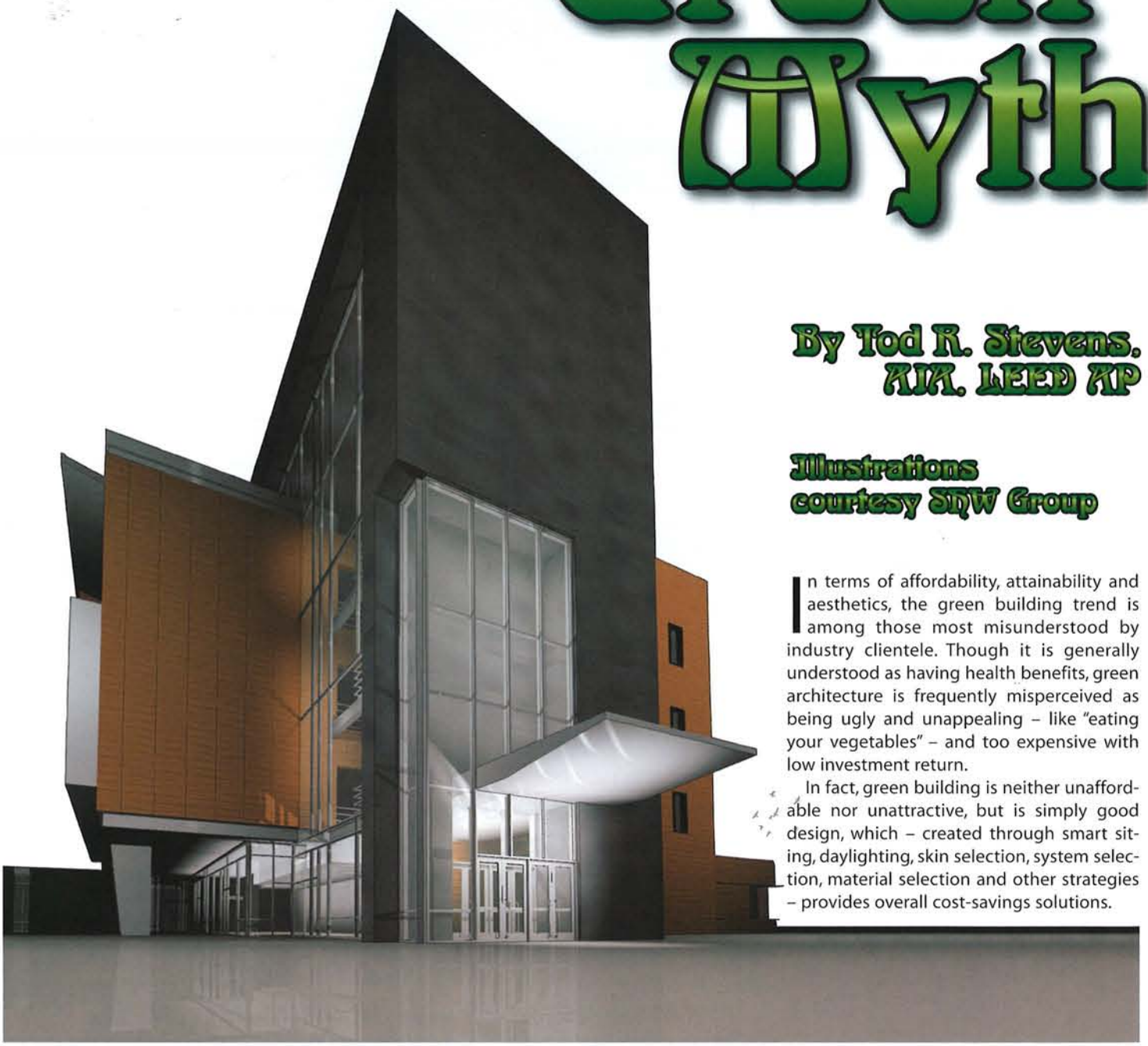
Debunking the Green Myth

By Tod R. Stevens, AIA, LEED AP

Illustrations courtesy SHW Group



In terms of affordability, attainability and aesthetics, the green building trend is among those most misunderstood by industry clientele. Though it is generally understood as having health benefits, green architecture is frequently misperceived as being ugly and unappealing – like "eating your vegetables" – and too expensive with low investment return.

In fact, green building is neither unaffordable nor unattractive, but is simply good design, which – created through smart siting, daylighting, skin selection, system selection, material selection and other strategies – provides overall cost-savings solutions.

On average, an upfront investment of two percent in green building design results in life cycle savings of 20 percent of total construction costs – more than 10 times the initial investment (Source: The Costs and Financial Benefits of Green Buildings: A Report to California's Sustainable Building Task Force, October 2003). According to the U.S. Green Building Council (USGBC), a $4 investment (per square foot) in building green nets a $58 benefit (per square foot) over 20 years.

In addition to costs-savings, even the most skeptical client would do well to consider the future:

- According to the USGBC, which rates and certifies green building based upon its Leadership in Energy and Environmental Design (LEED®) rating system guidelines with Platinum, Gold and Silver as the highest ratings, currently there are LEED projects in 41 countries and all 50 states. Clearly, green building has taken root.

- The value in green building construction starts surpassed $12 billion this year. By 2010, it's expected to increase to $60 billion (Source: McGraw-Hill Construction Analytics, SmartMarket Trends Report 2008).

- Expectations are that 80 percent of American corporations will be involved in green projects in 2009 (Source: McGraw Hill Construction, Greening of Corporate America SmartMarket Report, 2007).

- With education and government sectors expected to have, respectively, 64 percent and 62 percent green building growth (according to USGBC), it's only a matter of time before green building mandates are established nationwide, as is with virtually all Michigan projects now in order to receive public funding.

Lawmakers are already involved, and according to the USGBC, a bipartisan House committee has been created to advance green building practices in schools. Furthermore, today's college students – perhaps the most environmentally aware generation – will soon become tomorrow's corporate leaders and public policy makers, adding impetus for federal mandates in green building.

DEVELOPING A VISION FOR SUSTAINABILITY

The College of Education and Human Services (CEHS) at Central Michigan University is a good example of green design. The CEHS facility is seeking a LEED Gold rating. By meeting their criteria with the help of the project team, the university showed it is proactive towards sustainability. As universities become more competitive, this is a big recruiting and retention point for both prospective new students and future faculty members.

Being green requires smart planning, which with this particular project meant the team took university administrators, faculty

members, and other stakeholders through the process of identifying various criteria, LEED principles and visioning with them collaboratively. The challenge to create the multipurpose facility was to balance the university's needs with its desire to project a good green image globally, while remaining true to strict cost guidelines.

Universities are charged to maintain buildings long-term. Therefore, maintenance, durability, serviceability and all associated costs were among the primary criteria. Sustainability, selection of materials and the desire to create a building that is a living, breathing organism and an inspiration should also be a criteria.

The College of Education is designed to be an iconic representation of Central Michigan University's existing fabric, with architectural details reminiscent of items found throughout the campus.

EFFICIENT GREEN DESIGN PROCESS

Having engineers at the table early allows the team to achieve great synergies. Rather than designing in a vacuum, the design architect gets the general engineering requirements upfront, such as the percentage of windows on the facility's south and north sides.

It makes sense to work together like this to solve problems in aesthetic, sustainable ways. Traditionally, architects are two weeks ahead of the engineers in the design process. Under this old system, engineers "cushioned" their designs, making larger mechanical systems to safeguard themselves. With the real-time approach, the mechanical systems are the right size from the beginning.

This is important because every square foot costs money. Structural engineers are also involved in this process early, allowing them to influence the design with economical bay sizing to help minimize the structure. Right sizing is the approach to sustainability.

With everyone collaborating early like this, clients understand the sustainable direction and what's right for the project, where they can save costs and how they can balance budgets with criteria. Taking this seamless, holistic approach to building, rather than treating all parts separately, is what green building is all about.

Simply by bringing the engineers to help conceptualize, the CEHS project team was quickly able to identify those elements that are easy to integrate, such as designing for carpools, bicycle storage spaces and other alternative transportation applications.

SITING AND DAYLIGHT

Siting is one of the most crucial strategies in green building, and translates into tremendous savings on construction, energy and operating costs. Buildings sited in an east-west axis orientation, in which the long sides face north or south, offer controllability of systems.

Knowing that natural light in classrooms support learning and teaching, the team located these spaces on the northern façade of the CEHS building in order to gain ample windows, which creates a comfortable, pleasant environment and minimizes the need for supplemental lighting.

Individual punched windows articulate the faculty offices and minimize glazing on the south façade. The design team introduced window hoods around each window that extend out eight inches from the façade. The hoods around the windows help control the sun all year, deflecting direct rays and heat when the summer sun is high and allowing the winter sun to come in deeply to naturally warm the space. The hoods increase comfort for much longer time spans than do typical window systems.

The controllability of light by using separate switches on interior lighting allows the perimeter to be shut off when sensing enough daylight has entered rooms through windows, further minimizing lighting needs. Choosing fixture task lighting, in which lights go down to the desk rather than illuminating the whole space, also conserves energy.

Numerous case studies show increased

productivity in facilities that control lighting and use natural daylight. Considering that buildings represent 70 percent of U.S. electrical consumption, it only makes sense to use daylight as a smart green alternative. In large facilities like the CEHS, savings just on light bulb replacement alone can be significant. Add to that the reduction of electrical costs, and the lifecycle operating and maintenance costs are minimized further.

CLIMATE-APPROPRIATE MATERIALS AND SYSTEMS

Choosing the right roof also significantly reduces energy consumption, environmental impact and other costs. The green choices are many, and climatic and other regional variations are a major consideration. For example, the project team for West Brazos

Floor-to-ceiling walls of glass capitalize on the northern ambient light, letting sunlight filter through the classrooms located on the north side of the building and into the primary circulation spine.

Junior High School in greater Houston, an area known for its hot subtropical climate, used a reflective Energy Star roofing system. This feature, along with highly reflective pavement used for the school's walkways and parking lots, reduces heat absorption and the heat island effect.

The CEHS project team chose a green roof – one planted with hardy, low growth sedum plants. The multi-story building offers pleasant views created by its sedum-covered roof. Benefits of this roof are multiple. The roof collects and filters rainwater. Dirt and excess water don't wind up in the storm system, which saves on drainage and water sewer requirements, and the rainwater that the roof captures can also be reused for flushing toilets or irrigating landscape. The roof also reduces cooling costs and air pollution (greenhouse gases), and provides wind buffering and sound insulation, produces oxygen and increases biodiversity, creating small habitats.

Another example of creativity, aesthetic value and functionality offered by green building materials is the bamboo wall paneling selected by the project team for the CEHS's corridors. Research shows that the woody bamboo panels are strong and exceptionally resistant to scuffing and other types of abuse, which can avoid replacement costs and waste. They can also be taken down to access surfaces behind them, allowing more flexibility than the block or tile traditionally used in universities' corridors.

Rapidly renewable and technically in the grass – not tree – family, bamboo is one of the most environmentally friendly materials. Additionally, the bamboo wall paneling's warmth, golden color and long striations give the university a fresher, contemporary look.

The ventilated wall system (VWS), another sustainable practice, is relatively new in the U.S. but has been used as a major system in Canada and Europe for 30 years. In traditional wall systems, increased pressure inside the wall cavity causes it to act like a straw, sucking water into the wall's interior cavity. When water seeps into walls, construction deteriorates and fosters mold and mildew. The new VWS equalizes the pressure in the cavity, eliminating mold and moisture and avoiding "sick building syndrome." It also decreases both heating and cooling requirements. With smaller mechanical loads and less usage operation, costs go down. This is the beauty of green building. Its options, flexibility and functionality are myriad, not myth.

Green building has caught on, and now driven by social and economical forces, it's here to stay. With all the new, affordable materials available, green building is neither the expensive, nor utterly ugly vegetable. It's the cherry on top.

About the Author
Tod R. Stevens, a LEED-accredited professional, served as the design architect for Central Michigan University's College of Education and Human Services. In practice since 1993, Tod has specialized in all aspects of design services, with a special expertise in environmental stewardship. Since joining SHW Group in 2006, Tod has led the sustainable research for SHW's Michigan Studio.

Tod is a principal in SHW Group, one of the world's leading educational design firms with a focus solely on the planning and design of learning environments from pre-K through graduate studies. For more information, visit www.shwgroup.com.