional building ideas, yet he always figured out how to do it.

The walls of the house are pumice-crete, 18" thick, poured monolithically by Scott McHardy. They cost about more than most conventional methods, but they outperform on many levels. The material is locally mined, abundant and forms a well-insulated, breathing, bomb-proof envelope that has shape, like old Mediterranean architecture. SIPs panels give the roof an R-value of 46, clear windows on the south, low-e windows east and west, and honey-comb window covers for nights. We added Trombe walls that look like upstairs windows to the casual observer.

The goal of all this design and energy planning is to avoid using fossil fuels. To put propane, natural gas and coal out of the equation. New electrical technologies are racing ahead while fossil fuel technology to generate it is stagnant.

Originally I had planned to go off-grid—the ultimate manifestation of energy independence. It has a strong appeal to me, though I have to admit it was a romantic one. As long as the grid is nearby, a grid-tied system can be smaller in terms of kW and much cheaper than the off-grid system, and there are no batteries to maintain or worry over. The psychological hurdle I had to get over was to give up on the self-contained lifestyle and recognize that we as humans are all interconnected in a social grid. None of us are truly off the grid. Sometimes we make energy, sometimes we take it.

When I started shopping solar panels, they cost about \$5 per watt. Now they are \$1.21 per watt! There is no GRT on that, either. I bought my panels from a dealer in Albuquerque, and Derric Dumrese, of All Current Electric in Taos installed them well. I had laid out the house so that there were large perfectly inclined, south-facing surfaces on which to install all the solar hardware. After the roof was on, we liked the way it looked. Mostly out of vanity, we opted to move the panels to a corral setting on the ground, with a wall to be built out of low latillas to hide them. Sometimes, something emerges that you didn't anticipate and moving those panels made sense in the end. It turns out that it takes only a minute or two to clean off snow, or sweep off dust. And I don't have risk my life.

The twelve 235 Watt panels have provided an average of 17 kwh a day, while the house consumes about 10 kwh/day. If you really like to geek out on this, the Enphase inverters provide data every 5 minutes for each panel and organizes it into graphs of their performance. Check out my system out at <https://enlighten.enphaseenergy.com/public/systems/cXae56531>.

The solar hot water system has two Stiebel Eltron Sol 27's, a 100 gallon solar storage tank and a small electric demand heater. The solar panels heat up the tank as much as they can, and then if it isn't warm enough, the demand heater kicks in to make a hot shower every time. The solar heating powers the radiant floor heating as well, with back up electrical. Taking a shower with all solar heated water feels good.

Unfortunately, Kit Carson Electric does not currently give you money back if you produce excess electricity. Meanwhile, installing a smaller system makes more sense. Expand on it later when things change. Maybe by then you'll even have some renewable energy credits (RECs) to trade.

On the bright side, all the solar electric and thermal costs qualified for a 30 percent federal tax credit and a 10 percent state credit. My costs for the electric system was \$12,000 and for the hot water \$10,000. Energy independence cost \$22,000, but with the credit of \$8,800, the total was only \$13,200. A pretty modest cost in building a house, especially considering there will be no utility bills for many years. If the question for you has been when, then the answer is now.

