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Can LEED Survive the Carbon-Neutral Era?

The rating system is beginning to gain wide acceptance, but critics now wonder whether the checklist approach can meet the daunting challenges ahead.

By James S. Russell

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As China chokes on air pollution and the glaciers rapidly recede, green design in mainstream America takes on a boutique sheen. Eco-homes feature a bit of FSC-certified cabinetry, paints that don't off-gas, fancy air filters. The sell lays the sustainable message on thick: the Web sites and brochures for these projects make the buildings seem like Zen spas, with the bathwater triple filtered and floor-to-ceiling windows opening onto patches of pesticide-free green roofs.

Increasingly, the soybean inks on these marketing efforts include the acronym LEED, for Leadership in Energy and Environmental Design, the voluntary green-building rating system developed by the U.S. Green Building Council (USGBC). With climate-change concerns growing, the program is on everyone's radar. After all, buildings use about 70 percent of the electricity produced in the United States, more than half of which is generated by coal, the dirtiest fuel and worst contributor to global warming. In the absence of any substantial federal effort, LEED has almost by default become the primary way American builders tackle our daunting environmental challenges.

And yet the program has only certified about a thousand buildings since its inception in 2000. It's a tiny accomplishment compared to the 1.4 million homes that will start construction in 2007—a slow year. But LEED numbers are growing rapidly (see map). According to Scot Horst, chair of USGBC's LEED steering committee, there are 40,000 LEED-accredited professionals. "That suggests the level of market transformation." Dozens of municipalities now either encourage or require certification for building projects. Companies that did not even know what the acronym stood for a year ago now clamor for a Platinum rating.

Though global warming has made it more relevant than ever, the program has been slow to reflect the importance of climate change, largely because LEED's vision of environmental sustainability is exceedingly broad, taking in site development, water efficiency, building materials, and fresh air, among other issues. Until this June, buildings could get certified without receiving any of the energy points aimed at reducing carbon emissions. The rating system has suffered many growing pains but appears on the verge of wide acceptance; coping with climate change, however, could threaten the current model.

The primary reason so few buildings have been certified is quite simple: it is not easy. Architects not only have to design a better building, they have to document it copiously and then await the USGBC's judgment on whether they've achieved the rating they sought. And certification is not cheap. Fiona Cousins, who runs the mechanical engineering and sustainability group at Arup in New York, estimates that it can cost \$100,000 to document building performance for LEED. "It's a drop in the bucket for a \$50 million project, but very expensive for a small one," she says. Cost has kept the number of certified buildings low compared to the number of clients who ask designers to follow LEED's guidelines.

"Point mongering" is another sore subject. This is the cherry-picking of low-effort strategies—a bit of bamboo flooring, some never-used bike racks—that raise the score, but with little environmental impact. It's the peril of LEED's oft-criticized checklist approach. "We think LEED can be successful only if its environmental

strategies are so integral that you can't walk around the building and count the points," says Stephen Kieran, principal of Kieran Timberlake Associates, which scored Platinum—LEED's highest rating—for its Sidwell Friends School, in Washington, D.C. (see "[Teaching Tools](#)," July/August 2007).

Still, LEED critics are harder to find these days. "People who were doing something for the first time five or six years ago have learned a lot, and they can do it faster and cheaper now," says Stephen Selkowitz, who heads the Building Technologies Department at the University of California's Lawrence Berkeley National Laboratory. "If a client asks whether A is better than B, they can give an answer in five minutes rather than having to do a week of research." Auden Schendler—who, with colleague Randy Udall, called LEED "its own worst enemy," criticizing its cost, complexity, and rigidity in a 2005 *Grist* magazine critique—now tempers his criticism. The program, he says, is "moving in the right direction. They've addressed the energy aspect to a degree, and they're trying to make it easier to document."

Horst calls LEED "a leadership tool," not just a checklist. "It may not dramatically alter a typical project," he says, "but it requires the design team to go through the ideas and think about what they mean." Doug Farr, a Chicago-based green consultant, hopes those discussions move people beyond a small-bore "widget mentality" that focuses on the dollar payback of a fluorescent bulb or a triple-glazed window. Ideally, LEED requires the building team to look for strategies that work together to multiply benefits (better lighting, for example, yields less need for cooling) or that offer tangible advantages that can't be marked in the ledger as strictly ecological—like the psychic benefits of operable windows.

Owners may also have to make hard choices as they consider LEED's costs, benefits, and inevitable tradeoffs. "If a client has gone public about its intentions to certify to a certain level of LEED, they're forced to look much harder at ways to cut costs without taking out LEED strategies," Cousins says. "Is that Italian marble more important than the photovoltaic panels? Do you absolutely need to buy a ton more air-conditioning rather than build the rainwater-management system?" Reluctance to make these trade-offs is another reason why some owners ask designers to use LEED guidelines but skip the certification process. Bohlin Cywinski Jackson, for example, did not seek certification for Seattle's 2005 Ballard Library (see "[Ship Shape](#)," March 2006). "We feared that if we promised Silver and the bids came in too high there would not be funds for overruns," says senior associate Robert Miller. The building met its budget and went on to win many awards that cited its inventive green features.

While American architects tend to select LEED strategies à la carte, their European colleagues push large-scale building innovation. The green features of Foster + Partners' Gold-rated 2006 Hearst Tower are pedestrian compared to the daylighting and natural-ventilation strategies the firm used in the Commerzbank tower, in Frankfurt, almost ten years earlier. The [New York Times Building](#) features an advanced two-layer wall system and sensor-driven light controls, but the building's architect, Renzo Piano, did all those things in the 1998 Debis Tower, in Berlin, and that structure also harvests rainwater, collects excess heat from an on-site power generator, and opens windows for natural ventilation using computer-driven sensors that monitor the weather.

The innovation that emanates from Europe flows from cultural norms, high energy costs, and tax treatment, allowing designers to focus on a much longer time horizon than is common in America. "Europeans expect buildings to last a long time," explains Arup's Cousins, making higher up-front investments pay. Highly innovative buildings are also considered "the right thing to do," she says. In the United States, "the talk immediately turns to legal risk and money."

The fairly recent addition of innovation points (see examples below) should allow LEED to reward more groundbreaking designs. Indeed, Farr has watched strategies that not long ago were deemed exotic become mainstream. "First you make them legal," he says, referring to waterless urinals and geothermal heating-and-cooling systems, which many building codes prohibit. City officials in Troy, Michigan, altered stormwater-management rules and parking-lot construction requirements after Farr and architect Joe Valerio (of Chicago's Valerio De-walt Train) convinced officials to reduce parking in favor of native grasses and wildlife-attracting ponds in a headquarters for the Kresge Foundation. That three-acre prairie absorbs almost every drop of the site's runoff. Not a big deal, perhaps, but it suggests LEED's invisible multiplier effect,

especially as local governments struggle with flood control and water quality.

The wider public appreciation for the threat of global warming has moved LEED into the mainstream. With that acceptance, however, has come a push to focus the program more heavily on energy. Kent Peterson, president of the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), says, “We’re pulling out the stops to move the industry up the energy-conservation curve.” (ASHRAE writes the standards that guide building mechanical systems.) The society has partnered with AIA, USGBC, and the Illuminating Engineers Society of North America on guidelines that should deliver efficiencies 30 to 50 percent better than current codes.

ASHRAE also intends to introduce a mandatory standard that would require all buildings to be 30 percent more efficient by 2012. This will enforce a stiff learning curve on designers and builders, which could relegate the rest of LEED to the status of frill if coping with energy becomes all-consuming. ASHRAE and AIA are pushing Congress to commit to building construction that is climate-neutral by 2030. To meet that goal ASHRAE will have to get guidelines standards into the market by 2020, Peterson says, a short time for standards that will drive major building-industry change.

Advocates of green building have long claimed that LEED structures need not cost more than their unsustainable alternatives. A recent study, “The Cost of Green Revisited,” by construction-management consulting firm Davis Langdon, supports that claim—at least up to LEED Gold level. (The study didn’t look at Platinum buildings.) The report did include a caveat: “Few projects attempt to reach higher levels of energy reduction beyond what is required by local ordinances, or beyond what can be achieved with a minimum of cost impact.” This suggests that a heavy energy focus by LEED may become a hard sell if it’s perceived as more costly to implement.

Achieving significant energy reductions inevitably forces designers to use an integrated approach, which is how advanced buildings in Europe (and elsewhere) deliver great benefits, trading more elaborate walls and windows for fewer electrical and mechanical components. “With integrated design you’ll get 70 percent to the carbon-neutral goal,” Peterson says. “You’ll get the rest by on-site energy generation.” But these designs can only deliver impressive savings if every element works seamlessly together. It’s a more disciplined approach than making selections from a LEED checklist.

And LEED has yet to embrace the carbon-neutral goal, which in any case may be harder to achieve than Peterson makes it sound. Some high-profile green buildings save far less energy than advertised. The problem is that few designers, builders, and owners bother to make sure that what has been designed, whether green or not, is built properly and works well—an open secret that threatens to tarnish all green efforts. “We need to bridge the gap between design and performance,” Peterson said.

Peterson sees potential in another worthy idea, but one that could blunt the impact of LEED: an energy-rating system for buildings. An initiative already rolling out in the European Union requires that every building publish its energy performance. “No one has a clue what the energy performance of current buildings are,” Selkowitz says.

Public recognition of climate change has inspired even more ambitious efforts. The Living Building Challenge (www.cascadiagbc.org/lbc)—which seeks “to define the highest measure of sustainability possible in the built environment”—trades LEED’s checklist approach for a number of prerequisites: meeting all of a building’s energy, water, and water-disposal needs on-site, for example, or purchasing credits to offset the carbon footprint. USGBC has endorsed the effort, which was devised by the Cascadia Region Green Building Council.

Turning the tide on global warming is not the only issue that may drive greater complexity and cost into LEED. USGBC is working on a life-cycle-assessment methodology so that designers can make choices with staying power, but past attempts at such analysis have proven famously difficult to implement. LEED advocates talk of sleepless nights as they consider this enormous challenge: if the system moves too far ahead of public consensus or building-industry capacity, it will lose the widespread support it now enjoys. But if it moves too slowly, it flirts with irrelevancy as urgent issues take center stage. “Water management is looming

as a crisis right behind carbon,” Kieran explains. “Materials management is intimately related to carbon production. Let’s not lessen the broad focus of LEED but enhance the overall value of carbon-emissions reduction. Global warming is the more immediate question looming over us, but I’d be dismayed if we put all the eggs in one basket.”

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EXPANDING THE CHECKLIST

The USGBC grants up to four Innovation in Design (ID) credits to projects that demonstrate exceptional or innovative performance; the latter provision is intended as a catch-all for green-building strategies that fall outside the defined categories. As such, it should spur experimentation—but, so far, the registered innovations tend toward the quotidian (green housekeeping, pest management). We hope the following examples of more unorthodox and innovative solutions (each of which earned one ID credit) become the norm rather than the exception.

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BAT HABITAT PRESERVATION

For the Barn at Fallingwater—a nineteenth-century structure across from the iconic residence renovated by the Western Pennsylvania Conservancy in 2004—the architecture firm Bohlin Cywinski Jackson researched the feasibility of relocating two bat species that lived in the loft. The project includes a new roosting habitat for the bats.

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THERMAL SCANNING PROGRAM

An infrared scan, scheduled to be performed every two years, ensures that the building envelope of the Sacramento Municipal Utility District’s LEED Platinum customer-service center is performing as energy-efficiently as intended.

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INDOOR VOC MONITORING

A personnel-support facility for the U.S. Navy, in Virginia Beach, included a VOC-sensor system to continuously monitor indoor air for alcohol, acetone, ammonia, carbon monoxide, formaldehyde, and other harmful compounds. When cautionary levels are reached, the system signals air handlers to flush out the building with additional outside air.

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WEIGHING EMPLOYEE CO₂ EMISSIONS

To decide whether to relocate to a new building, the branch of a school-accreditation association compared the CO₂ emissions that would result from employees traveling by car to two locations. When the emissions proved to be higher at its original building, the school decided to relocate.

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9 WAYS TO LEED

1) **NEW CONSTRUCTION:** First LEED program, launched in 2000; created to guide high-performance commercial and institutional projects, with a focus on office buildings.

2) **GUIDELINES FOR MULTIPLE BUILDINGS:** An application guide for new construction, intended for projects where several buildings are constructed at once or in phases.

3) **EXISTING BUILDINGS:** Introduced in 2004; provides performance-based benchmarks for building owners and operators.

4) **COMMERCIAL INTERIORS:** Launched two years ago; USGBC calls it “the recognized standard for certifying high-performance green interiors.”

- 5) **CORE AND SHELL:** Launched last year and aimed at speculative buildings, the system looks at base building elements, such as structure, envelope, HVAC, and water consumption.
- 6) **HOMES:** The ratings system was officially launched at GreenBuild earlier this month; 336 homes were certified under the pilot program, with 8,204 pending.
- 7) **NEIGHBORHOOD DEVELOPMENT:** A pilot program, launched this year, integrates the principles of smart growth and green building into neighborhood design.
- 8) **SCHOOLS:** Introduced in April, the rating system focuses on the unique design and construction requirements of K–12 schools.
- 9) **RETAIL:** A pilot program was introduced in April that, according to the USGBC, “recognizes the unique nature of retail design and construction projects.”

Find out more facts about this story on the [Reference Page: November 2007](#)

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