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Alternative Ways to Waste Energy – and Money

By **Bill Holmes, P.E.** May 13, 2013 11:46:23 am

"Bill, let me give you some advice, don't ever use your own home as an experiment," said Bob, publisher and owner of several newspapers. We were walking around his beautiful three-year-old solar house, which looked out over the lake on his wooded, hilly property in one of the most beautiful parts of southern Indiana. It was the late 1970s and everyone was focused on energy. Bob was a World War II veteran and an electrical engineering graduate of Purdue nearly 40 years before.

Even though he could easily afford to pay the electric bills for any size house, Bob wanted to do his part to help conserve energy and the environment. With his inquisitive mind, I am sure he had done a lot of research before he decided he wanted an energy-efficient house using all of the latest technology. The house was supposed to be mostly heated by its passive solar design and south wall of windows, but it also had solar panels on the roof.

For backup heat during those weeks of dreary days of the long and frequently depressing Indiana winters, and for summer air conditioning, it had a geothermal heat pump system with a "lake loop," a closed loop of piping submerged on the bottom the lake to take advantage of the lake water temperature which, "according to theory," stayed essentially constant at 55 degrees year-round. (We later measured the actual temperatures throughout the shallow lake in the middle of February and again in August, and found that the water temperature varied more than 50 degrees; too cold for the geothermal system to work in the winter and too hot in the summer.)

As Bob was showing me the second set of solar panels on the roof that had failed and lost all their antifreeze, staining his roof and the side of his house, he was telling about the mechanical engineer and contractor from Indianapolis who had installed the system and maintained it up to that point. He was fed up and looking for another engineer. I was local and it was a small town. He had heard good things about me from others in the community, and as a member of the board, he knew I was teaching at the local Purdue Campus. Although he didn't mention it, I am sure he remembered the fact that I had been an honor carrier for his newspaper a few years before.

Those wonderful sources of free heat, solar panels, didn't work all that well when the sun didn't appear for a couple of months. Too bad that occurs during the Indiana winters when you could actually use some help heating your house. All of those articles about the wonders of heat from the sun didn't seem to emphasize that. I may have been the only local reader to notice that many were coming out of the Solar Energy Research Center at New Mexico State University in Las Cruces. And I only noticed because NMSU was my alma mater, the place the Air Force had sent me for my Master's.

In the 365 days I had lived there, we only had one day when the sun didn't come out. It had actually rained. In the winter, it was 60 degrees during the day and 20 at night and there normally wasn't a cloud in the sky. Have you heard of the cliff dwellings near Silver City or adobe homes? The Indians in that area had been living in passive solar homes for thousands of years. Those thick walls slowly absorbed the heat from the sun all day and released it into the south-facing dwellings during the night. By morning the walls were cool and the cycle started all over. I imagine back up heat was an extra bear skin or maybe even a small fire. Too bad New Mexico had so few lakes or those innovative Indians could have tried a geothermal system with a lake loop instead.

My ancestors in the Midwest hadn't heard about all of that. They were stuck living in sod homes and log houses without a single solar panel. Abe Lincoln spent about 10 years of his life in Southern Indiana, and for a while lived in a cabin with only three walls and a deerskin covering the open side. Talking

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Author Bio

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Bill Holmes, P.E. founded Holmes Energy LLC www.holmesenergy.com and developed the AutoPilot Monitoring-Based Commissioning (MBCx) System in 1979. He has a B.S. and M.S. in mechanical engineering and has done additional coursework and research for his PhD. He is a former Purdue professor and taught for several years in the Continuing Education in Energy Management Program at the University of Wisconsin.

Bill has produced savings from 20% to, in a few projects, more than 50% from low-cost, no-cost changes in management, operation, maintenance and control alone in all types of facilities including Industrial Plants owned by Fortune 500 Companies.

He is the recipient of a DOE Award for Energy Innovation and was the Indiana Energy

about freezing in the winter! He actually had to chop wood just to keep warm.

Bob took me inside to the magnificent living room with the south wall of glass facing the lake and the 20-plus-foot ceilings with a clerestory of smaller windows on the north side. He showed me the carpeting and beautifully upholstered furniture that had been faded by the sun and the wood tables that had dried out and were cracking. And oh yes, the new draperies they had installed to help protect against more sun damage as well as to keep the occupants from frying on sunny days. Before they bought the drapes, the living room was uninhabitable on a sunny day. It was too hot! He described how when he and his wife Betty tried to sit in there to read on cold evenings, a draft of cold air would dump from those clerestory windows right down the back of their necks. He was really frustrated.

His architect had been a professor from the Purdue Campus in Indianapolis who was regarded as one of the leading experts on solar energy in Indiana. (Remember, those Purdue professor are really smart.) But that may not have been much of a distinction; I didn't know if there even were any other solar experts in Indiana. He had given a number of talks around the state. As a matter of fact, I had gone to hear him talk about solar energy and solar heating at the local library a couple of years before. Apparently Bob had heard him and had been impressed enough to hire him to design his new house.

I thought his talk on solar was pretty informative. I had enjoyed it. I understood the thermodynamics and the energy transfer. I understood that the heat into the house and solar panels had to go somewhere. I had been reading everything I could get my hands on about solar heating. I had even designed a solar water heating system at the local wastewater treatment plant.

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Manager of the Year in 1990. He has published numerous papers and been making presentations on his projects and methods for more than 25 years. Bill is a sculptor, a writer and a regular contributor to Sustainable Plant.

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