

Paradise Valley's Hybrid House

Shifting Seamlessly Between Renewable Energy and the Grid

■ BY MOLLY BROWN

Hybrid corn, hybrid cars, now hybrid houses—and if Pouwel Gelderloos' vision takes root, they will be a natural progression in the development of green homes.

Outside Emigrant, Montana, sits a home that can function completely off the grid. Asked what he means by "hybrid," Gelderloos laughs and says "this is a sophisticated house designed to prioritize the use of natural resources, not your "underground hippie house of straw, tin cans, and ground up tires." Hooked up to a well and the electric grid, the house is designed to seamlessly switch from hybrid sources to conventional ones without a human having to be there to make that happen.

Utilizing every drop of moisture that falls on its roof, re-using gray water within the house (three ways), accessing sunshine through solar panels that provide electricity and hot water, harnessing wind through a turbine, and maximizing the free energy of passive solar heat, the home features fourteen inch thick walls for optimal insulation rated at R45. Gelderloos has created a sustainable, traditional looking home without any of the inconveniences people associate with unconventional sources of energy.

"If it is a day without sunshine, typically we have wind and the batteries have stored much of the electrical power we would need. If it is one of those rare days when we don't have either, the system will automatically switch over to conventional electrical hook-up," Gelderloos said.

A builder and contractor by profession, Gelderloos told us that building houses is his passion. "I love working with my hands and creating beautiful things," he says. "And beautiful is a good word to describe this 3000 square foot octagon shaped home, situated near a stream with well placed windows bringing in the stunning views of the Absaroka Mountains, along with plenty of sunshine and breezes, depending on the need of the moment.

Born in Amsterdam, he was a remodeler and restorer of old homes, seven hundred year old homes at times. Quickly tiring of all the rules and regulations one finds in large cities, Gelderloos decided to move to California to see if he could build and work without so many restrictions. Struggling with imperfect English and a foreign accent, he could only find work as a painter. "When you don't speak like others, people sometimes think you are not very smart," he remembers. Thirsting for even more freedom, after a year in southern California he moved to Paradise Valley and has lived here for twen-

ty-six years.

His building skills and old world craftsmanship are evident in the Bank of the Rockies' branches he has built in Emigrant, Livingston and Helena, along with many private residences.

"Around six years ago, I became in-



Pouwel Gelderloos built and resides in this hybrid house in the hills above Emigrant.

terested in renewable energy," Gelderloos said. "I realized that our houses are not much more than a tent. They have evolved in a logical and historical fashion but in today's world are becoming unsupportable." Gelderloos reasons that bringing energy into homes as electricity or natural gas from long distances will become unsustainable. Rising costs, market forces, and availability could make homes that can be instantly heated with the flip of a switch unaffordable. Houses that are minimally insulated, to his way of thinking, contribute to environmental degradation. "Over its lifetime, a home causes more pollution to the planet than our cars do," he said.

Looking to nature for inspiration, Gelderloos focused on water and heat. "Water is more crucial to us than electricity," he said. "We can live without electricity; we cannot live without water." His statement rings true. In many parts of the world, water is not an unlimited resource. Water wars are already occurring, have historically in the American West, and continue to this day in battles between states like Montana and Wyoming over water flowing from tributaries of the Yellowstone.

This area of Montana receives sixteen inches of water a year. "I looked at the mountains and thought about how the water travels down to the rivers. So I built my roof steep like the side of a mountain, constructed oversized gutters to capture the water, which filters through sand, just as it does in nature,

and is stored in collection tanks below the home."

Three 1600 gallon tanks and two with a 2500 gallon capacity contain the water collected off the roof. It is then filtered through a series of secondary filters (down to 5 microns) and zapped by a UV filter to kill any microbes before arriving at the tap.

The water tanks have a float in them that alert the conventional well and pump system if the water level becomes too low. The pump and well then kick in, again allowing an easy transition between the two systems without needing any human intervention.

The genius of the design doesn't end there. All water used from the home, excluding the toilet and kitchen sink, is directed through a separate system to be re-used in the home. The solid waste goes directly to the septic. Gray water is re-circulated through the home for use

period after an initial fire.

The greenhouse features three foot deep concrete beds filled with eighteen inches of rock, topped with a layer of sand, and then filled with a foot of topsoil. The gray water flows through the beds in a gravity system. Gelderloos dug down with a small spade and turned up soil that was uniformly moist. Plants lined the beds, ready to be transplanted for year round growth.

Two large sets of doors open from the greenhouse to the main house allowing for the release or capture of heat, depending on the season. A ceiling fan and a duct-work system create a thermal loop distributing warmer air from the second level to the north side rooms in the house. Cooling in the summer is supplied by circulating air past the cool water in the underground storage tanks, averaging fifty to sixty degrees in summer.

The wind generator combined with solar panels supplies the necessary electrical energy for the home. Connected to the conventional power grid as a back-up, there is never a danger of running out of power.

Claiming not to be a disciple or a prophet of environmentalism, Gelderloos insists that this project is a way to demonstrate how humans can take responsibility for their own energy consumption and lessen their carbon footprint at the same time. "Having my water tested opened up a new way for me to look at the interconnectedness of man and nature," he said. "If we pollute the water systems of our planet, the planet gets sick. But we too, in turn, become sick from drinking polluted groundwater." It is a cycle that he believes that can be mitigated with more innovation.

In the 1970s, when high oil and energy prices were as much an issue as today, new technologies began to emerge. But lacking digital and computer technology, the systems were cumbersome, expensive and never caught on for the mainstream homeowner. And people were unaccepting of homes that didn't look conventional or fit in with their neighborhood, as were mortgage lenders concerned about resale value. This hybrid home, though, solves those problems and more.

It is said that a man's home is his castle. For Gelderloos, it is more than that. It is a way to combine his philosophy, his vision, and perhaps a future business into one project.

"Initially, I did not come at this project as an environmentalist. I looked at this project from the standpoint of a realist. But I soon realized the two are inseparable," he said.

Seamless, finely crafted, aesthetically pleasing, Gelderloos has created what may be the ideal home—one that takes the free gifts of nature and utilizes them respectfully and efficiently.

Interested in visiting this hybrid home? In the future, Gelderloos and his family will be providing tours on the first and third Sundays of each month. Interested in building one? You are in luck. Gelderloos wants to help others build a hybrid home or adapt their existing one by incorporating green sources of energy. A hybrid home could be in your future. For a glimpse, visit www.oasishybridhomes.com.

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into toilets and the greenhouse through an underground piping system that irrigates the plants. That water is again filtered and reused two to three times before it finally ends up in the septic system. Two separate sewage systems run throughout the home insuring no contamination of the gray water.

"We designed a greenhouse that wraps around the front of the home, both for the passive solar heat and to allow us to grow our own food throughout the year," Gelderloos said.

Lined with bricks to capture heat from the sun, the greenhouse works well. "I have not had to turn on any heat this winter. On a sunless day, we can depend on heat from our fireplace," he said. "I looked at a rock one day in the winter and picked it up. It was warm from the sun. Why can't we do the same in our homes, I wondered?"

Gelderloos also built a Finnish style oven (with masonry mass) that can store and radiate heat for a prolonged