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DESIGNING THE WAY TO green

PATRICIA L. KIRK

Environmental design is now synonymous with sustainable, or green, design.

In the past, environmental design involved creating spaces to meet human aesthetic or functional needs or to provide a specific sort of experience. Today, it involves taking environmental concerns into account in the design process and encompasses the built, natural, and human environments.

This shift in focus reflects the broadening and deepening of environmental design concerns to involve the relationship of humans to the natural environment and survival of the planet. The change in focus also represents expansion of the scope of design activities to include policies, programs, and products used to create human habitats, and of the role of "designer" to encompass engineers, environmental scientists, landscape designers, urban planners, and waste management experts, in addition to architects.

The evolution of environmental design to be synonymous with sustainable, or green, design began about 50 years ago with visionary thinkers like Buckminster Fuller, who invented the geodesic dome and popularized the terms *spaceship Earth*, *ephemeralization*, and *synergetics*. Green building practices, however, only recently entered the mainstream with establishment of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating program, a uniform system for measuring the level of sustainability achieved by a project.

"LEED was a watershed," says environmental and real estate consultant Charles Lockwood, because it helps ensure that users and buyers receive the environmental benefits they pay for, giving green building practices credibility in corporate America. Key to this

Experimental sustainable big-box Wal-Marts opened in Aurora, Colorado, and McKinney, Texas, last year. Along with with large window clerestories that provide daylighting, the stores also have skylights with mirror reflectors that track the sun, providing natural lighting where there are no windows.

credibility was a critical mass of sustainable buildings built before the LEED system was created, such as the Toyota USA headquarters in Torrance, California, which he says demonstrated the benefits of green and "proof of the promise."

Greening Retail

Over the past few years, a number of Fortune 500 companies have built green facilities of their own, including Nortel, Bank of America, Goldman Sachs, and IBM. Even Wal-Mart last year opened experimental sustainable big-box stores in Aurora, Colorado, and McKinney, Texas, that have extensive energy-saving technologies, including on-site energy production. (See "Greening the Big Box," June, page 94.)

"This not a good guy wearing Birkenstock shoes running around doing good things for the Earth," says Hank Baker, senior vice president of Forest City Stapleton Inc. in Denver. "They're realizing they can make more money doing it."

Regardless of its motive, "Wal-Mart is leading the way to LEED in retail," says Brian Levitt, project developer for Forest City's Northfield Stapleton town center project. "They did everything you can do and made it an educational experience, putting up signs to tell people about the technology. You walk through and go 'wow.'"

HINES

Houston-based Hines currently is constructing a 12-story, 266,000-square-foot (24,700-sq-m) office project in Irvine, the first office building in California to be precertified under the U.S. Green Building Council's LEED-CS (core and shell) rating system.

Retailers generally present a sustainability challenge, he notes, because it is difficult to convince them to pay extra rent to save energy, alter national store prototypes, or change vendors in order to use recycled, renewable, and nontoxic materials and products in construction. That is why Northfield Stapleton, a 1.3 million-square-foot (119,000-sq-m) mixed-use project, is unusual, says Levitt: it is the first town center project to seek a Silver rating under the LEED core and shell (CS) program. (See "Retail Goes Green at Stapleton," page 204, September).

The LEED-CS program gives developers an opportunity to obtain certification without having to qualify space that will be occupied by tenants. Previously, no opportunity existed for developers of speculative office buildings or retail space to receive a LEED rating. In Northfield's case, only common spaces, such as administrative offices, maintenance facilities, and restrooms, will be rated.

Noting that retailers are the biggest consumers of energy, Levitt developed educational and incentive programs aimed at getting Northfield tenants on board as well. The educational program focuses on the intangible benefits of green design, including good public relations, increased employee productivity, and reduced employee absenteeism and turnover, all of which add up to higher sales and profits.

The Sustainable Tenant Incentive Program (STIP), developed by *How to Get to Green* author Marik Peternel, is a 51-point "baby steps" program that walks Northfield tenants through the process. Although achieving LEED certification is optional, all tenants are required to integrate 17 green practices that each cost $1 per square foot or less. "We had serious opposition, but have had good success with the program so far," Levitt says. If all goes as planned, Northfield will have the first complex composed entirely of green stores, including national retailers. "We've made it easy and cheap to get them halfway there," he notes. "We're biting our nails hoping tenants will buy in."

Green Office Innovations

Houston-based Hines, a global real estate developer/owner and early adopter of green building practices, built the 33-story Calpine Tower in downtown Houston, an example of a real estate venture executed in accordance with environmentally responsible principles. In 2003, the building was 85 percent leased before com-

WAL-MART

Green screens on the garden center at Wal-Mart's experimental green stores (right) give the building shade and ventilation, while passive solar signals use the sun's energy to make motorists aware of pedestrians and stop signs.

The 33-story Calpine Tower (below) in downtown Houston, built by Hines, integrates green building design using products with technologies that provide energy efficiency and healthy air quality. In 2003, 85 percent of the building's space was leased before completion at a time when the city's office vacancy rate exceeded 20 percent and rents were falling.

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The company is currently constructing two speculative office buildings in southern California that also are registered with the LEED-CS program. Doug Holte, Hines's California regional senior vice president, says he is not sure yet which LEED level the buildings will attain, but notes that state-of-the-art technology and materials are being used, along with design features that create an open interior space providing extensive daylighting.

According to Holte, 7.5-foot (2.3-m) vertical windows with high-performance, low-emissivity glass wrap the buildings with few column interruptions. The floor design brings exterior light into centrally located administrative offices by creating notches that allow light to pass through solid wall areas.

Noting that tenants prefer green buildings over conventional office buildings, John Mooz, Hines vice president, contends that competition for tenants is driving the green office movement and points out that green office space commands premium rents and leases up faster than conventional space.

Green Paradigm Shift

"It's the coming of a green mindset, where what used to be a specialized effort is becoming common practice," says Paul Danna, a principal at Los Angeles–based DMJM Design and designer of two Hines office buildings in southern California. A pioneer in sustainable development, he designed Washington's Department of Ecology building in 1989, which received a LEED Silver rating more than ten years after it was built.

"It's fairly simple: like any new line of thinking, technology is involved, but also the sensitivity it brings to design," Danna notes. "As firms gain a better understanding of integrated design, they are pushing the limits, going from Bronze and Silver to Gold and Platinum." Over the next ten to 15 years, buildings certified as LEED Gold or Platinum will be the standard rather than the exception, he predicts.

plants, clean the water, and allow it to percolate back into the aquifer close to where the rain originally fell.

Green roofs also reduce the energy required to maintain comfortable temperatures inside buildings, insulating rooftops from heat and decreasing the heat-island effect, points out Lawrence Reid, a landscape architect and principal at Sausalito, California–based SWA Group. A green roof costs more than a conventional roof—about $11 per square foot ($118 per sq m)—but extends the life of the roof by protecting roofing material from ultraviolet radiation and heat.

Additionally, it contributes to biologic diversity by providing a habitat for animals, has aesthetic value, stores surface water, and ultimately helps minimize the effects of global warming, he says.


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The green roof at the Gap headquarters building in San Bruno, California, conserves energy by eliminating the heat-island effect and provides a habitat for birds and insects.

The Restoration Economy

The next leap in sustainable development will involve the retrofitting of existing buildings to add green features and the rise of a restoration economy. "The real boom coming is in bringing existing buildings up to LEED specifications," contends Lockwood. This renovation market will lead to new contracts and revenue for industry professionals and suppliers.

Storm Cunningham, founder of the Alexandria, Virginia–based consulting firm Revitalization Strategies, Inc., and author of *The Restoration Economy*, concurs, predicting a major push to regenerate properties at the end of their life cycles to bring back value. "Restoration development is inherently green because it reuses something," he points out. "The sweet spot is when you combine the two—reuse a building and retrofit it with green. You can't get any greener than that!"

Cunningham maintains that restoration is the fastest-growing segment of the economy, but believes that fact is lost because government reporting systems are not set up to separate renovation permits from those for new projects. He suggests that some cities have already turned the corner, engaging in adaptive use of buildings, as is taking place in downtown Los Angeles, and locating stores in distressed areas where they become a revitalizing influence, as is happening in Harlem and Washington, D.C.

Heinfeld agrees, and suggests that in the future, real estate buyers will look at operational and maintenance costs, as well as rents, to determine capitalization rates. "Users in the marketplace are helping to drive this shift in real estate values," he says. Consequently, owners are looking at their inventory of buildings and replacing worn-out equipment with more efficient systems because "the end game is better," he says.

This is a very exciting time," adds Lockwood. "The price [of building green] is down. Knowledge is up. LEED provided standards, and [green] buildings delivered on the promise. Next is the renovation boom," he says. "This will be as significant as the invention of the elevator or air conditioning in transforming real estate." ULI

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SWA GROUP

LPA, INC.

The energy-efficient design at Toyota's U.S. headquarters campus (opposite page) in Torrance, California, the largest privately owned LEED Gold office complex in the country, includes the country's largest privately owned rooftop photovoltaic system (right). Recycled concrete and drought-tolerant plantings are used in the building's landscaping (above).

Consequently, the cost of building green today is comparable to traditional building costs, contends Dan Heinfeld, president of Irvine, California–based LPA Architects, a pioneering firm in environmental design and designer of the Toyota USA building in Torrance, which received a LEED Gold rating. "I don't accept the argument that it's a great idea, but will cost more," he says. The Toyota building was the myth buster, demonstrating that green didn't have to cost more, he notes. "Every building should and can have a green quotient."

Nature's Bonus

Heinfeld stresses that environmental design is part of the initial decision-making process. "Sustainability is neither additive nor deductive: it's part of a building's DNA," he says. "Systems must respond to the region's climate." Some elements will not change according to the local climate, such as products involving indoor air quality and recycling. But any element related to energy will change and will require unique building design, which ultimately may make a building more interesting architecturally, Heinfeld notes.

"The process begins with understanding of what a site offers for free," Heinfeld continues. "Know where the sun is; look for connections—things that can do double duty. Look for marriages between time-honored design principles that respond to the region's climate, and find the right solution within those principles," he advises. "Get what you can for free, and then add the new technologies you can afford. People who think sustainability is about technology are missing a great opportunity. There's no downside to using less—conserving energy and water. The most exciting thing that's happened in our industry in 50 years is a paradigm shift to take advantage of appropriate, time-honored design principals," adds Heinfeld.

John Knox, developer of Noisette, a 3,000-acre (1,200-ha) sustainable development in North Charleston, North Carolina, that is converting a navy shipyard to civilian use, views a building as an organic environment. Taking advantage of all that nature has to offer before integrating expensive technologies, Knox has been able to produce green homes at Noisette selling for

$140,000 to $225,000. (See "Getting Behind the Wheel," page 70, June.)

"My grandfather knew shutters were not just ornamental, how to orient a house to take advantage of the prevailing winds, and that using native materials made a home last longer," he says. "Great building principles have stood the test of time across all cultures; it is an intuitive way of doing things."

New York City architect/planner Frederic Schwartz, an advocate for rebuilding New Orleans using principles of sustainability, emphasizes the importance of considering passive measures to conserve energy before adding technologies. "It's common sense to first do things that don't cost anything, like daylighting instead of lights, ceiling fans rather than air conditioning," he says. "After passive measures, then think about Energy Star appliances, wind and sun energy, geothermal heat pumps."

FOREST CITY STAPLETON, INC.

The 1.3 million-square-foot (119,000-sq-m) mixed-use Northfield Stapleton is the first town center project to seek a Silver rating under the LEED-CS (core and shell) program.

Schwartz, who is working on three projects in New Orleans, contends that the rebuilding effort there presents an opportunity to reverse the years of environmental misdeeds and overdevelopment of wetlands that ultimately led to the city's destruction. "We have a chance to reinvent, reinvigorate, and change the evil ways that led to this mess," he says, pointing out that ground zero in New Orleans encompasses 116,000 acres (46,900 ha), and 200,000 people are still not able to return home.

Pushing the Limits

As designers and developers push the limits of sustainable innovations, they are entering new territory. In the case of Noisette, Knox notes that in attempting to replicate how nature deals with waste, developers did not create a waste disposal system, but rather a waste management infrastructure in which the majority of waste becomes raw material used to produce something else. In nature, everything discarded is food for another system, so "instead of our waste going to landfills, it's becoming products," he says.

Charleston-based Southeast Biodiesel is opening a plant at Noisette that will convert used vegetable oil from restaurants to fuel for use in school buses, automobiles, trucks, and shrimp boats. Wood pallets are being turned into hardwood flooring and planters.

Chris Fisher, who bills himself as an "eco-preneur," has developed seven products from pulverized glass, including material used to create countertops, sinks, and floor tile; sandblasting sand; rock substitute used in golf course greens; a product used in pool and water filtration systems; glass-fiber wallboard that is mold resistant; road aggregate; and a glass-and-oyster-shell mixture used to pave driveways. Fisher also collects food waste from restaurants and grocery stores to grow verma, or worm compost—"the crème de la crème of compost," he says.

Additionally, Clemson University's Restoration Institute is building a research and development campus in North Charleston that will focus on historic preservation and materials science, plus provide the region with an economic driver, encouraging innovation and investment in restoration technologies.

Sustainable strategies used at Noisette are not unique, notes Harry Gordon, Noisette planner/architect, but are more fully integrated than those generally found elsewhere.

The stormwater management system, for example, consists of a chain of different strategies that together reduce harm to the environment. Green roofs reduce and slow rainwater runoff, which is captured in rain gardens and swales that beautify streetscapes with native

plants, clean the water, and allow it to percolate back into the aquifer close to where the rain originally fell.

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Heinfeld agrees, and suggests that in the future, real estate buyers will look at operational and maintenance costs, as well as rents, to determine capitalization rates. "Users in the marketplace are helping to drive this shift in real estate values," he says. Consequently, owners are looking at their inventory of buildings and replacing worn-out equipment with more efficient systems because "the end game is better," he says.

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