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Going Green

Sustainable Design and Construction is Transforming the Marketplace

Increasing numbers of owners, architects, engineers and contractors are becoming more concerned about a building's environmental responsibility, profitability and the health of its occupants, which is leading to more sustainable designs and construction.

By Debra Wood

With energy costs rising and workers' health and productivity a concern, building owners are turning to sustainable designs that create structures that can save money and boost employee and energy efficiency.

"It's capturing the marketplace," said Scott Kelly, AIA, a partner in Re: Vision Architecture in Philadelphia. "It's not just a trend; it's here to stay."

Kelly is a founding member of the Delaware Valley Green Building Council and chairman of the AIA Philadelphia Committee on the Environment.

Helen English, executive director of the Sustainable Building Industry Council, agreed that sustainable designs are here to stay. She said she has seen increased interest in all three of the SBIC's specialty areas: high-performance schools, residential and federal buildings.

"Sustainability has arrived," English said. "To crank it up one more level, the SBIC says that all buildings to a greater or lesser degree have seven design attributes. They must be accessible, aesthetic, sustainable, secure, productive, flexible and cost-effective."

Sustainable growth

About 5 percent of all U.S. commercial construction, by square footage, has registered for Leadership in Energy and Environmental Design Green Building Rating System certification from the U.S. Green Building Council, a coalition of more than 2,000 owners, developers, designers, contractors, product manufacturers and other interested entities.

The council developed the standard definition for high-performance, green buildings and offers third-party validation that structures meet the standard. It recognizes projects at the certified, silver, gold or platinum levels, depending on how many elements meet the requirements.

"The primary goal of LEED is to transform the marketplace," said Emily Turk, LEED architect for USGBC. "It's taking hold. Users want it and design professionals and manufacturers are pursuing it."

Since 1999, USGBC has certified 102 buildings and received registration for more than 1,000 projects, the first step in the application process.

"LEED gives it structure," said Mark Keen, AIA, chairman of the AIA Baltimore

Committee on the Environment. "People can put their arms around it and compare building to building."

Architects and project teams are building green, sustainable buildings without seeking LEED certification. That saves documentation costs but eliminates outside review and validation.

"The documentation ensures you are getting what you're paying for, but at the same time, it costs more," Keen said.

Costs for a sustainable building, without LEED certification, may not run any higher than for a traditional structure.

Tom Liebel, AIA, LEED, of Baltimore, has found that the cost of building green has decreased during the past five years as people become more familiar with the concepts and manufacturers produce greener materials. But even when associated costs bump up the price, owners recoup the initial outlay within a matter of years.

A study released late last year by Capital E group, Lawrence Berkley Laboratory and participating California state agencies found that financial benefits of green buildings exceed cost by a factor of 10 to one. The savings resulted from lower energy, waste and water costs; lower environmental and emissions costs; lower operational and maintenance costs; and increased employee productivity and health.

"There's a significant payback over the long term of the building," Kelly said. "You are getting a better return on investment than the stock market."

Building Green

Some architects believe strongly in the environmental benefits, while others are following the lead of developers, Keen said. Either way, they typically bring engineers and contractors into the design process early.

"[Sustainable design] is a matter of thinking of things holistically or as systems," said Rick Harlan Schneider, AIA, LEED-AP, Inscape Studio, Washington, D.C. "To get a successful green building, it's very important to take a team approach."

The USGBC LEED process grants points in six focus areas: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality and innovation in design.

"Most of the credits in the rating system that apply to contractors are in environmental quality and the material and resources section," Turk said.

The building industry contributes significant quantities of debris to landfills. Recycling building materials and using materials from within a 500-mi. radius earns LEED points.

"A sustainable building is one that works in concert with the resources you are using," Keen said. "Eventually, the end result is a zero-net waste product."

The team must adapt the project to the site to produce less of an impact, said Steve Benz, chief engineer, Judith Nitsch Engineering Inc. of Boston. Green civil engineering often involves water drainage. Systems range from creating swales and landscaping that can benefit from the runoff to capturing and filtering the water and using it to flush toilets in the building.

"The thinking is to treat water as a resource, instead of a byproduct of development," Benz said.

Situating the building to increase sun exposure can also save on energy costs. Rehabilitating a structure near bus routes and existing utility lines, such as the 1899

Stewart's Building in Baltimore, makes it greener than building in a distant suburb.

Liebel designed the conversion of the former department store into retail and office space. The contractor used locally recycled steel, added insulation and replaced windows with insulated, aluminum windows.

Green buildings typically include more skylights and windows with energy-efficient glass to let in natural light. But the systems also may block hot summer rays to decrease air-conditioning demand. A plant-covered roof helps control storm-water runoff, and it insulates and reflects rather than absorbs heat. Solar panels transfer the sun's warmth into useable energy, and heat exchangers capture heat produced by machinery for reuse. Radiant heat decreases air particulates. And installing waterless urinals decreases the initial cost of running water lines and annual operating costs.

Operations and maintenance are critical, especially to governments that operate the structures they build, English said. Facilities staff must be trained on how to tend to chillers and other equipment that function differently than traditional models.

During construction, as well as after, an emphasis is placed on air quality. So contractors may need to increase air ventilation to protect workers' health. Eliminating products with volatile organic compound improves air quality. Turk said more manufacturers are producing low-emitting carpeting now than five years ago, as demand has increased.

"We are changing the marketplace through education and by example," Turk said.

Next Steps

USGBC will complete pilots and introduce two more categories - existing buildings and commercial interior - later this year. It has three more in development: core and shell, homes, and neighborhood developments.

"This goes to the foundation of how we live our lives," Keen said. "Everybody cannot continue the way we've done it. The resources are being depleted at a greater and greater rate."

Keen said he has found overwhelming support not only from owners, seeking long-term financial savings and productivity gains, but also in the general Baltimore community. With more owners thinking green, designers and contractors familiar with the building methods stand to gain customers.

"If you're in the design profession and you don't start to change your ways now, in 10 years, you will be out of business," Kelly said. "This recent wave of people understanding sustainability is driving the market."

Useful sources:

U.S. Green Building Council <http://www.usgbc.org>

Sustainable Building Industry Council <http://www.sbicouncil.org>

Delaware Valley Green Building Council <http://www.dvgbc.org/>

National Capital Region Chapter of the U.S. Green Buildings Council
<http://www.usgbc-ncr.org/>

The Costs and Financial Benefits of Green Buildings
<http://www.usgbc.org/Docs/News/News477.pdf>

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