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Harvard Business Review

ON

Green Business Strategy



Building the Green Way

Charles Lockwood

What Every Executive Needs to Know About Global Warming

Kimberly O'Neill Packard and Forest Reinhardt

Bringing the Environment Down to Earth

Forest Reinhardt

A Road Map for Natural Capitalism

Amory B. Lovins, L. Hunter Lovins, and Paul Hawken

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Alissa J. Stern

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Building the Green Way

CHARLES LOCKWOOD

Executive Summary

JUST FIVE OR SIX YEARS AGO, the term "green building" evoked visions of barefoot, tie-dyed, granola-munching denizens. There's been a large shift in perception.

Of course, green buildings are still known for conserving natural resources by, for example, minimizing on-site grading, using alternative materials, and recycling construction waste. But people now see the financial advantages as well. Well-designed green buildings yield lower utility costs, greater employee productivity, less absenteeism, and stronger attraction and retention of workers than standard buildings do. Green materials, mechanical systems, and furnishings have become more widely available and considerably less expensive than they used to be—often cheaper than their standard counterparts. So building green is no longer a pricey experiment; just

about any company can do it on a standard budget by following the ten rules outlined by the author.

Reliable building-rating systems like the U.S. Green Building Council's rigorous Leadership in Energy and Environmental Design (LEED) program have done much to underscore the benefits of green construction. LEED evaluates buildings and awards points in several areas, such as water efficiency and indoor environmental quality. Other rating programs include the U.K.'s BREEAM (Building Research Establishment's Environmental Assessment Method) and Australia's Green Star.

Green construction is not simply getting more respect; it is rapidly becoming a necessity as corporations push it fully into the mainstream over the next five to ten years. In fact, the author says, the owners of standard buildings face massive obsolescence. To avoid this problem, they should carry out green renovations.

Corporations no longer have an excuse for eschewing environmental and economic sustainability. They have at their disposal tools proven to lower overhead costs, improve productivity, and strengthen the bottom line.

THE DRAMATIC, 647,000-square-foot PNC Firstside Center in downtown Pittsburgh boasts a magnificent facade of curving glass, steel, and stone overlooking the Monongahela River. The winner of several design awards, the building rises from a large plaza graced with waterfalls and fountains. Its airy, light-filled interior has 11-foot ceilings, floor-to-ceiling windows, an atrium, an open floor plan, and all the latest building system technologies, including individual climate controls. What

most observers don't realize is that this is a "green," or environmentally and economically sustainable, workplace—and that it costs 20% less per square foot to operate than its comparably sized "standard" sister building in Philadelphia.

Green buildings, as many know, have less negative impact on the environment than standard buildings. Their construction minimizes on-site grading, saves natural resources by using alternative building materials, and recycles construction waste rather than sending truck after truck to landfills. A majority of a green building's interior spaces have natural lighting and outdoor views, while highly efficient HVAC (heating, ventilating, and air-conditioning) systems and low-VOC (volatile organic compound) materials like paint, flooring, and furniture create a superior indoor air quality.

Just five or six years ago, the term "green building" evoked visions of tie-dyed, granola-munching denizens walking around barefoot on straw mats as wind chimes tinkled near open windows. Today, the term suggests lower overhead costs, greater employee productivity, less absenteeism, and stronger employee attraction and retention. Companies as diverse as Bank of America, Genzyme, IBM, and Toyota are constructing or have already moved into green buildings. Green is not simply getting more respect; it is rapidly becoming a necessity as corporations—as well as home builders, retailers, health care institutions, governments, and others—push green buildings fully into the mainstream over the next five to ten years.

In fact, the owners of standard buildings face massive obsolescence. They must act now to protect their investments. "Building owners are starting to do reviews of their portfolios to see how green their buildings are and

what they need to do to meet growing market demand,” says Ché Wall, chair of the World Green Building Council. Citigroup, for example, has already begun looking at how its 100 largest buildings stack up against accepted green standards. Based on those findings, the company will then review its worldwide real estate portfolio and create a green road map to help improve the efficiency of its buildings. Soon, financial institutions and investors will use new valuation methodologies to quantify important green building factors like productivity and long-term life cycle costs when determining real estate values.

The Shift to Green

Before 2000, companies generally regarded green buildings as interesting experiments but unfeasible projects in the real business world. Since then, several factors have caused a major shift in thinking.

First, the creation of reliable building-rating and performance measurement systems for new construction and renovations has helped change corporate perceptions about green. In 2000, for example, the U.S. Green Building Council (USGBC) in Washington, DC, launched its rigorous Leadership in Energy and Environmental Design (LEED) rating program. LEED evaluates buildings and awards points in six areas, such as innovation and design process. The program has Certified, Silver, Gold, and Platinum award levels. Other rating programs include the UK's BREEAM (Building Research Establishment's Environmental Assessment Method) and Australia's Green Star. Certainly, companies can create green buildings without using these rating programs, and many that do follow program guidelines choose not to spend the time and money applying for certification.

Nevertheless, certification assures prospective buyers and tenants that a building is truly sustainable. (For more on these rating programs, see “Green Standards” at the end of this article.)

Second, hundreds of U.S. and international studies have proven the financial advantages of going green. Well-designed green buildings, for example, have lower utility costs. In its first year of operation, Genzyme Center—Genzyme Corporation’s 12-story LEED-Platinum headquarters in Cambridge, Massachusetts—used 42% less energy and 34% less water than standard buildings of comparable size. Green buildings can also boost employee productivity by approximately 15%, in part because they use alternative building materials that don’t emit toxins, like formaldehyde, that are commonly found in standard building materials and workplaces. At Genzyme Center, 58% of the 920 employees report that they’re more productive there than they were in Genzyme’s former headquarters building. Employee sick time in the new headquarters is 5% lower than for all of Genzyme’s other Massachusetts facilities combined. Moreover, green design criteria—including abundant daylighting, individual climate controls, and outdoor views—raise morale and employee satisfaction, which also improves productivity.

Finally, green building materials, mechanical systems, and furnishings have become more widely available, and their prices have dropped considerably—in some cases below the cost of their standard counterparts. According to Turner Construction chairman Thomas C. Leppert, four industry studies of more than 150 sustainable buildings across the United States show that, on average, it costs only 0.8% more to achieve basic LEED certification than to construct a standard building. The PNC Firstside

Center was already under construction as a standard building when the owner, PNC Financial Services Group, decided to go green instead. Even so, the project was completed two months early, came in \$4 million under the original (and only) construction budget, and earned LEED's Silver rating. Now, PNC has constructed several of more than 200 planned green bank branches. The average construction time was 45 days faster than for PNC's traditional branches, and the costs were the same or lower. In the northeastern United States, for example, PNC's green branches each came in \$100,000 below the cost of a competitor's new standard branches.

Building green is no longer a pricey experiment; just about any company can do it on a standard budget by implementing the following ten rules.

Rule 1: Focus on the Big Picture

According to William Browning, a senior fellow at the Rocky Mountain Institute in Colorado, integrating green principles into a building's planning and design process can generate 40% more savings and 40% better performance than simply adding green technologies to a traditionally planned and designed facility. Planning, designing, and constructing a green building isn't like installing new signage or adding a design feature at the last minute. If a company wants to stay within a standard budget and reap the full benefits of a sustainable building, all development decisions from the start must be guided by a green mind-set.

To launch a successful green planning and design process, it's important to hire the right project team members: architects, engineers, contractors, and consultants who are knowledgeable about the broad spectrum

of green design tools and technologies and who have experience planning and constructing a variety of green facilities. Team members who are unfamiliar with green will often resist any deviation from standard design principles, building materials, and construction processes. They will make mistakes on everything from the amount of insulation needed to the selection of interior components like nontoxic flooring, therefore limiting the building's sustainability and having a negative impact on the budget.

A collaborative green project team begins by examining the building site, the exterior and interior plans, and the budget—managing up front each planning decision's effect on the overall project. A green planning and design process was essential to the success of the nine-story, \$112 million (in Australian currency) global headquarters for Lend Lease in Sydney, Australia. The company wanted the building to set a new benchmark for energy efficiency and indoor air quality to increase worker satisfaction and retention, but it insisted on a standard budget. Also, the city had imposed height and building density limits, so the building needed to have the greatest possible amount of usable space on each floor. One way the project team surmounted these challenges was by selecting a water-based, chilled beam air-conditioning system. Although it cost 30% more to install than a standard system, the water-cooled system was 30% more energy efficient and took up less room between ceilings and floors, leaving more usable space on each floor. The team reexamined all of the other planned elements as well. Replacing standard T-8 lamps, for example, with more energy efficient T-5 lamps (with smaller housing units) was another way to save space, which helped reduce materials and construction costs.

Rule 2: Choose a Sustainable Site

If a building or a business campus is going to be truly green, it cannot be constructed on prime farmland, parkland, a historic or prehistoric site, or the habitat of an endangered species, nor can it be built within 100 feet of wetlands. Ideal locations for sustainable development include in-fill properties like parking lots and vacant lots, redevelopment sites like rail yards, and remediated brownfields. By choosing such locations, companies avoid contributing to sprawl and the degradation of environmentally significant sites, often while being near services they need.

Genzyme Center earned its LEED-Platinum rating in part because of its location. The building stands on a remediated brownfield site (where a coal gasification plant once stood). It is adjacent to a power plant—something that might typically be considered a challenge because it means unattractive views for workers and visitors. Genzyme, however, turned the plant's proximity into an opportunity by piping the plant's "waste" steam into the center's HVAC system to warm the building in the winter and cool it (with two steam absorption chillers) in the summer. Adopting this steam system reduced the building's electrical requirements and energy costs, and those savings are reimbursing the company for the system's higher up-front capital costs.

The LEED rating program gives points to properties located within a quarter mile of bus lines and within half a mile of rail and subway lines. Genzyme Center is a five-minute walk from a mass-transit station. Approximately 25% of the building's 920 employees leave their cars at home.

Rule 3: Do the Math

To complete a successful green building on a standard budget, the project team must apply a cost/benefit analysis to each component before allocating funding. For instance, a green roof costs more than a standard roof to install, but it brings a larger return on investment because it lasts years longer and provides more benefits, particularly storm water management and lower energy costs. (See Rule 5 and Rule 8.)

When DPR Construction planned its green regional office in Sacramento, California, it used a proprietary software program called Ecologic3 to analyze the costs and benefits of each point in the LEED rating system for this building, as well as the costs to own and operate it. According to Ted van der Linden, DPR's director of sustainable construction, the company weighed each possible LEED credit against the overall \$6.2 million budget, projecting the costs and benefits of each credit, as well as a ten-year return on investment. DPR found that approximately \$85,000 of the \$6.2 million would be spent on additional green up-front costs, including architecture and engineering design fees. Over the first ten years, however, the 52,300-square-foot office building will more than make up that \$85,000 by generating \$400,000 in operations savings.

Cost/benefit analyses should also incorporate the financial assistance, tax breaks, and other incentives that more and more cities, states, and utility companies offer to organizations that construct green buildings. Chicago, for example, awards floor area ratio (FAR) density bonuses for downtown buildings that have green roofs. Since 2000, New York State's Green Building Tax Credit has given deductions against a com-

pany's or developer's state tax bill for projects that meet specific sustainable requirements, like the under-construction Bank of America Tower in Manhattan. California's Savings by Design program—sponsored by four of the state's largest utility companies—provides design assistance and subsidies for energy efficient non-residential buildings.

Rule 4: Make the Site Plan Work for You

Site planning can minimize the amount of on-site infrastructure like roads and parking lots, reduce grading and other earthwork, limit erosion, maximize sediment control, and provide easy access to public transportation—all of which will earn LEED points, lower construction costs, and reduce the facility and infrastructure footprint. IBM Tivoli Systems, for example, has dedicated 70% (63 acres) of its 90-acre headquarters campus in Austin, Texas, to open space. The rest of the site has been designated for structures (up to eight office buildings and parking garages) and infrastructure.

One simple site-planning strategy that can reap significant benefits is building orientation. Consider interior lighting. Typically, it makes up 20% to 25% of an office building's direct energy use partly because heat generated by the lights leads to more air-conditioning. Building orientation, however, can create a daylit interior that needs much less artificial lighting, saving money both up front and over the long run. In locations commonly subject to winds, buildings can be oriented to capture the breezes through rooftop clerestories and other windows that provide cross-ventilation.