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Sustainable Buildings and Construction Management

by David Tanza, AIA, CCM

“If we keep going the way we are going, we are going to end up where we are headed”

- Groucho Marx

As construction managers we often have an opportunity to assist our clients during the preconstruction phase of their projects. This provides an opportunity to guide the

design process and help make sure our clients get a high quality product that maximizes their return on investment. With is opportunity comes responsibility.

The design and construction industry is increasingly being asked to take responsibility for insuring buildings are resource efficient; provide

occupant comfort and well-being and community sensitivity. This movement is centered on the Leadership in Energy & Environmental Design, LEED, process which is a program of the U. S. Green Building Council.

Although unsustainable buildings appear to only harm their local environment, their

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impact can be felt across state-lines and borders. South American rain forests are clear cut for lumber used to build cabinets in New York. Homes in Los Angeles are framed with old-growth lumber from Washington State and powered by burning coal strip-mined in Arizona. Unfortunately the costs of poor design are not borne by the building owner, but by many others.

It should not be surprising that building construction, maintenance and operations require enormous amounts of materials and energy. According to researchers at The Worldwatch Institute, an independent, non-profit environmental research organization based on Washington, D.C., it is estimated that worldwide building construction and operations account for over 40 percent of the world's total energy consumption. This means the worldwide building industry has a tremendous effect on natural resources and waste. This effect is not an isolated item threatening to cause problems in the future. The way we build today is affecting our current landscape, available resources, economy, health and sense of community. Architects and builders did not intend to create problems such as sick buildings, auto-oriented communities and global warming. Current standards of design evolved over time based on many factors including functionality, concern of first cost, effi-

ciency and financial issues. Except for a few enlightened professionals, environmental sensitivity has not been a consideration.

Building "green" does mean that energy-efficiency features are simply forced onto a project, but rather a process of analyzing and optimizing an integrated design of interconnected components. Green building design looks at integration of site and building design, energy and water efficiency, resource-efficient construction, lighting and mechanical design, and building ecology. Certainly separate features may have higher individual costs (*e.g.* energy-efficient windows) but their use may reduce the entire building cost because other elements such as the heating systems can be downsized or eliminated. In order to realize the multiple benefits the building must be evaluated as a whole, not item by item.

The green building process encourages teamwork to promote an open exchange of ideas to develop integrated, whole-systems solutions. In the conventional development process, key individuals are often left out the decision-making process or are added too late in the process to take advantage of their expertise. Early and often collaboration can reduce and sometimes eliminate both capital and operating costs and can help anticipate and avoid technical difficulties that could add cost if addressed later in the

process. An integrated and collaborative approach helps to produce a larger vision that goes beyond simple building design, permitting one solution to be leveraged to create many more solutions—often at no additional cost.

The LEED Green Building Rating System, developed by the U.S. Green Building Council, is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. LEED provides a complete framework for assessing building performance and meeting sustainability goals. Based on well-founded scientific standards, LEED emphasizes state of the art strategies for sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. It is a whole-building approach that encourages and guides a collaborative, integrated design and construction process. There are four levels of certification and points are awarded for overall performance rather than for specific items.

As a growing number of clients are realizing the need for change, the field of sustainable design or "green" design is emerging, gaining popularity and becoming more main-stream. Sustainable design is not a *style*, but rather a transformation of how we think about design, construction, and operating buildings. The main goal of sustainable design is to

lessen the harm of poorly designed buildings on the environment through a whole building approach that begins from inception and carries through to operation.

For many professionals a green building simply has a few recycled products, installs solar panels or uses double-pane glass. A lot of buildings and building products are called sustainable because they contain a few features that lower their impact on the environment. Sustainable design is not about adding features, it is actually a principle and philosophy where buildings are suited to their individual sites and place. In his book, *Ecological Design*, Sim Van der Ryn, notes that sustainability needs to be firmly grounded in the nitty-gritty details of design. He asks penetrating questions such as; "How can we design our products and manufacturing processes so that materials are completely reclaimed? How can we create wastewater treatment systems that enhance, rather than damage, their surrounding ecosystems? How can we design buildings that produce their own energy and recycle their own waste?" These questions demonstrate the depth of thinking that is required to assist in the design and construction of sustainable projects.

The U. S. Green Building Council developed the LEED system with the intent that a building earning a LEED Silver certification need not cost

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more to design and construct than a conventional building. Mounting evidence indicates the U. S. Green Building Council has succeeded in developing a system with little or no marginal construction cost. The recent report by a nationally-recognized construction cost consulting firm, Davis Langdon Adamson (DLA), found no statistically significant difference between the per-square-foot construction cost of LEED and non-LEED projects in their database.¹ In *Building for Sustainability*, a report prepared for the David and Lucile Packard Foundation in October 2002, the calculated design and management fees for a “typical” building project and a LEED Certified building project are identical.² The California State Sustainable Building Task Force found LEED Certified projects to have a premium of approximately 0.6% over standard projects, and that the net present value of the reduced operating costs and occupant health care needs is on the order of ten times greater than the incremental investment, using conservative assumptions.³ Higher levels of achievement, particularly LEED Platinum, can cost more and can result in fantastic performance, such as buildings that generate more energy than they use.

(Footnotes)

¹ Matthiessen and Morris (2004) *Costing Green: A Comprehensive Cost*

Database and Budgeting Methodology — http://www.dladamson.com/images/pdf_files/costinggreen.pdf.

² Packard Foundation, BNIM Architects, Hawley Peterson Snyder Architects (2002) *Building for Sustainability Report: Six Scenarios for the Los Altos Project* - <http://www.packard.org/index.cgi?page=building>.

³ Katz et al (2003) *Costs and Benefits of Green Building: A Report to California's Sustainable Building Task Force* <http://www.ciwmb.ca.gov/greenbuilding/Design/CostIssues.htm>.

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