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Cold winter proves builder's energy theories

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The Star's real estate editor

Aside from a few orange-growers in South America who stand to profit from the Florida freeze, it is difficult to imagine anyone actually feeling grateful for the rugged winter of 1981-82.

Craig Wolfe, a former country rock musician who is now a Kansas City, Kan.-based home builder, is just such a person.

Not meaning to seem callous, Mr. Wolfe acknowledges that this winter's bitter cold posed great hardships for many area residents. But the harsh conditions of December, January and February also provided an excellent laboratory for the testing of Mr. Wolfe's latest housing design, a 1,568-square-foot split-level home he has dubbed "The Energy 1 Concept Home."

A unconventional dwelling completed last fall September at 14622 W. 85th Terrace in a conventional Lenexa subdivision called The Cedars, the house passed the winter's test with flying colors, he says.

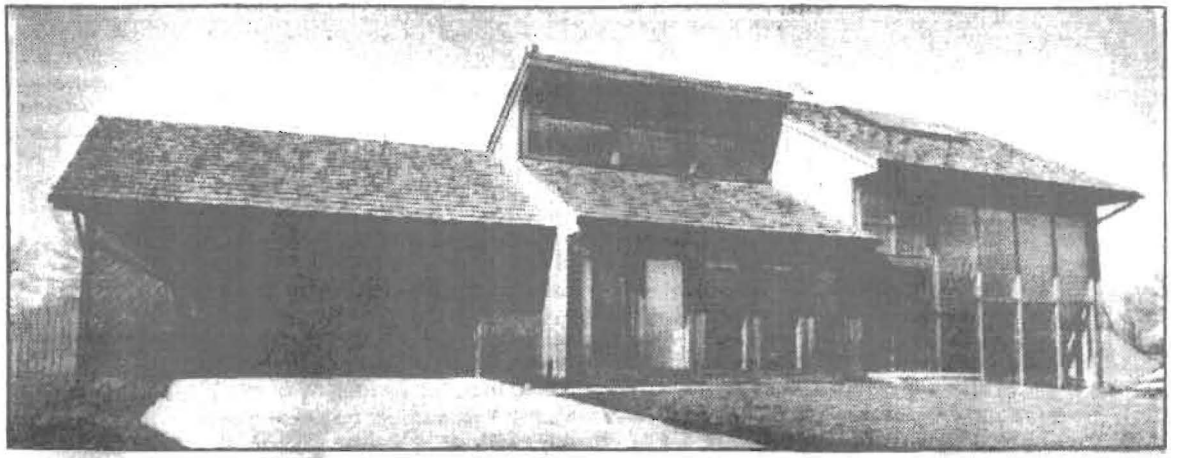
While other families struggled with huge natural gas bills, the owners of the house, Mr. and Mrs. Tom Staggs, spent only $114 for heat from Dec. 1 through March 1, a cost incurred through the operation of three of the home's four electric baseboard heaters, the only mechanical heating devices to be found in the house.

Based on standard comparisons of the efficiency of electric heat to natural gas heat, Mr. Wolfe says, the $114 paid by the Staggs to the Kansas City Power & Light Co. is the equivilant of $55 worth of natural gas, an average cost of $13.75 a month.

"A lot of builders in solar energy didn't think it would work," Mr. Wolfe said of his house, which combines elements of passive solar, earth contact and super-insulated housing designs into one package. "They didn't think we could heat this house with four small baseboard heaters."

The heaters, monitored during the winter by KCP&L, did not heat the house by themselves. The sun provided most of the heat through large south-facing windows and a greenhouse—heat which was retained inside the house by super-insulation features designed to limit "infiltration" of outside air.

Court Cosby, technical director for Enertech Consultants Inc., an energy management firm which assisted Mr. Wolfe and KCP&L in the monitoring and testing of the house, said heat loss in the house through infiltration was limited to one-sixth the level for the average home. In most homes, he said, up to 50 percent or more of the heat can be lost through infiltration.



A variety of energy-efficient features, including a greenhouse (at right) and clerestory windows (upper center) helped keep electric heating bills down to $114 during the winter of 1981-82 at this house at 14622 W. 85th Terrace, Lenexa, erected by builder Craig Wolfe without a conventional furnace. (staff photo by Dan Peak)

"This is the tightest house in Kansas City that we have tested," said Mr. Cosby, a former engineer with Butler Manufacturing Co. here. "It is one of only two houses we have tested which could meet the Swedish standards for infiltration required on all new houses."

That the house could meet Nordic standards should not be surprising, considering the fact that Mr. Wolfe based his design on techniques created by builders in Finland, a Scandanavian country where energy conservation in housing is less a matter of economics than a means of survival.

Mr. Wolfe, a University of Kansas business graduate who worked for a decade as a singer-songwriter in a group called Amdahl-Wolfe, has latched on to the Finnish design after only four years as a home builder. The key to the plan, he says, is construction technique.

Because the house is heavily insulated to protect against heat losses (including two inches of Styrofoam on the foundation, one inch of Thermax around exterior framing from the base plate on up and layers of thin, plastic-like polyethylene spread virtually everywhere from foundation to ceilings to act as a vapor barrier), construction requires meticulous attention to detail.

So serious is Mr. Wolfe about eliminating infiltration that exterior walls are "double-walled," with the standard two-by-four walls bolstered by two-by-twos on the inside. Both walls are filled with insulation bats and separated by a layer of polyethylene. Electric outlets are installed inside the two-by-two section, eliminating the chances of heat loss through outlet boxes.

The sun is brought inside through large floor-level windows and clerestory windows in the great room. All windows are insulated with Window Quilts, rolling thermal shades which reduce heat loss at night and during cold days as well as protect against unwanted sunlight on hot summer days.

The home's three bedrooms are bermed on the north and back up to the greenhouse, a two-level

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glassed-in area where sunlight is absorbed by the thermal mass, a 16-inch concrete wall broken only by doors which provide access to the greenhouse from the bedrooms. Mr. Wolfe said heat takes eight to 10 hours to conduct through the mass, meaning that it is gathered from the sun during the day and radiates into the bedrooms at night, when it is needed most.

The greenhouse also contains an attic fan which is used at night in the summer to cool the concrete tile floor in the great room and the thermal mass wall.

Stale air, a problem in "tight" houses where outside air infiltration is minimized, is moved out of the house through an air-to-air exchanger, a device which brings outside cool outside air into the house and heats it with the stale warm air it is expelling. Without the exchanger, Mr. Cosby noted, residents would be annoyed by cooking and other odors and endangered by possible pollutants.

All these devices, assisted by the baseboard heaters, kept the house a comfortable 68 to 70 degrees all winter, said Mrs. Staggs, who, like her husband, works for Sperry Univac Corp.

Based on an average cost of $3,000 to install a conventional furnace, Mr. Wolfe says the alternatives in the Staggs' home cost $1,000 more than conventional construction. But even when the cost of conventional mortgage financing is added (the couple bought the house with an adjustable rate market loan), he says, he believes the energy savings make such houses a bargain.

The great room of Craig Wolfe's Energy I Concept Home in Lenexa is heated in large part by sunlight which enters through large south-facing windows (at left) and radiates off a concrete tile floor. In this view from the dining room, one of the windows is covered by a rolling shade (called Window Quilts) used at night during the winter and to regulate the sun in the summer. Against the wall at right is a wood-burning stove which was not used by the owners of the house because Kansas City Power & Light Co. was monitoring the home's use of electric baseboard heaters for auxiliary heat. KCP&L paid the family $250 not to use the stove. ***(staff photo by Dan Peak)***

So much so, in fact, that he and Mr. Cosby of Enertech are now discussing with investors the possibility of developing a Johnson County subdivision of 1,200-square-foot Energy I Concept Homes.

"We think this is it; this is the design plan we are going to use from now on," says Mr. Wolfe. "We are excited, but it is kind of scary too, because we are giving people not what they want but what we think they need."