

ELECTRONIC HOUSE

Green Development Features Affordable Homes

Solar panels and hydro air heating systems are some of the features found in homes in this energy efficient neighborhood.

Oct. 22, 2008 — by [Steven Castle](#)

Building or buying a green home is too expensive, right? Not if you're Carter Scott of [Transformations](#), a home developer in Townsend, Mass., who is building a 41-home development of energy-efficient three-bedroom homes with price tags of \$350,000 to \$390,000, which is comparable to new homes in this Central Massachusetts community.



Prices for the zero-energy homes range from \$360,000 to \$390,000.

Nearly every house in the development has solar panels on the roof and is super-insulated, primarily using 2-by-6-inch stud construction, separated by 24 inches instead of 16 inches, which reduces material costs. Heating for those frigid New England winters comes primarily from hydro air systems using [Polaris](#) water heaters and [First Company](#) air handlers with heating coils. The gas-fired Polaris water heaters are 96-percent efficient, and no furnace is required. The development even has affordable condo units in colonial-style structures with [Evergreen](#) solar panels on their roofs. And Scott's own home in the development uses geothermal energy for heating, cooling and hot water.

The solar panels certainly advertise a sexy part of being energy efficient. A typical home in the development has reduced its electrical demands by 60-percent and has a monthly bill of \$60 for all the utilities. During one month this year, Scott himself received an electric bill for 91-cents.

But perhaps the greenest feature here is the extra insulation that provides a fundamental seal against the cold and enables lower heating costs. Most of the homes have five inches of dense, blown-in cellulose insulation with an inch of rigid foam insulation, and one zero-energy home has nine inches of it, plus three inches of rigid foam insulation for an insulating R-value of 49.

The zero energy home, in fact, has no traditional burner or boiler. The 1,252-square-foot house will get all of its heat from the tight seal, super insulation and two [Mitsubishi Electric Mr. Slim](#) ductless air-source heat pumps positioned on each floor. In addition, a [LifeBreath](#) energy recovery ventilator (ERV) breathes in fresh air from the outside, exhausts stale air and adjusts humidity as needed. The three bedrooms on the second floor rooms have exhaust vents to keep the air moving. The deed-restricted affordable home cost \$195,200 and has R-5.5 triple paned,

low-E windows, with electricity coming partly from the 5.7-kilowatt solar array on the roof. Scott says it will take the energy equivalent of two hair dryers to heat the house.

In fact, all the houses now being built in the development will be zero-energy homes with the same 12-inch-thick walls and air-source heat pumps, Scott says. There's a 1,880-square-foot zero-energy home priced at \$360,000 and a 2,180-square-foot Greek Revival zero-energy home available for \$390,000.

Scott's own 2,200-square-foot house (with an additional 800 square feet in basement) saves about 80-percent of typical energy costs, thanks to its 4.6-kw PV system, plus a geothermal heating system that pulls heat from the ground, where there is a warmer temperature in the winter. The geothermal setup is a direct-exchange system that uses the heat from the earth to warm a refrigerant in 100-foot-deep bore holes. The warmed refrigerant is then piped into to a heat exchanger that taps the heat for a forced air system in the house. It can also cool the house by taking heat out, and is used for the hot water system. The Scotts get hot water, heating and cooling from the same system. The only drawback is the system's \$21,000 price tag.

Newer homes in the development will have solar thermal systems, which heat a refrigerant in tubes and then piped into a solar water tank to heat the water for the home's hot water needs. In these cases, a [SunDrum Solar](#) systems attach to the backs of the Evergreen PV panels to both collect the heat trapped beneath the solar panels and help cool the panels. And by taking that heat away, the panels operate more efficiently. Scott says his roofer can install the system for about \$6,300 per house.

Scott is also starting to do some energy monitoring. His own home has a [PowerCost Monitor](#) from Blueline Innovations, which attaches to the power meter and wirelessly transfers the data to the small monitor inside. He also has three thermostat data loggers in the zero-energy home, with data that can be downloaded to a computer.

Scott has heard of the studies about energy monitoring helping people save electricity, but he's not entirely sold on the concept. His family used their own energy monitor for a couple of months, then interest waned. "If you can tie [the energy monitoring system] into your computer screen, it might be more useful," he says.

A big help in building these market-rate green homes comes in the form of rebates from the [Massachusetts Technology Collaborative](#) amounting to more than \$16,000 of the \$22,000 to \$23,000 cost of a typical 3.45-kw photovoltaic solar system. Scott is also getting a rebate for including affordable housing in the mixed-income development. But the builder is proving that you don't have to spend exorbitantly on a house to have a green one. In fact, these homeowners are eligible for federal and state tax breaks for being green.

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