

LivingHomes: A Catalyst in Green Residential Design



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The LivingHomes model home in Santa Monica, California. (Source: www.livinghomes.us)



The model home lit at night by LED lights. (Source: www.livinghomes.us)

Green Building is a subject that has gained a lot of momentum in the past few years. Previously, the topic was reserved for architectural and building construction magazines. Now, it has crept into mainstream pop culture, where magazines like *Vanity Fair* and *Time* are placing it on their front covers. This is in part due to the US Green Building Council's (USGBC) development of the LEED (Leadership in Energy and Environmental Design) Green Building Rating System, which is now a nationally recognized "brand". Green Building has also become a part of pop culture by branching into different typologies of architecture from commercial buildings to residential buildings. Particularly with residential design, green homes are gaining popularity with soon-to-be homeowners and experienced homeowners alike.

The LEED system is voluntary and consists of consensus-based national standards for sustainable buildings. LEED for Homes is a new initiative set to launch in early 2007, which focuses on rewarding green homebuilders and pushing the homebuilding industry towards a more sustainable practice. This program will provide national consensus for the elements of a green home and allows homebuilders in various markets to obtain a LEED rating on their projects. The incentive for the homebuilder is that their products will stand out in the market, especially

since LEED ratings are becoming increasingly well known. The LEED for Homes pilot program, started in 2005, includes 125 builders and over 725 housing units.¹

The LEED for Homes program is based on a four-tiered rating system: Certified, Silver, Gold, and Platinum. Points are awarded to projects based on their application of several categories: energy resources, water resources, building construction resources, land resources, and enhanced indoor environmental quality.²

This past August, the LivingHomes model home obtained the highest LEED rating in its new program, the "LEED for Homes" rating system, receiving 91 out of 108 possible points. It is the first home in the country to receive the highest LEED rating of platinum, which only 19 other buildings have received. The residence is located in Santa Monica, California and was designed by architect Ray Kappe (founder of SCI-arc) for LivingHomes. Its design and construction has undoubtedly set new sustainable standards for residential design. The home claims to be "zero energy, zero water, zero waste, zero carbon, and zero emissions".³

According to Rick Fedrizzi, president of the US Green Building Council, the model home demonstrates how involving sustainable design methods early in the construction process can lower operating costs, increase home value, reduce maintenance problems, and improve

indoor environmental quality. Equally important, LivingHomes has made the residence available for consumers to buy across the country- for those that can afford it. Also in the works is a second line of homes designed by David Hertz. Each living home is designed to reach at the very least, a silver rating.⁴

The LEED for Homes rating system evaluates projects through several categories: location and linkages, sustainable sites, water efficiency, indoor environmental quality, materials and resources, energy and atmosphere, homeowner awareness, and innovation and design process. LivingHomes achievement in some of these categories will be further elaborated on.⁵

Water Efficiency (WE)

Water is efficiently circulated and used throughout the site by using water reclamation for irrigation. A native landscape and rooftop garden is used to divert stormwater and alleviate the heat island effect caused by conventional black roofs. The house also employs an integrated stormwater management system, which includes sub-surface irrigation, a 3500-gallon cistern, and a grey water recycling system to divert sink and shower water for irrigation.⁶

Indoor Environmental Quality (IEQ)

A large part of making the model home

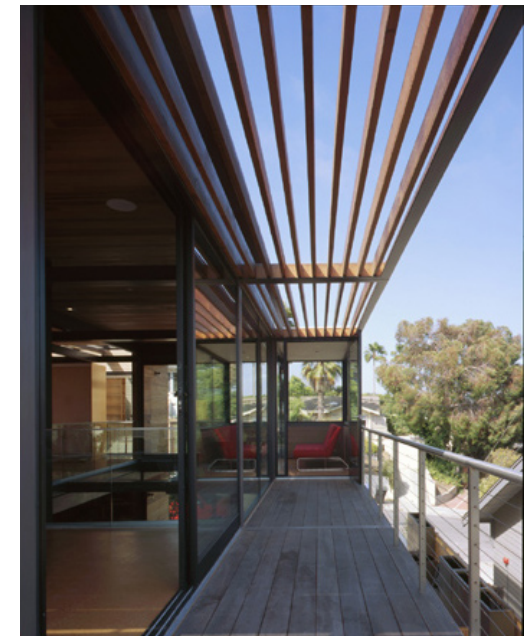
safe and sustainable on the interior involves creating a carbon-neutral atmosphere by offsetting carbon dioxide emissions. In order to execute this, LivingHomes pays for a “carbon off-set” for each home it sells in addition to its first year operation. The model home features low-emitting finish materials such as low Volatile Organic Compound (VOC) paints and stains to decrease any affects of off-gassing. Additionally, the home uses a steel structure, which does not support mold growth. The radiant heating system within the floor of the home heats the space in a more healthy and effective way instead of forcing contaminant-infected air throughout the home. LivingHomes also provides the option of indoor gardens to produce and clean indoor air. An indoor garden was installed in the model home and contains plants that filter indoor pollutants and are strong oxygen creators.⁷

Materials & Resources (MR)

The majority of materials in the model home are re-used or sustainably created. This allowed the house to be produced with 75% less construction waste. Low-e Solarban60 glazing and Polygal polycarbonate glazing was used on the Fleetwood doors and windows. These materials have greater thermal properties than regular glass, but do not appear aesthetically different. If the construction of the home involves



The rooftop solar pannels generate energy for the home. (Source: www.livinghomes.us)



The materials of the home were reused and sustainably created. (Source: www.livinghomes.us)



The window glass contains low-e glazing to help keep heat out in the summer and retain it in the colder months. (Source: www.livinghomes.us)



The structure of the house is made from steel, which is not susceptible to mold like stick frames are. (Source: www.livinghomes.us)

dismantling of an existing home, LivingHomes donates the materials to Habitat for Humanity. Considering that landfills are comprised of 40% construction waste, this helps to reuse materials and decrease waste. The millwork, ceiling, siding, and framing use Forest Stewardship Certified (FSC) wood. Other sustainable materials in the house include 100% post-consumer recycled paper based countertops, recycled glass tiles, recycled porcelain tiles, and Green Fiber 100% recycled denim insulation.⁸

Energy & Atmosphere (EA)

The LivingHome model home is projected to be 80% more efficient than a conventional home of similar size. The majority of the home's energy is produced by on-site photovoltaics. Other sustainable features include solar water heating, radiant floors, resource efficient Energy Star appliances, LED lights that use a significantly less amount of power than conventional lights, special fans that exhaust moisture from the bathrooms, and a "whole-house" that automatically vents hot air. As an additional touch, a 175 CFM fan was installed into the garage door, which automatically exhausts carbon monoxide from the garage.⁹

Innovation & Design Process (ID)

An important aspect of the home's sustainability is that it is flexible in its program

and function. The model home includes movable walls, modular millwork, and a structural frame that can be easily added on to and reconfigured to create new spaces. The materials in the home can also be easily disassembled and reused if the home is deconstructed in the future. Through out the design process, LivingHomes employed and collaborated with experts in particular professions to create features like the green roof and radiant heating system. The model home also contains products of other companies who are involved in sustainable design such as: organic bedding and linen from Matteo, water-efficient fixtures by Kohler, FSC certified cedar from Eco-Lumber Co-op, special roofing by Carlisle-Syntec, interior design by Heidi Toll Design, an energy-efficient spa by Jacuzzi, and furnishings by Design Within Reach, Herman Miller, and Henry Hall Design.¹⁰

What's Left to be Improved?

By looking at the materials and systems used, it is safe to assume that this is a high-priced home. According to their website, the budget was \$250 per square foot, and this does not include design costs (10-15% of the budget), permit fees, engineering, transportation, installation, or the foundation work. These additions can add another \$70-90 per square foot. However, many things are included in the cost of the home such as finishes, fixtures, appliances, a roof deck

and garden, interior garden or atrium, heating and cooling systems, cabinetry, FSC wood, low-VOC paints, and formaldehyde-free millwork. LivingHomes realizes this is a costly structure and is working on lower per square foot costs. Until then, they claim that the model home is still a 20-40% reduction in cost of a similarly constructed home.¹¹

Although LivingHomes model homes received the highest LEED rating, there are still categories in which it did not perform well. The project was awarded full points in the following categories: location and linkages, sustainable sites, water efficiency, and homeowner awareness. It received more points than required in the energy and atmosphere category. The model home under performed in the indoor environmental quality, materials and resources, and innovation and design process categories.

The model home could have increased its points in the indoor environmental category by using more materials and finishes that did not produce strong off-gasses. This would also have simultaneously improved its points in the materials and resources category. The home underperformed in the innovation and design process category in part because of its lack of affordability. Because the cost of the house was high to begin with and there was no affordability goal, LivingHomes could have spent more money

in the materials and resources category.

The location and linkages category appears to give points to a project based on the sustainability of its location. LivingHomes was awarded the full ten points in this category, yet it was hard to find information that supported that. The home included a garage, which alludes to the type of buyer they are pursuing and a location that requires traveling by car. There was no mention of mass transit options or the site location in relation to other nodes of retail or office development. Perhaps LEED should give more points to projects in urban location that rely on mass transit options.

The major drawback of LivingHomes is its high price. Green building design, particularly residential green building, should be focused on affordability if it wants to appeal to the masses. The prefabrication construction of the model home is a great idea to make these units affordable. Although the price is high, LivingHomes has catalyzed a trend in home building. Other designers might be inspired to find more affordable options for green residential design from the LivingHome.



The plan is open and flexible to allow the programs to grow and change as needed. (Source: www.livinghomes.us)



The custom homes can range from 650 square feet to 6,000 square feet. (Source: www.livinghomes.us)

EVALUATION CATEGORY	POINTS AVAILABLE	POINTS OBTAINED
Location & Linkages (LL)	10	10
Sustainable Sites (SS)	14	14
Water Efficiency (WE)	15	15
Indoor Environmental Quality (IEQ)	14	9
Materials & Resources (MR)	22	8
Energy & Atmosphere (EA)	29	32.5*
Homeowner Awareness (HA)	1	1
Innovation & Design Process (ID)	4	2
TOTAL	109	91

Certified = 30-49 points / Silver
= 50-69 points / Gold = 70-89
points / **Platinum = 90-109 points**

* Awarded bonus points

Endnotes

1 US Green Building Council LEED for Homes, "Rating System for Pilot Demonstration of LEED for Homes Program," (Version 1.72. US Green Building Council, 2005).

2 Ibid.

3 LivingHomes, "The USGBC LEED for Homes Program Awards LivingHomes the First Ever Platinum Rating in Residential Sustainable Design," (<http://www.livinghomes.us/press/press_leeed1.html>, 2006).

4 Ibid.

5 Ibid.

6 Ibid.

7 Ibid.

8 Ibid.

9 Ibid.

10 Ibid.

11 Ibid.

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