

LEEDING THE WAY TO A GREENER FUTURE



JULIE DIETRICH

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INSTRUCTOR BERMAN

INTRODUCTION

Despite its name—the United States Green Building Council—and its acronym—the USGBC—the institution is not a government agency. Rather, it is a “non-profit community of leaders working to make green buildings available to everyone within a generation.”¹ To this end, the organization developed the LEED rating system in 1998. LEED stands for “Leadership in Energy and Environmental Design.” These self-appointed arbiters of ‘green-ness’ have been quite successful in promoting their brand. It now seems that if one wants her building duly acknowledged in today’s race for sustainable recognition, then, for a fee, she best obtain certification from this organization or a reasonable facsimile thereof.²

Of course, there are quite a few individuals, organizations, and companies who do want recognition of their green efforts and have undertaken to meet LEED’s requirements for green certification, as a visit to the LEED Web site attests.³

One such individual who undertook the LEED certification process is Jeff Rogers—a homeowner living in North Truro, Cape Cod, Massachusetts. Mr. Rogers was very successful in his application for certification. Indeed, he received the platinum rating, the highest available through LEED, and, at the time of certification, 2007, his was the first home in Massachusetts and only the eighth in the nation to attain such status.⁴

Rogers may have had a head start over some potential LEEDites as he is a LEED Accredited Professional, worked for 10 years in the environmental consulting field, currently manages the family-owned Ace hardware and lumber store in Provincetown, Massachusetts, and is the founder of New England Green Building, an offshoot of the family business, the purpose of which is to facilitate green building.⁵

Though there are eight LEED credit categories—Sustainable Sites (SS), Locations and Linkages (LL), Water Efficiency (WE), Energy and Atmosphere (EA), Awareness and Education (AE), Materials and Resources (MR), Indoor Environmental Quality (IEQ), and Innovation and Design (ID)—LEED defines a green home through the following five categories:

1. Energy: focusing on insulation and the concept of a sealed envelope
2. Indoor Air Quality: minimizing combustion gases, moisture levels, and particulate matter

¹ Based on information available at <http://www.usgbc.org/Default.aspx> (10/17/08).

² Personally, I have some problems with these self-created organizations that one must pay in order to gain legitimacy. I don’t deny that, ultimately, they probably serve a purpose, but their existence subsequently results in financial gains (non-profit or otherwise) to themselves and out-of-pocket expenses to others. I suppose, though, that is the name and game of capitalism at work. In any event, an in-depth discussion of the issue is beyond the scope of this paper.

³ See <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1721>.

⁴ _____, “Home, green home.” *The Economist* 6 Sep. 2008: 74.

⁵ Based on information available at <http://www.negreen.com/AboutUs.html> (10/23/08).

3. Materials: environmentally friendly, recycled and recyclable, and limited waste
4. Water: minimize erosion, runoff, and demand and effectuate controlled re-use
5. Sites: avoid environmentally sensitive sites⁶

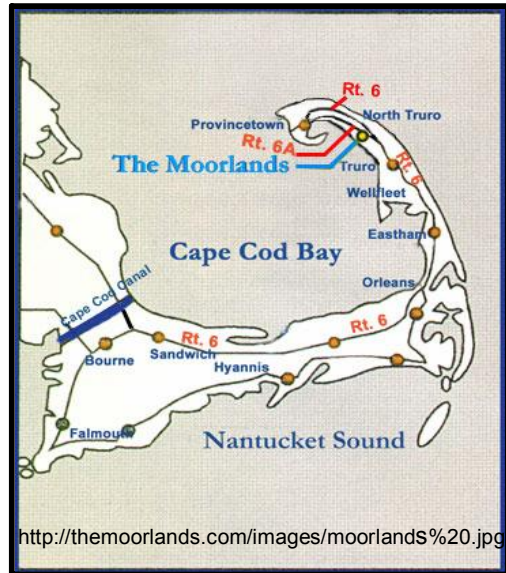
THE ROGERS HOME

The Rogers home is situated on .22 acres in North Truro on Cape Cod in Massachusetts (see map at right). It is 2100 square feet, and construction was completed in 2007. The house is the result of a “major gut rehab” of a former 25-year-old home.⁷

Let us analyze and look at the Rogers home in light of the five categories enumerated above...

Energy: The Rogers home uses no fossil fuels and generates 100 percent of its own electricity, including for cooking. It is, then, a zero-energy home, meaning it has a net energy consumption of zero over a typical year. The home also has a geo-thermal heat pump that heats and cools the house using groundwater. The efficiency of this system means there is no air conditioning; it is not needed, despite the hot, muggy Cape Cod summers. Approximately 75 percent of the roof cover is arrayed with a series of photovoltaic solar panels; these panels convert sunlight into electricity (see photo on cover).⁸ The Rogers home also features a heat-recovery ventilator. Situated in the basement, the device uses separate blowers to move incoming fresh air and outgoing stale air. The heat-exchange core transfers heat to fresh air without mixing the airstreams.⁹

A common metaphor used in the green building industry to explicate the concept of energy efficiency, or air tightness, is a sealed envelope, a thing that permits little exchange between the interior and the exterior. All those little cracks and crevices that allow the transfer of air between the inside and the outside of a home can add up to real energy costs in the form of high utility bills. Indeed, while the average home exchanges about 35% of its air with the outside each hour, the Victorian home of the author of *The Economist* article cited herein has an



⁶ Based on information available at <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1720> and the LEED for Homes Rating System.

⁷ Information learned from Jeff Rogers via telephone on 10/21/2008.

⁸ _____, “Home, green home.” *The Economist* 6 Sep 2008: 74.

⁹ Klenck, Thomas. “How It Works: Heat Recovery Ventilator.” *Popular Mechanics* Aug 2000.

exchange rate of 80 percent! The home of Jeff Rogers, on the other hand, has an exchange rate of just seven percent.¹⁰ The only utility bills the Rogers receive are telephone and cable.

Indoor Air Quality: There is nothing within the Rogers home that produces carbon monoxide. Moreover, there are very few toxic materials. Adhesives, paints, and insulation are all free of formaldehyde and contain low levels of volatile organic compounds (VOC's),¹¹ examples of which include, *inter alia*, paint strippers, cleaning supplies, building materials, and furnishings. The heat-recovery ventilator also acts as an air purifier, removing stale air and circulating fresh.

Materials: As mentioned earlier, the new Rogers home was the result of a major gut rehab of a former 25-year-old home. Sixty to seventy percent of the original structure was retained, including the original dormer roof (see photo on cover; dormer roof to the left). The new roof is made of recycled plastic and sawdust. The siding is cement fiber board made by HardiPlank,TM which consists of premium cement, finely ground sand, and natural fibers. Basically, HardiPlankTM is partly wood and partly cement.¹² The deck is recycled decking made by Trex,TM which is a combination of wood and plastic fibers derived from reclaimed or recycled resources, including sawdust and plastic grocery bags.¹³

Water: Like the foregoing categories, the Rogers home also excels in sustainable design insofar as water is concerned. The home contains all modern appliances, dual-flush toilets, and low-flow taps and showers. On the roof, the photovoltaic panels sit next to arrays of water-heating tubes, which provide solar-generated hot water. The family of four uses less than one-third of the water an average family of equal size would use.¹⁴ Because the house is on the beach, there is no rainwater harvesting system; it is not needed. Instead, the rain water is piped back into the aquifer. The geography also lends itself to xeriscaping. The landscape of the property contains only indigenous plants and sand.¹⁵

Site: As mentioned, the Rogers home is situated on .22 acres. The property is approximately 500 feet from the shoreline and replaced an existing structure in poor condition.

DISCUSSION

As we can see from the foregoing category particulars, Jeff Rogers did a commendable job in meeting the LEED standards. Of course, one would expect as much since he received the

¹⁰ _____, "Home, green home." *The Economist* 6 Sep 2008: 74.

¹¹ Ibid.

¹² Based on information available at

<http://homerenovations.about.com/od/houseexteriorframework/a/hardiplank.htm> (10/31/08).

¹³ Based on information available at <http://www.trex.com/whytrex/WhatIsTrex.aspx> (10/31/08).

¹⁴ _____, "Home, green home." *The Economist* 6 Sep 2008: 74.

¹⁵ Information learned from Jeff Rogers via telephone on 10/21/2008.

platinum rating. There is a little confusion in the Rogers scoring because he underwent certification as LEED was transiting from one rating system to another. According to the current rating system, as seen in Table 1 at right, the platinum rating for home certification runs from 90 to 136 points.

LEED for Homes Certification Levels	Points Required
Certified	45-59
Silver	60-74
Gold	75-89
Platinum	90-136
Total Available	136

Source: LEED® for Homes Rating System

When Rogers had his home certified, he was eligible for a possible 108 points. Of that possible total, he scored 94.5.

In the Energy Category 1, the sealed envelope, Rogers scored 27 out of 29 points. Under Indoor Air Quality Category 2, Rogers scored 10 out of 14. For the Materials Category 3, Rogers scored 11 out of 24. He lost a lot of points in this category, scoring only one out of a possible 10, because his home is not smaller than the national average. Under Water Category 4, Rogers obtained 9.5 out of a possible 12 total; and, finally, under Sustainable Sites Category 5, Rogers scored 12 out of 14. (See Appendix A for the complete official Project Checklist, which includes the total scoring table.)

Again, with a platinum ranking of 94.5 out of a possible total of 108 under the old ranking system, Rogers came darn close to a perfect score, so one would be hard-pressed to find much fault with his efforts. In speaking with Rogers himself on October 21, 2008, this author asked him if he were satisfied with the home and whether there was anything he hadn't done that he now wished he had, or anything he had done that he now wished he hadn't. To his credit, he was quite honest in his response. Firstly, he indicated that he was very satisfied with the home and that it was the best house he'd ever had. Of course, it's only the second house he's ever had, so one could argue that this is not that much of a testimonial. Still, he pretty much built the house himself from the ground up, so there's certainly a sense of pride there as well.

As for what he did do or might have done, Rogers said that he wished he had not retained the original dormer roof. Keeping it meant that he had to sacrifice additional energy because he could not install solar panels on that section of the roof. Moreover, it cost him a fair amount of money to retain the original dormer because it had to be hoisted with a special crane and treated very carefully. Furthermore, the retention of the dormer roof also meant he had to get a small evacuated tube water system instead of a flat plate.¹⁶

Another thing he would have done differently related to the hot water system. The house currently has an 80-gallon storage tank with two coils: one for solar and one for geo-thermal.

¹⁶ I didn't quite understand this bit of our conversation and since he was a very busy man and I did not want to take up too much of his time, I did not ask him to explain a second time when I didn't quite catch it all on the first go-round.

In retrospect, Rogers wishes he had gotten a bigger storage tank with an on-demand electric hot water heater because, during the winter, the hot water is not hot enough. Consequently, at the time of our conversation, Rogers was in the process of upgrading the hot water system.

Something else Rogers could have done but didn't was to install a gray-water system for laundry and the like, but he didn't because of all of the permitting required, the additional expense, and, frankly, it was just too much for the contractors to deal with. With respect to this latter point, Rogers also mentioned during our conversation that he had to continually re-assure the contractors that if they simply followed Rogers' directions/instructions and if something ultimately went wrong with any part of the overall design, they would not be responsible in any way.

In conclusion, we will just address the cost issue. Rogers figures it cost him an additional \$75,000, or 23 percent more, to build an impeccably green home than it would have done otherwise. He received \$35,000 in rebates and incentives from state and federal governments and expects to recoup the rest in avoided energy costs within five years.¹⁷

¹⁷ _____, "Home, green home." The Economist 6 Sep 2008: 74.

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