It's Not Easy Building Green

Before the first shovel breaks ground on your green building project, know why you're building green and how to steer clear of development pitfalls and public scrutiny.

By Joseph Higgins

With environmental issues gaining a foothold in academic culture, a growing number of colleges and universities nation-wide are considering green building design for new projects on campus. The term *green building* describes a facility that is designed, constructed, and operated in an environmentally friendly and resource-efficient way. The tangible benefits of green buildings can include reduced life cycle costs, better ventilation and lighting, improved occupant productivity, and reduced liability from exposure to poor indoor air quality.

This trend toward green development is often initiated by a diverse constituency composed of students, faculty, and facility planners—each group possessing a different awareness of the associated costs and implications of building green. Meanwhile, many senior administrators remain cautious when it comes to welcoming a green project to campus—and with good reason. A lack of knowledge about the real costs and political risks of such endeavors can result in project setbacks and sometimes public embarrassment.

Ultimately, the business officer is responsible for balancing the ideals underlying green building with the common predicaments of restrictive budgets and time frames. Cost and schedule considerations can lead even the most environmentally conscious institutions to quietly suspend a meaningful environmental showcase. For instance, the faculty of a small university voiced disapproval when the administration chose not to fund $800,000 in daylighting features and solar power technologies in its latest green building. The decision followed recent statements by officials that claimed the university had a "serious" commitment to the environment.

Any meaningful commitment to a green building program requires adequate financial resources, well-defined goals, and—most importantly—a well-developed environmental position. To minimize political and financial backlash, the goals and rationale for green design must be specific and defensible.

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Reasons to Go Green

The reasons cited by most colleges and universities for incorporating green buildings on campus generally fall into four categories. The political and financial risks associated with each are often not fully appreciated.

1. Program improvements (low risk). A low-risk strategy for adopting green building ideals involves aligning such implementation with the improvement of a specific academic program or achievement. For example, Oberlin College's new center for environmental studies was a natural outgrowth of the institution's efforts to provide the best possible laboratory for environmental education—a place where students acquire competence with environmental technologies and analytical skills—by assessing full societal costs over the building's lifetime. The political and financial risks for undertaking this showcase project were relatively low because well-defined academic program goals lent themselves to justifying the green ideals, the use of emerging technologies, and the significant incremental investments required.

2. Altruism (high risk). On the other end of the risk spectrum are altruistic reasons for building green. These are often considered high risk because the potential for political backlash is great. Campuses such as Middlebury College and Furman University have enjoyed politically successful green building projects because both projects derived from an established campus environmental position that clearly identifies institutional commitments with regard to educational programs, campus operations, construction practices, and public awareness.

Conversely, an independent green building project justified on a platform of virtue without a campus-wide environmental position often culminates in political or financial fallout. For example, early in the planning stages of a new research facility at a small institution, senior administrators publicized their financial commitment to incorporate green design elements, stating, "It is just the right thing to do." During the design process, several trees were selected for removal to accommodate the footprint of the building. Campus environmentalists publicly campaigned against removing the trees, asking that the building be relocated because "It, too, was the right thing to do." Near project paralysis resulted in a withdrawal from any environmental project goals. The building was ultimately realized as a conventional structure.

Similarly, the student and faculty advocates at one institution—feeding off the precedent set by their newest green building on campus—are now looking to senior administration to legislate a "climate-neutral" position for their campus (i.e., no airborne CO2 emissions). The reality is that implementing the necessary emission-reduction measures into existing buildings and replacing the campus coal-fired power plant could come at a cost of more than $15 million—a now unwelcome price tag for altruism.

3. Economic payback (moderate risk). Often, an economic business case becomes the reason for protecting key elements of green design from budget constraints. The business case recognizes opportunities for reduced capital costs or life cycle cost savings from such things as energy, water, and maintenance. Achieving good indoor air quality through proper ventilation systems and selecting building materials that have low off-gassing and toxicity properties are quality measures that support reduced liability.

However, backlash can ensue if the promises of capital cost savings, energy savings, and building systems performance are overstated or never materialize. Several examples exist wherein a green building failed overall to meet highly publicized energy reduction goals, a situation subject to criticism within public forums. For instance, a primary goal for a prototype of one institution's green building was to use the newest generation of solar photovoltaic panels, rendering the building a net exporter of electricity rather than merely a consumer. Campus advocates and skeptics alike challenged this goal in its infancy. Cost considerations eliminated the photovoltaic panels and other integrated design elements. Although the photovoltaics were installed a year later, the building must still acquire 60 percent of its electric power from its local utility because the electric loads originally anticipated for the building were unrealistic.

4. Enhanced image (low risk). The most compelling reason underlying the adoption of green building initiatives is the desire to enhance the university's image. Use of the "green" label can reposition an institution's image for the purposes of both attracting potential students and environmentally conscious donors and retaining faculty and staff. Many institutions adopt green building design solely to reaffirm their positions as leaders in technology or to achieve higher-level goals for their campus. For early green building adopters, publicity opportunities have been plentiful in the local and national media, greatly improving institutional image and community relations.

Shades of Green

Many benefits from green buildings are already part of traditional design practices for high-quality institutional facilities. It's a matter of degree—or *shade.* Consider these different levels of design commitment.

Light green: The early green buildings of the 1970's oil embargo era focused simply on energy efficiency and the use of

recycled materials, whereas the "sick building" syndrome in the 1980s raised concern for occupant health and productivity. The attention grabber in the 1990s became preserving local and global biodiversity by mandating emissions reductions. The green building solution to these point-in-time issues has traditionally been a single-issue approach—specifying increased levels of energy efficiency, healthy interiors, better ventilation, high-efficiency lighting, or high-tech window glazing.

Dark green: It is only recently that designers in the United States began to appreciate that an integrated design solution to these issues would encourage a new breed of high-performance sustainable building. The American Institute of Architects defines sustainability as "the ability of society to continue functioning into the future without being forced into decline through exhaustion or overloading of the key resources on which that system depends." This new generation of sustainable green building focuses on the entire project delivery process, integrating environmental principles with design, construction, and operation.

Extreme green: The cutting edge of green building design is a form of applied ecology. Often referred to as *eco-design*, this approach requires an understanding of the ecosystem of the project site and its relationship with biospheric functions and global resources. These green buildings are not only environmentally responsible consumers but are touted as positive contributors, given that they literally give back to the environment by producing more energy than they consume, creating minimal pollution, and regenerating local natural systems. Eco-design is still largely a grand agenda in an evolving field, but a small number of institutions—such as Oberlin College—are trying to establish positioning on the forefront of this innovative ecological design (see sidebar, "Going to Green Extremes").

Certification

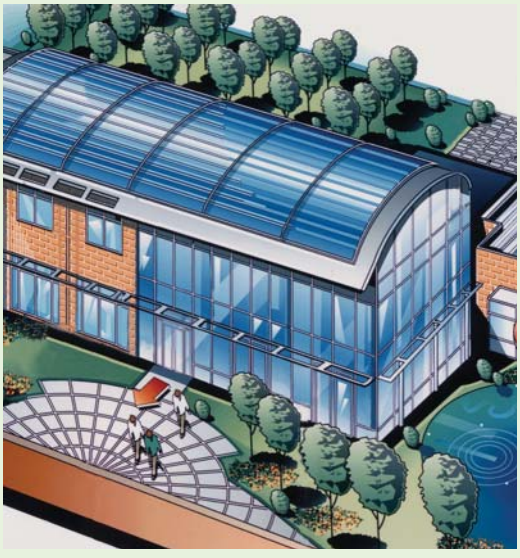
Given these variations of green, the notion of what constitutes a green building is still hotly debated. This lack of official parameters precipitated development of the Leadership in Energy and Environmental Design (LEED) rating system, which was formalized in 2000 by the U.S. Green Building Council (www.usgbc.org). This standardized rating system is fast becoming an accepted method of certifying building designs as environmentally friendly and is already being used to validate the legitimacy of hundreds of green building projects.

The LEED 2.0 Green Building Rating System represents a consensus from all segments of the building industry and focuses on the concepts of site use, energy efficiency, indoor air quality, and resource and material efficiency. The rating system provides owners with a self-administered scoring process that translates into four possible levels of certification: LEED Certified, Silver, Gold, and Platinum—the highest level. Credits are awarded toward the various certification levels on the basis of the green measures incorporated into a building's design. The different levels also provide a framework for understanding the financial cost commitments required by the certification selected (see sidebar, "How Much Green to Go Green?").

It's important to note that LEED ratings are based exclusively on

Going to Green Extremes

The Adam Joseph Lewis Center for Environmental Studies at Oberlin College, completed in 2000, is one of a handful of campus structures across the nation that aims to give back to the environment by actually producing energy and helping to regenerate the natural systems of its locations. Well before and after its completion, the building attracted the attention of local and national media, which positioned it as a leader in the green building movement. Currently, the environmental studies team continues to implement design changes that increase energy production, decrease consumption, and improve the building's efficiency with respect to resource use. (For more information, go to http://www.oberlin.edu/envs/ajlc.)



a building's design. After a period of five years, a building will need to be recertified through the forthcoming Operations and Maintenance Rating System, the results of which will determine any necessary adjustments to a building's green status certification. While many advantages exist to using this consensus-based standard, the current LEED rating system does entail shortcomings that are worth mentioning (see sidebar, "LEED—A Work in Progress").

To date, only two campus buildings hold LEED certification—one at Emory University and the other at the University of California, Santa Barbara. Emory University's Whitehead Biomedical Research Building opened in November 2001, earning a LEED Silver certification with green features such as individual lab module lighting, HVAC controls, an energy recovery system, a storm water harvesting system, and building materials of high recycled content. Completed in January 2002, the Donald Bren School of Environmental Science and Management at the University of California, Santa Barbara, was certified as LEED Platinum, with green design features that include natural ventilation, reclaimed water for irrigation, and alternative energy sources from landfill methane gas and solar panels.

Approximately 50 other institutions have green certification pending, including Tufts University, Mount Holyoke College, the University of Cincinnati, Penn State University, and Portland State University. Some institutions have gone so far as to officially mandate that all future building designs be certified on the basis of the LEED rating system.

How Much Green to Go Green?

Most owners would like to include green features, but often a limited budget is barely enough to cover projections. Many elements of environmentally responsible building design do cost more, at least in the short term. Initial costs depend in large part on the level of certification selected as a target goal. As seen in the accompanying chart, "Incremental Project Costs for Green Buildings," a LEED Certified building can cost up to 8 percent more (or 5 percent less) than a conventional building and require up to 25 years to recoup those additional costs from the savings produced by enhanced efficiencies. Likewise, a LEED Platinum building may cost an additional 33 percent and take from 20 to 50 years to recoup upfront costs.

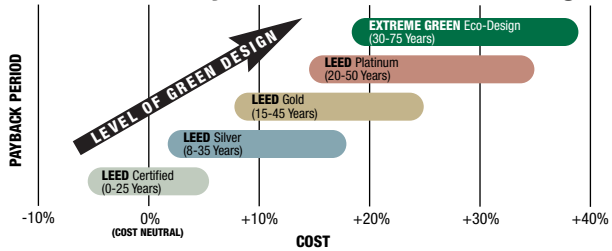
These initial costs may seem daunting to many. But there is growing recognition that traditional first-cost constraints can provide for certain green design features. For instance:

- Consider renovating versus constructing a new building.
- Minimize east- and west-facing windows.
- Use operable windows that promote natural ventilation.
- Create open floor plans to promote natural daylight.
- Control indoor lighting with occupancy sensors.
- Promote storm water recharge with pervious paving.
- Use native planting to limit irrigation and chemical use.
- Match window glazing to different orientations.
- Include water- and energy-efficient equipment.
- Recycle construction waste.
- Use environmentally friendly building materials.
- Employ structural materials as finish materials.

With proactive collaboration among design team members, it's also possible to incorporate—even within a traditional budget—more intricate green strategies. As the green design industry matures, it is becoming increasingly clear that the integration of design elements (i.e., the architectural envelope and mechanical systems) is key to achieving an institution's sustainability goals. Integration can even keep construction costs down, though more upfront design time and costs are usually required.

Finally, the ability to make decisions based on life cycle economics can create additional opportunities for improving green building designs. This life cycle cost analysis considers savings over time for reduced energy and water consumption and increased durability and productivity. While not every green design component will have a payback, the integration of these design features will result in a more favorable payback. As such, a growing number of colleges and universities are consciously choosing higher first-cost design elements—an approach that can result in significant operational savings down the road.

Incremental Project Costs for Green Buildings



This illustrates a range of additional costs to conventional building projects for varying degrees of green design. These project cost ranges are based upon a survey of 10 client projects and include the incremental costs for construction, design, management, furniture, fixtures, and equipment.
SOURCE: Joseph Higgins, Copyright 2002

For a green building project to be both meaningful and successful, the particular shade of green should be firmly established well before any conceptual design begins.

Pointers From Pioneers

When most colleges and universities begin to move toward green building design, the challenges encountered are greater than anticipated. Thus, there is a tendency to fall back on traditional design and construction practices. To better prepare those considering green building design, the following lessons are offered from the trenches of some noteworthy green project pioneers.

- **Establish leadership and goals at the highest level.** If the desire for green design resides within the short-term political agendas of only a few, the project may ultimately disappoint. The most successful green projects are those predicated on an underlying motivation as well as a commitment to a well-defined campus environmental position developed by an institution's most senior officials. Project goals should include the quantifiable targets of lower energy consumption, lower water usage, and construction waste recycling, or the winning of a particular LEED certification.
- **Don't claim that you'll get everything right.** The notion of green building design is simple to understand but often difficult to implement. Shortcomings in the design, construction, and operation of even the most fastidious environmental projects are inevitable. Many of the greenest buildings in the United States and Europe do not function as originally intended or involve recurring maintenance and operation issues. Be open to calling your first green project a learning experience. A positive attitude from all stakeholders to persevere through unanticipated obstacles is part of the success story.
- **Prepare for runaway environmentalism.** It takes only a few campus constituents to undermine an otherwise noteworthy undertaking. Such potential inhibition reinforces the need to both establish an environmental philosophy for the campus prior to focusing on a green building project and to adopt defensible environmental goals and reasons early in the conceptual design phase. Nominate a resilient green building champion from within the ranks of the institution to represent the institution's perspective from concept through daily operations.
- **Choose your shade of green early.** For a green building project to be both meaningful and successful, the particular shade of green should be firmly established well before any conceptual design begins. Institutions attempting to incorporate green design elements after a traditional program and budget are set will likely struggle with much higher initial costs, fragmented strategies, and scheduling delays and fee issues from the design team. Green goal setting should bear the influence of an established terminology and a basic understanding of issues specific to the project at hand. The primary elements of the LEED rating system should govern goal-setting sessions, and campus constituents should discuss and evaluate best choices within budget constraints.
- **Budget appropriately.** The budget allowance for incorporating green design elements must be realistic and should be weighted as the equal of building size, program, and aesthetic considerations. The analysis of specific systems design options should provide for design budget contingencies. Some incentives and government programs are available for those motivated to seek external financing for green buildings, although most awards are relatively small and not geared toward nonprofit institutions (e.g., tax rebate incentives). Good starting points for available grants and rebate incentives include www.sustainable.doe.gov; www.bfagrants.org; www.epa.gov/globalwarming/funding; and www.energystar.gov.
- **Acquire design and integration expertise.** When looking for a designer, keep in mind that integrated green building design experience is usually the province of an individual as opposed to an entire firm. As green design practices are still somewhat novel, most building designers do not have applicable green architecture experience. If this is the case, be sure the key design individual has demonstrated experience and is available to focus on your project. Likewise, it is imperative that the project team (designers, constructors, and operators) works collaboratively. Consider employing specialty consultants to augment the capabilities of the design team and to provide a level of independent design review and final systems commissioning.
- **Insist on base building comparison and iterative energy modeling.** Make sure from the beginning that the design process includes benchmark comparisons to conventional building types with respect to project and operating costs. These benchmarks serve two purposes. First, they guide decision making during the design process when the cost-benefit attributes of various design options are being compared. Second, these benchmarks provide the necessary talking points for publicizing the project's success to the larger campus community and to external audiences.

  Caution is warranted with regard to benchmark comparisons. A stark reality is that many green building projects tend to fall short of their projected energy-saving goals—sometimes by as much as 10 to 30 percent. This is usually

LEED—A Work in Progress

Some college and university administrators are becoming aware that shortcomings exist in the current U.S. Green Building Council's LEED 2.0 Green Building Rating System as it pertains to varying building program types or to the uniqueness of a campus setting. For example, a college library or science facility will often require higher energy levels for lighting or air systems than do other buildings. Also, it doesn't make sense for a university to install either dedicated shower amenities for bicycle commuters if residence halls are close by or car-refueling stations if parking facilities are remote to the building. Under such conditions, certification credits in these areas are forfeited.

As with any standardized rating system, limitations or inhibitory conditions may exist. For example:

- Options for the physical location of a new campus building may be restricted, consequently limiting the available certification credits for urban development or alternative transportation. Limited site options can dampen opportunities to achieve an outstanding Gold or Platinum building design.
- As the design complexity and cost thresholds for achieving the Gold and Platinum certifications are significant, some institutions lose interest if budgets prohibit them from pursuing anything but the highest certifications.
- If an institution determines that the project will fall short of meeting a credit requirement, little incentive exists to continue environmentally responsible activities in that category, and there is no incentive to exceed minimum credit requirements.
- Some local and state building codes do not yet have a full working rapport with green design applications.
- The cost, time, complexity, and uncertainty of introducing yet another challenging step in the design and construction process may lead to aborted certification pursuit. Some who have used the LEED rating system reported up to 300 hours of incremental professional time spent documenting and administering the process.

Despite these shortcomings, the LEED rating system has generated significant interest and is a valuable resource for those seeking validation of their environmental priorities. While most institutions are choosing to have their projects certified with the LEED rating system, others, including Stanford University, are using LEED only as a reference in the development of their own set of sustainable guidelines. Overall, institutions are optimistic and looking forward to future versions of the LEED 2.0 rating system—refinements that better link the environmental scores with the unique character of a campus setting.

attributed to inadequate energy modeling techniques or to a failure to understand implementation of the final model during construction. Consider employing an energy-modeling specialist who has experience with both green buildings and the specific technologies being installed. Likewise, use several iterations of energy models during the design process and ensure that the final reconciled energy model matches the actual design.

- **Be sure your operations team is committed.** As much as 5 to 15 percent of operational savings are forfeited each year because new buildings are not adequately commissioned and operated as intended. One complicating factor is that many of the technologies used in green building design are often foreign to a campus operations team. Effective operation of any green building ensures that the operations staff is intimately involved in the design process and witnesses firsthand how the various systems are intended to operate. To further build confidence, schedule follow-up visits by the design team with the operations staff to review and document the ongoing operation of the building's systems.

Payback

As green building design continues to evolve, business officers must stay abreast of the benefits, potential risks, and financial requirements involved. The commitment to build green may not be the easiest development decision to implement, but the payback in enhanced institutional image, resource savings, operating efficiency, occupant productivity, and publicity can be tremendous. With a well-established environmental position as validation, a college or university campus can be an ideal setting for showcasing an institution's ingenuity in green building design.

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NACUBO and APPA Colocated Meetings to Address Facilities and More

BY JAMES E. MORLEY JR. AND E. LANDER MEDLIN

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Editor's note: At the end of July, NACUBO and APPA will colocate their annual meetings at the Opryland Hotel, in Nashville. James E. Morley Jr., president and chief executive officer of NACUBO, and E. Lander Medlin, executive vice president of APPA, discuss the objectives of the colocation and the benefits afforded business officers and facilities managers.

Collaboration among associations with mutual interests and concerns is key to serving members effectively, comprehensively, and cost efficiently. Many higher education associations serve a lot of the same institutions or "customers" and, thus, have good reasons to work together. In colocating the annual meetings of NACUBO and APPA July 26–29, it is the intent of our two associations to enhance our efforts at collaboration.

The bringing together of the business officer and the facilities professional provides an opportunity for communication and informal dialogue that can enhance the credibility of each profession to the other and to the higher education community in general. At the same time, the colocating of our annual meetings gives NACUBO and APPA the chance to strengthen programming in a cost-effective manner, providing more value to our members. Members of both associations will have the opportunity to share, expand, and refine the fundamental concepts of their respective professions. The educational content of these two meetings, positioned under one roof—the Opryland Hotel, in Nashville—will provide the business officer with advanced exposure to the language of facilities and construction management; offer the facilities professional the opportunity to hone business acumen; and give all attendees a forum to examine issues of institutional policy in a unique and mutually beneficial manner. And the joint hosting of NACUBO's and APPA's exhibits will provide a convenient means for the business officer and the facilities manager to become acquainted with the services available from each other's corporate partners.

The timing of this event, albeit essential, could not be more appropriate, given education's current environment, future needs, and issues. The focus of education is shifting from teaching to learning; one-way to two-way; passive to interactive; producer to consumer; and monopoly to competition—all within an environment no longer bound by time and place. Higher education is now a market-driven, growth industry. The fabric of the higher education enterprise is being rewoven. Education, research, and public service are morphing into the more dynamic modes of learning, discovery, and engagement. This is not simply semantics, but a definitive shift from passive to active and from isolation to involvement and integration within the entire community. Frankly, higher education is at a critical juncture—one that needs all of our best efforts.

Thus, a formal exchange between two parties of critical institutional decision makers is of great significance. We must prepare, through substantive and creative mediums, to address the pressing issues in higher education, of which there are four of particular urgency: recruitment and retention of students and faculty; community building; the cost of education; and the impact of changing technologies. By working collaboratively, APPA and NACUBO can endeavor to impact these critical, strategic issues at the institutional policy level.

The annual meetings will feature interactive discussion panels, target experts in a variety of topical areas, address different perspectives on common industry concerns, stimulate open discussion on relevant issues in higher education, and provide a marketplace of products and ideas. In the marrying of what constitutes the annual professional highlight for each of our respective associations, we hope to promote an enhanced understanding of and appreciation for one another's role. From our perspective, the benefits of a joint conference are:

- sharing in quality education through joint programming;
- increasing the value for attendees by broadening exposure to topics, speakers, networking, and trade show exhibitors;
- providing a two-in-one opportunity for smaller campuses, where one person wears many hats;
- pursuing partnerships and collaboration as key strategies in serving members;
- building upon economies of scale;
- building synergy and trust across the higher education community;
- collectively increasing our ability to influence higher education.

We see the colocation of our meetings as a perfect opportunity for each institution's business officer and facilities manager to attend—and benefit from—their major annual educational event as a team. It is our hope that you and your colleague will take advantage of this year's cooperative programming between NACUBO and APPA, a literal rendition of NACUBO's "Band Together" theme.

For more information about the colocated meetings, go to http://www.nacubo.org/ annual_meeting/.