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### A Cautionary Tale

*Amid our green-building boom, why neglecting the old in favor of the new just might cost us dearly*

BY WAYNE CURTIS

Show me the person who doesn't love a green, environmentally responsible building.

Green buildings are good for you and good for society, and they're absolutely everywhere these days—you can't open an architecture publication without seeing a splashy spread touting some new sustainable project. The green building movement has even added to our vocabulary, albeit with ungainly expressions like carbon footprint and FSC-certified wood.

In just a few years, the nonprofit U.S. Green Building Council (which administers the Leadership in Energy and Environmental Design program) has become surprisingly influential in shaping how new commercial buildings are constructed. Like the Good Housekeeping Research Institute, with its seal of approval, the council puts a sort of ecostamp on buildings via a menu of points, adding another new term to the lexicon: *LEED certified*.

More than a handful of local and state governments have passed laws requiring that new public buildings be LEED certified. (Structures meeting basic requirements are deemed certified; those that go beyond the minimum can receive silver, gold, and platinum ratings.) In Seattle, new city buildings must achieve a silver rating, which is also true in Dallas for new construction of more than 10,000 square feet. Companies like Royal Caribbean, Nike, and Adobe have all touted their LEED buildings. When Armstrong, maker of flooring and cabinets, unveiled its impressive LEED-platinum building last summer in Pennsylvania, government officials there proudly proclaimed their state second only to California in LEED certifications. And last fall, the Green Building Council launched a new rating system for houses, joining the National Association of Home Builders and Energy Star.

This rush toward ecofriendliness was wryly dubbed "conspicuous conservation" by Wired magazine a decade ago. Green, it seems, is the new Gehry. Of course, green is more than a style. It's an imperative. Henry Moss, an architect with Bruner/Cott in Massachusetts, recently suggested in a talk to the Boston Preservation Alliance that "sustainability has taken the moral high ground from preservation." Old is nice, but green is essential. It's something society needs to do now. And like most medicines, green might taste a little bitter. And it might involve a small sacrifice or two.

One might be tempted to compare the recent green wave with the rise of modernism more than a half-century ago. Planners and architects back then didn't just want buildings to look different; they also wanted to change the direction society was headed. The old ways of thinking were outmoded. Yesterday's buildings solved yesterday's problems; new buildings were needed to solve the problems of today—and tomorrow. Of course, many people will recall what happened to America's historic fabric the last time we undertook a nationwide revamping of the built landscape. The result was urban renewal, and it left many of our best urban areas in tatters and many of our historic buildings in piles of rubble. And though hardly anyone would argue against the need to reduce our consumption of dwindling resources, one other word might come to mind when listening to those who envision a brave new world filled with environmentally friendly new buildings: Uh-oh.

"We in the preservation business have always been about sustainability and stewardship," said Mike



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Jackson, chief architect with the Illinois Historic Preservation Agency, at the Traditional Building Exposition and Conference in New Orleans last fall. "But it's a message that's not getting out."

Preservationists and environmentalists have long shared many values. For starters, there's the drive toward stewardship and conservation of resources, whether cultural or environmental. Both groups subscribe to the precautionary principle, in which minimal intervention is always preferred to major overhauls.

Yet when it comes to green, the gulf between the two may be broadening. New green buildings, brimming with the latest in modern technology, are perceived to be on one side; the old buildings, full of quaint, inefficient technologies and drafty windows, are on the other. Which leads one to ask: Just how "ungreen" and energy inefficient are those older buildings?

Not very, it turns out. The reputation of older structures as energy sieves, in short, is simply not justified by the data. According to the U.S. Energy Information Administration, commercial buildings constructed prior to 1920 have an average energy consumption of 80,127 BTUs per square foot. For the more efficient buildings built since 2000, that number is 79,703 BTUs. (The energy efficiency of buildings constructed between these years was less enviable—reaching around 100,000 BTUs—reflecting the cheap oil and electricity of the thermostat age.)

Older homes may not have been as stout and efficient as commercial buildings, but they were green in their own way. "The original buildings had no choice but to be green," said Florida architect Steve Mouzon, founder of the New Urban Guild, at last fall's traditional building conference. "Otherwise, you'd die of heat stroke in the summer, or freeze to death in the winter." Houses in the South had high ceilings and louvered shutters; in the North, they featured thick walls and smaller windows. Sleeping porches provided coolness in summer, and woodstove-centered kitchens gave off warmth in winter. Today, new houses tend to be largely interchangeable wherever you live. Shutters, for instance, have become vestigial, totems from the past screwed into the sides of new houses that do nothing against the wind or sun.

"People often tend to think that historic buildings are inherently energy inefficient," writes Walter Sedovic, a preservation architect in Irvington, N.Y. "The opposite, though, is more likely to be true: that many historic buildings are inherently very energy efficient." As he put it when I contacted him: "Before sustainability had a name, traditional builders incorporated sustainable elements into buildings. Working in sync with the environment was the norm, including siting, local materials, natural ventilation, shading, reflective roofing, cisterns, indigenous plantings—the list becomes long, and in many ways mirrors 'new' standards espoused today."

Consider one curious example: prismatic glass blocks, which can still be spotted above the doorway of the occasional early-20th-century storefront. These glass blocks, invented in the late 19th century, were cast with prisms along one side to redirect sunlight deep into long and dark rooms, magnifying available light between five and 50 times. The Luxfer Prism Co., the leading manufacturer, once held 162 patents related to these glass blocks, and a young architect named Frank Lloyd Wright served as product designer for a year. Some 300 buildings featured the prisms in the first year of production. By 1906, the number of buildings employing them swelled to 12,000. Then they fell out of fashion. Cheap electricity became available, lighting even the dimmest recesses of a shop or office with the flip of a switch. Manufacturers ceased producing prism blocks by the 1930s. The existing blocks were painted over or blocked by drop ceilings.

Now, the whole idea of moving daylight deep into buildings is back in fashion. The term currently in vogue is "daylighting"—that is, maximizing natural light in a building with reflective tubes or fiber optics. "Good daylighting creates beautiful, appropriately lit spaces while saving energy," reports the Daylighting Collaborative of the Energy Center of Wisconsin.

Old windows, of course, aren't often associated with "green" these days. Quite the opposite. Ancient, paint-flecked panes are pulled out every day, with new vinyl windows inserted in their stead by homeowners seduced by newspaper ads promising that you can "Save Energy Now!" for impossibly low prices, including installation. The aesthetic result? A building that had long worn elegant wire-rimmed frames suddenly switching to clunky, Clark Kent glasses.

It's a sacrifice, of course. But it's for the greater good, because replacement windows make sense for environmental reasons, right? Not so fast. It turns out that windows—even old single-pane windows—are responsible for relatively minor energy loss in most buildings.

"Only 10 to 12 percent of the total air infiltration in a building is through the windows," said Sedovic. "The cold isn't being transferred through the glass. It's through openings in and around the sash. The energy loss is mostly through the roof and through the sill." He suggested that "replacement walls" or "replacement fireplaces" would make more sense for the energy conscious. So why are we bombarded

with ads for replacement windows? "It's because windows are easy to construct, easy to transport, and easy to sell," he said. "But they're the wrong idea."

According to the *Whole Building Design Guide*, for instance, an older single-pane window has an insulation factor of R1. A modern double-glazed window offers R3 insulation. Yet if the walls of a historic building have an R-value in the teens, "taking a window from R1 to R3 will not provide sufficient energy savings to offset the cost of replacement windows and associated waste," according to the guide.

What's more, if your goal is to reduce overall resource consumption, restoring and maintaining old windows make sense in another way. "We call them replacement windows because you keep replacing them," said Sedovic, invoking the words of his colleague John Seekircher.

When modern windows, with their high-tech seals, eventually fail—and they will—the result tends to be catastrophic failure. You don't repair them. You replace them. Anyone who doesn't see something amiss in replacing century-old windows with "environmentally responsible" windows that will be junked and replaced every decade or two is suffering from an irony deficiency.

"The most responsible way to buy clothes is to shop at Goodwill. And the most responsible way to build is to recycle an old building."

So said Yvon Chouinard, the founder of outdoor clothing manufacturer Patagonia, at the opening of its Portland, Ore., store in 2001. The shop is on the ground floor of a reclaimed former warehouse and truck terminal originally dating to 1895. (The building was bought and rehabbed by the environmental advocacy group Ecotrust, which has headquarters in the building; it was the first historic restoration to earn a LEED gold rating.)

The same notion was put more simply by architect Carl Elefante in last summer's *Forum Journal* (published by the National Trust): "The greenest building is one that is already built."

That's more than a snappy T-shirt slogan. It's a fresh perspective for looking at our building stock. "The 'green design' movement," said Illinois architect Jackson, "has largely ignored the inherent ecological advantages of building reuse, including the primary one—embodied energy."

*Embodied energy.* Another term unlovely to the ear, it's one with which preservationists need to get comfortable. In two words, it neatly encapsulates a persuasive rationale for sustaining old buildings rather than building from scratch. When people talk about energy use and buildings, they invariably mean operating energy: how much energy a building—whether new or old—will use from today forward for heating, cooling, and illumination. Starting at this point of analysis—the present—new will often trump old. But the analysis takes into account neither the energy that's *already bound up* in preexisting buildings nor the energy used to construct a new green building instead of reusing an old one. "Old buildings are a fossil fuel repository," as Jackson put it, "places where we've saved energy."

Simply defined, embodied energy is the energy required to extract, process, manufacture, transport, and install building materials. And it's not a new idea. The concept has been around since at least 1976, when energy pioneers Bruce Hannon and Richard Stein calculated how many BTUs were required to produce various building materials. They determined that the typical building of the mid-20th century required the equivalent of five to 15 gallons of gasoline per square foot.

Preservationists took note. The poster for Preservation Week in 1980 featured an illustration of a brick building in the shape of a gas can, overtly linking energy and buildings. A year later, the National Trust published *New Energy from Old Buildings*, which laid out the case for keeping old buildings in operation for the simple purpose of saving energy. Then, with the plummeting price of fuel, embodied energy fell out of fashion, like prism glass. The whole notion of viewing our cityscapes as latent oil fields disappeared from the national conversation. But today, with the price of a barrel of oil stampeding toward three digits, it's edging its way back in.

The data behind embodied energy are compelling. According to Jackson, if embodied energy is worked into the equation, even a new, energy-efficient office building doesn't actually start saving energy for about 40 years. And if it replaces an older building that was knocked down and hauled away, the break-even period stretches to some 65 years, since demolition and disposal consume significant amounts of energy. "There's no payback here," Jackson said. "We're not going to build anything today that's going to last 65 years."

The figures are less eye-popping for new residential construction. It takes about 13 years to recoup lost energy, assuming that a new, environmentally efficient home is similarly sized to an older one. But it's probably not, given the ballooning of the average American house. Double the size of a house,

and the time needed to recoup lost energy grows to 28 years.

Sometimes, the energy costs are even less apparent. The Chesapeake Bay Foundation's newly constructed Philip Merrill Environmental Center opened in late 2000, and the foundation notes that it "may be the world's 'greenest' building." Indeed, it was the first to earn a LEED platinum rating, and it's been cleverly designed to reduce its environmental impact—with cork floors and cisterns and materials that are wholly recyclable. But as *Environmental Building News* recently noted, the new building was constructed 10 miles from the original headquarters in downtown Annapolis, Md., meaning that many of the 100 employees who once walked to work now drive. (The new building does feature facilities for bikes and kayaks to encourage self-propelled transport.) It's uncertain whether the energy savings from the new building will offset the increased consumption from the commuting.

An analysis by *Environmental Building News* has concluded that the energy used by workers getting to work at the average office building is about 30 percent more than that consumed by the building itself. For new office buildings, energy consumption by commuters is double that of the buildings. It's all part of what architect Shari Shapiro has referred to as "green sprawl"—the building of green structures in unsustainable contexts. The solution for getting away from these hidden imbalances, many experts believe, is to move from an emphasis on green design to green planning, to refocus from the little picture to the big. Only then can green architecture get beyond feel-good slogans and have a genuine impact.

"We have agreed to learn from the old folks," said Florida architect Mouzon last fall, speaking of his fellow New Urbanist designers. And that means not just learning the older, enduring styles of architecture, but also designing with the local environment in mind, siting homes for greater efficiency, and building houses that sit lighter on the land.

Among the signal traits for ensuring sustainability is one that gets little attention, said Mouzon. And that's "lovability."

"The very first core of sustainability is: Can a building be loved?" said Mouzon. "It doesn't matter how much energy you save if you're carting it off to a landfill in a generation."

Take, for example, solar panels, many acres of which were installed on rooftops during the Environmentalism 1.0 (and energy crunch) of the 1970s. Technical shortcomings aside, they didn't last because they were generally regarded as eyesores. "We lost a generation of sustainability because they couldn't be loved," Mouzon said.

"Sustainability begins with preservation" is how the authors of the *Whole Building Design Guide* put it. And that could be the motto of the National Trust's new focus. At the Trust's annual meeting in St. Paul last fall, President Richard Moe noted that the preservation movement has periodically reinvented itself: It started with a focus on iconic landmarks, then took up the benefits of adaptive use before going on to emphasize the social values of preservation in building stronger communities.

"Now we're on the threshold of a new phase," he said, "as growing numbers of people are concerned about the degradation of the environment and our relentless consumption of irreplaceable energy and natural resources. Preservation certainly isn't the solution to these problems, but it can be—and should be—an important part of the solution."

"Let's tell the story that we're green," Jackson said. "We're just stealth green. We don't show it—we have no solar panels, no collectors, no whiz-bang things. We're taking old buildings and putting them back in use and making them more green."

*Stealth green.* Another new term. And one preservationists can embrace. Better yet would be a different mindset—one in which going green wouldn't have to be done on the sly.

Contributing editor Wayne Curtis is the author of *And a Bottle of Rum: A History of the New World in Ten Cocktails*.

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