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Inside Real Estate

Better-Built Houses Can Cut The Power Bill

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Imagine living through a long Colorado winter in a house with no furnace, boiler or water heater powered by traditional fuels — but no such bills either.

Builder Eric Doub and his family have done this for two years in a very energy-efficient home. While Doub has put in plenty of solar panels and other specialty items, a lot of his savings comes simply from careful choice of construction materials and methods.

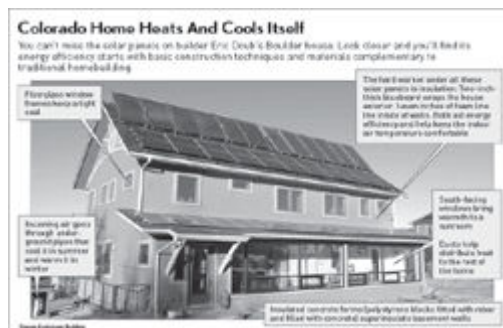
"These homes are giant thermal batteries," he said. "I turned my heat on 10 times last winter, yet my home had a constant temperature of 73 degrees throughout the winter."

As home buyers show interest in cutting energy use and power bills, more builders are tailoring construction to that goal. Some are now designing for substantial energy efficiency, putting up what are called "high-performing" homes.

Doub constructs these and the even more energy-saving "zero-energy homes" — like his own — as president of Boulder, Colo.-based EcoFutures Building.

Regional Differences

Trapping and distributing heat efficiently in winter is an important design consideration in Doub's homes. In Dallas, builder Jim Sargent seeks ways to alleviate summer heat. He says builders haven't routinely been doing all they can in that department.



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"The way some homes are being built is archaic," said Sargent, a principal with AndersonSargent Custom Builder. "When you think about the techniques used to save electricity, you hit yourself in the head it's so simple."

Building low overhangs above windows to create shade or strategically placing windows to face away from the summer sun will cut energy use, he says. Even planting a tree in front of the south-facing windows will pay dividends.

Tightening up homes so that there are no leaks will help particularly during summer and winter, when temperatures are at extremes.

Sargent says a common view is that leaks come mainly from windows, but that's not necessarily the case. Sealing around ventilation ducts can trim heating and cooling costs, he says. So can establishing a barrier between an attic and the rest of a house.

Walls are responsible for 40% to 60% of lost energy, Doub says. Putting up double drywall panels and filling the space with foam will block air leakage.

Pay Now, Save Later

Built-in energy efficiency can raise the cost of home construction. The idea is that a buyer gets paid back later in the form of lowered power bills.

Sargent says the techniques he uses can add 10% to overall building cost. However, his homes use 50% less power than traditional houses.

Standard homes are big power gobblers. Along with commercial buildings they use 71% of the nation's electricity, according to the Energy Information Agency.

The average home actually creates more pollution than the average car, the Environmental Protection Agency says.

"Most existing homes are really 8-mile-per-gallon homes," Doub said. "By increasing the initial building cost of a home by 7% to 8%, about 30% to 50% of the lifetime energy use of the building can be saved."

The potential for long-term cost savings figures big in demand for so-called "green homes" that are built to be both environmentally friendly and energy efficient. Lower operating and maintenance costs were the key motivation for 63% of people who bought a green home, according to a survey done by McGraw-Hill Construction for the National Association of Home Builders.

Truly green homes amount to a \$1.8 billion market and account for about 0.3% of U.S. homes, McGraw-Hill says. It estimated last year that about 2% of the residential construction market has at least one green element, but that can be something as basic as energy-efficient appliances.

In the Seattle area, national builder **Centex** ([CTX](#)) has been seeing rising demand for homes it constructs to local "built green" standards. As of the end of the 2007 fiscal year in March, it had built 406 such homes, with an average sales price of \$450,000.

"Feedback . . . indicates that customers are interested," said Holly Sinclair, the company's Seattle division marketing director. "However, the awareness of the program is still growing."

Energized By Incentives

States most proactive about building green include California, Colorado, New York, New Jersey and areas of the Pacific Northwest, says Tim Merrigan, a senior program manager for the Department of Energy's National Renewable Energy Laboratory.

These states offer incentives to builders who construct zero-energy homes, he says. The federal government also offers tax credits of up to \$2,000 to build green.

"The trend really took off six or seven years ago when California was experiencing rolling blackouts, market manipulation and excessively high utility bills," Merrigan said.

His lab and the Energy Department's Building America Program aim to get the top 3,000 U.S. builders into net-zero-energy home-building by 2020.

Such homes maximize energy savings. They can be built to produce and return to the power grid, through solar and other means, enough energy to cut annual power costs to zero — at least in theory. Builders say they encounter the most demand for homes capable of moderate energy savings.

Laying Groundwork

Over the last five years, Merrigan says, 1,000 to 2,000 zero-energy homes have been built nationwide.

"Our goal is to have developers following a national home construction standard that will essentially result in putting up little power plants," he said.

Doub builds zero-energy homes by blending simple construction techniques with efficient technology. He uses solar thermal and photovoltaic panel setups, which cost \$31,000 and \$25,000, respectively.

These panels convert sunlight directly into electricity. The home draws energy from its stored supply in cloudy or dark conditions. But when it is sunny, the excess energy is sold back to the utility company through a net metering agreement at 4 cents a kilowatt per hour.

Air coming into homes can be routed first through underground geothermal pipes to cool it in summer and warm it in winter.

New Building Blocks

Developers who construct high-performing and zero-energy homes say they use basic building materials and products. Some manufacturers are coming up with new materials aimed at this market.

Concrete forms maker Dukane Precast, of Naperville, Ill., uses concrete mixtures with 38% recycled content. Instead of heavy quarry limestone, Dukane uses an expanded lightweight slag aggregate, a blast furnace byproduct. That cuts concrete panel weight, says Brian Bock, Dukane's vice president.

"Not only is less material being used, with better results, but trucking costs are cut by up to 50% due to fewer trips needed to ship to a site," he said.

Bock adds that concrete homes, such as one Dukane had built in Bolingbrook, Ill., save on heating bills in a region that can have nasty winters. Concrete walls and ceilings create an airtight seal that keeps the cold air outside and the heat inside.

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