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A PREFABRICATED
HOME GOES
SOFT ON THE
ENVIRONMENT

BY KJ FIELDS

THERE'S NO PLACE LIKE HOME—at least, no place like Steve Glenn's home. As the first house to receive a LEED Platinum award under the U.S. Green Building Council's LEED for Homes pilot program, Glenn's home serves as a model for his Santa Monica, Calif.-based company, LivingHomes (www.livinghomes.us). The company produces prefabricated houses that combine high design and green-building features with a faster construction process. In fact, Glenn's home was delivered to his Santa Monica lot in 11 modules, and the structure was installed in one day. Glenn intends LivingHomes to provide a new option for homebuyers with sustainability in mind.





THE BEGINNING

The founder and chief executive officer of LivingHomes, Glenn spent his first career in technology, but when he turned his attention to real estate, his thesis came quickly.

"There are a lot of people who care deeply about design and sustainability in the products they buy but who can't buy homes that reflect those values. We're developing homes for this market."

Glenn opted to build prefabricated homes because he says they can reduce costs, production schedules and construction waste while increasing quality.

Renowned modern architect Ray Kappe, FAIA, designed the first line of LivingHomes, and David Hertz, a highly regarded sustainable architect, currently is designing the second line. Kappe's goal was to create prefabricated houses that express the structure without seeming like a series of boxes.

"I wanted to get interesting volumes and more spatial qualities out of a prefab house and make it feel like a conventionally built home," Kappe says.

Glenn's 2,500-square-foot (232-m²) model home has an airy 2-story living room, mezzanines and open rooms that make the space more interactive. Kappe's design used 70 percent glass because "glass houses reach out to the site and bring the yard and views into the internal experience."

According to Glenn, Kappe's plan worked. "Ray knows how to create incredible volumes," he says. "The space is light and warm with varying textures and planes."

ENVIRONMENTAL CHARACTERISTICS

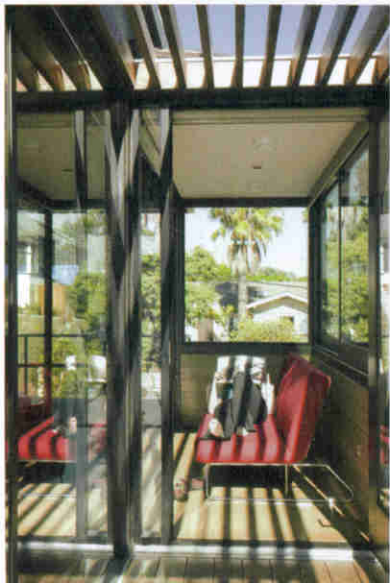
The model home's appeal is more than aesthetic. A combination of measures makes the house 80 percent more energy efficient than a comparably sized conventional residence. On the roof, photovoltaic cells



➤ On the roof, photovoltaic cells generate 80 to 90 percent of the home's electricity. A solar water heater provides hot water for domestic use and supplies the home's radiant floor heating system. A gas-fired boiler serves as a back-up system when needed.



Landscape irrigation comes from two sources—a greywater system that reclaims water from the sink and shower and a storm-water management system that directs rainwater into a 3,500-gallon (13249-L) cistern.



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Expansive double-pane low-E glass panels and 1-inch- (25-mm-) thick polycarbonate glazing fill the home with natural light and minimize heat gain. A whole-house fan automatically vents hot air to maintain comfortable indoor temperatures. At night light-emitting diodes with a 30,000-hour lifetime illuminate the interior using one-fifth the power of incandescent bulbs. Insulation is another energy-saving factor with R-values of 14 and 15 in the walls and 30 in the roof and ceiling.

The home features a variety of reused, reclaimed or recycled materials, including 100 percent post-consumer recycled paper-based countertops and recycled denim insulation.

Its landscaping is created with native and drought-tolerant plants that receive subsurface irrigation, which is a highly efficient water-delivery system. Landscape irrigation comes from two sources—a greywater system that reclaims water

from the sink and shower and a storm-water management system that directs rainwater into a 3,500-gallon (13249-L) cistern. The roof also features a garden that helps insulate the home, reduce heat-island effects and divert storm water.

An indoor garden in the model home uses a selection of plants to filter pollutants and produce fresh oxygen. Low-VOC products and formaldehyde- and urea-free millwork protect IAQ, and the steel structure inhibits mold growth. In the garage, a fan automatically exhausts carbon monoxide when the garage door closes.

A SMART OPTION

In addition to the model home, 10 semi-custom private California residences are in various stages of development. Currently, the homes cost approximately \$250 per square foot, not including foundation, transport or install.

Low-VOC materials, ultra-low-voltage LEDs, Energy Star appliances, low-flow faucets and dual-flush toilets are standard green features in the homes. Forest Stewardship Council-certified

wood is used for siding, millwork and floors when a homeowner makes wood selections. Concrete floors made with fly ash or cork floors are other available choices. Additional standard components include recycled insulation and recycled porcelain tiles or recyclable glass tiles in the bathrooms. A vegetated roof, high-efficiency water heater and PVs that supply approximately 20 percent of electrical consumption also help each home achieve targeted sustainable goals.

Customers can upgrade by adding more PV panels to increase the system's energy production. A solar hot water system, storm-water reclamation system, native/drought-tolerant landscaping and greywater reuse system (if allowed by the city) also can be installed. Systems that monitor electricity production and consumption are other supplementary green options.

LivingHomes soon will offer several basic packages that customers can tailor by selecting different floor plans, materials and environmental options. Aware that homeowners frequently undertake remodels, LivingHomes offers movable walls and floor plates for





flexibility. The company also is in the process of creating a 20-acre (8-hectare) residential community in Joshua Tree, Calif., near Joshua Tree National Park.

An exemplary feature of these prefabricated homes is the minimal construction waste. In traditional stick-built construction, 40 percent of construction material ends up in the landfill compared with 2 percent for prefabricated homes.

"Prefabricated homes are much more efficient to build because construction takes place in a controlled environment, and shop

drawings and jigs make it easier to define and construct materials," Glenn says. "For the model home, we used a recycling company that recycled an average of 70 percent of the construction waste materials."

With the home's stylish design, environmental attributes and long-term performance, LivingHomes is reshaping the prefab market and opening doors to sustainable housing. 🌱

KJ Fields is a freelance writer based in Portland, Ore.

green beam

MODULAR-HOME MANUFACTURER

LivingHomes, Santa Monica,
Calif., www.livinghomes.us

- Steve Glenn, owner
- Amy Sims, project architect
- Daniel Cunningham,
project manager

ARCHITECT

Ray Kappe, FAIA,
Santa Monica, (310) 459-7791

INTERIOR DESIGN

Heidi Toll Design,
Beverly Hills, Calif.,
www.heiditoll.com

GENERAL CONTRACTOR

(site work only)
Hinerfeld-Ward Inc.,
Los Angeles,
www.hinerfeld-ward.com

COMMISSIONING AGENT

Davis Energy Group,
Davis, Calif., davisenergy.com



Glenn Residence Wins FSC Honorable Mention

IN ADDITION TO BEING LEED PLATINUM CERTIFIED under the U.S. Green Building Council's LEED for Homes pilot program, the Glenn residence, Santa Monica, Calif., achieved another auspicious recognition during the Greenbuild International Conference and Expo in November. The home received the Honorable Mention Award in the Washington, D.C.-based Forest Stewardship Council's Designing & Building with FSC Awards. The awards sought commercial, institutional, mixed-use and residential entries that use at least 50 percent FSC-certified wood and help promote market transformation.

The Glenn residence's exterior and interior siding and ceilings solely consist of FSC-certified western red cedar. All decking is FSC-certified tigerwood. One hundred percent of the home's millwork is FSC-certified maple Europly, and 85 percent of framing is FSC-certified Douglas fir two by fours. The warm, modern style of the home afforded a lot of wood use, and FSC was the ecological choice.

The Glenn residence demonstrated that it is creating market transformation by being published in mainstream magazines, including *BusinessWeek*. The project also educated subcontractors by providing them experience with sustainable design and FSC-certified wood, as well as introducing them to each other for future reference. The home was featured in the Santa Monica Green Building Tour and stands as local proof that concepts, such as greywater systems and vegetated roofs, actually work.

For more information about the Designing and Building with FSC Awards, see "happenings," page 10, and visit www.fscus.org.

ROOFTOP GARDEN AND NATIVE LANDSCAPING / Richard Grigsby, **The Great Outdoors Landscape Design & Construction**, Los Angeles, www.greatoutdoorslandscapedesigns.com

PHOTOVOLTAIC ARRAY / **Permacity Corp.**, Commerce, Calif., www.permacity.com, and **Gridpoint Inc.**, Washington, D.C., www.gridpoint.com

ROOFING / **Carlisle Syntec Inc.**, Carlisle, Pa., www.carlisle-syntec.com

FOREST STEWARDSHIP COUNCIL-CERTIFIED CEDAR / **Eco-Lumber Co-op**, Richmond, British Columbia, Canada, www.ecolumber.ca

ONE-HUNDRED PERCENT RECYCLED DENIM INSULATION / **U.S. GreenFiber LLC**, Charlotte, N.C., www.cocooninsulation.com

LOW-E GLAZING ON DOORS AND WINDOWS / Solarban 60 from **PPG Industries**, Pittsburgh, www.ppg.com

POLYCARBONATE GLAZING ON DOORS AND WINDOWS / **Polygal Plastics Industries Ltd.**, Charlotte, N.C., www.polygal.com

SLIDING-GLASS DOORS / **Fleetwood Windows & Doors**, Corona, Calif., www.fleetwoodusa.com

SHADING / **Mechoshade**, Long Island City, N.Y., www.mechoshade.com

ENERGY STAR APPLIANCES / **Bosch**, Huntington Beach, Calif., www.boschappliances.com

SOLAR WATER HEATER AND RADIANT FLOORS / **ACME Environmental Group**, Santa Monica, Calif., www.acmegreen.com, and **Creative Climate**, Glendale, Calif., www.creativeclimateinc.com

FIREPLACE THAT BURNS DENATURED ALCOHOL / **Eco-Smart**, Chicago, www.ecosmartfire.com

LIGHT-EMITTING DIODES / **Permlight Products Inc.**, Tustin, Calif., www.permlight.com

BATHROOM FANS / **Panasonic Corp. of North America**, Secaucus, N.J., www.panasonic.com

VENTILATION / **Aprilaire**, Madison, Wis., www.aprilaire.com

WHOLE-HOUSE FAN AND GARAGE EXHAUST FAN / **Tamarack Technologies Inc.**, Buzzards Bay, Mass., www.tamtech.com



LOW-VOC PAINTS AND STAINS / **AFM Safecoat**, San Diego, www.afmsafecoat.com

ONE-HUNDRED PERCENT POST-CONSUMER RECYCLED PAPER COUNTERTOP / **Paperstone** from **KlipTech Composites**, Hoquiam, Wash., www.paperstoneproducts.com

RECYCLED GLASS TILES / **Oceanside Glasstile**, Carlsbad, Calif., www.glasstile.com

RECYCLED PORCELAIN TILES / **Coverings Etc.**, Miami, www.coveringsetc.com

RECYCLED GLASS COUNTERTOPS / **EnviroGlas Products Inc.**, Plano, Texas, www.enviroglasproducts.com

FLOORING / **Natural Cork**, Augusta, Ga., www.naturalcork.com

WATER-EFFICIENT FIXTURES / **Kohler Co.**, Kohler, Wis., www.kohler.com

DUAL-FLUSH TOILETS / Sterling from **Kohler**

SHOWER DIVIDER / **3form**, Salt Lake City, www.3-form.com

FURNITURE / **Design Within Reach**, San Francisco, www.dwr.com; **Herman Miller Inc.**, Zeeland, Mich., www.hermanmiller.com; and **Henry Hall Designs**, San Francisco, www.henryhalldesigns.com

ORGANIC BEDDING AND LINEN / **Matteo LLC**, Los Angeles, www.matteohome.com

LEED FOR HOMES EVALUATION OF LIVINGHOMES MODEL

Categories	Points Available	Points Attained
Location and Linkages	10	10
Sustainable Sites	14	14
Water Efficiency	15	15
Indoor Environmental Quality	14	9
Materials and Resources	22	8
Energy and Atmosphere	29	32.5*
Homeowner Awareness	1	1
Innovation and Design Process	4	1.5
Total	109	91

Platinum certification requires 90 or more points. The LEED for Homes Checklist is available at www.usgbc.org/DisplayPage.aspx?CMSPageID=147.

*Awarded bonus points.