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December 29, 2006

Energy-efficient house passes first test

Model home will now be asked to perform while being occupied

By **Christina Littlefield**

Las Vegas Sun

A model home has lived up to its promise of producing more energy than it consumed in a yearlong test, leading to the next - and more critical - test in the experiment: Gauging energy use when the house is occupied.

The science project is being conducted by UNLV's Center for Energy Research and Pinnacle Homes, which has sold the home to a buyer who has agreed to allow energy use to be monitored for another two years.

UNLV has been monitoring the specially built, energy-efficient tract house, located in Pinnacle Home's Vinings development in southwest Las Vegas for the last year, and comparing the results with its more standard neighbor.

The two 1,600-square-foot homes have identical, flipped floor plans, but the baseline home was built using standard construction practices, and the so-called Zero Energy House uses every energy-efficient technology available. Electricity and gas consumption is measured with 100 devices embedded in the home during construction, said Robert Boehm, director of the Center for Energy Research.

Boehm's goal has been to evaluate which technologies best conserve energy and which are the most cost-effective.

Pinnacle plans to use the data to build a collection of 40 to 50 zero- or low-energy homes, marketing director Bob Balzar said.

"We've not had an electric bill for a year, and that is very attractive to us," Balzar said. "In comparison, the baseline home ran about \$200 a month."

Many of the energy devices, however, come with high price tags. The photovoltaic electrical system, which generates electricity from solar panels on the roof, can cost as much as \$55,000 before rebates, Balzar said. But by buying in bulk, Boehm believes, homebuilders can construct zero-energy homes at a cost that only adds about 10 percent to the price of a traditional home.

UNLV's Zero Energy House lives up to its name

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With upgrades such as a better air-conditioning unit, improved insulation and windows, compact fluorescent lighting and a solar-heated water system, the Zero Energy House used 58 percent less energy than its neighbor. The photovoltaic system generated 1,700 more kilowatts of electricity than it used - enough to have run the house for another four months.

The numbers reflected limited use of the homes, Boehm said, but nonetheless gave researchers a chance to see how the two homes compared under the same conditions. As model homes, both were heated and air conditioned throughout the year and had their lights on all day. Students also did tests on the water heating systems, as the Zero Energy House used a solar water heating unit on the roof and an on-demand heating device as backup.

But researchers did not test how the Energy Star appliances measured up against the standard appliances in the baseline home, nor were they able to account for other electrical devices such as televisions or computers. Appliance usage can account for 10 percent to 30 percent of a home's energy usage, and will likely bring the Zero Energy House to a net energy usage of zero.

Right now, Nevada Power technically owes UNLV for power it generated for the year, but while the utility acknowledges the credit, Boehm said there will be no refund check in the mail.

"But they will bring it (the power bill) down to zero, except for the \$6 a month access fee" for using the utility's grid, Boehm said.

The most cost-effective techniques builders can use in future houses is additional insulation such as the special reflective foil lining in the attic and placing the duct work within the insulated space of the house so cool air or heat aren't lost in the attic. A more costly but highly effective device was the upgraded air conditioner with a water-evaporation system to cool the condenser, resulting in a 55 percent energy savings compared to the standard unit next door, Boehm said.

But the energy-saving air conditioner required additional maintenance because of the valley's hard water.

A quick and easy way to save energy, homeowners are advised, is to use compact fluorescent lights. They last up to seven years, use 20 percent the power of incandescent bulbs and put off less heat, saving on cooling costs.

Pinnacle covered the construction costs of the homes and the research work is being paid for with a \$228,000 grant from the Nevada Southwest Energy Partnership through the National Renewable Energy Laboratory.

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