Raising the Bar

The first LEED–certified higher education project in Virginia serves as a laboratory for studying effects on the design process.

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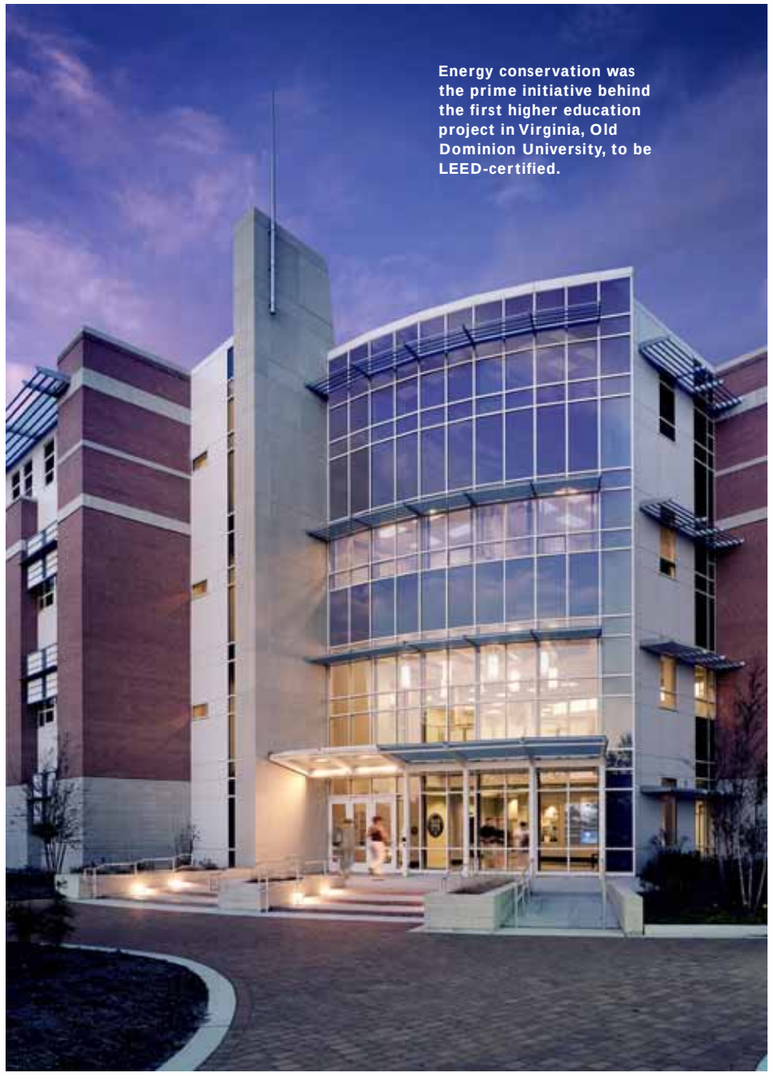
Increasingly, designers and clients alike are embracing the principles of sustainable design to conserve natural resources and gain the financial and quality-of-life benefits of a high-performance building. Some are going a step further, seeking certification under the Leadership in Energy and Environmental Design (LEED) Green Building Rating System, developed by the members of the U.S. Green Building Council (USGBC) as a voluntary national standard for developing sustainable, high-performance buildings.

Energy conservation was the prime initiative behind the first higher education project in Virginia to be LEED certified by the USGBC. The four-story, 83,000-square-foot Engineering and Computational Sciences (ECS) building at Old Dominion University in Norfolk, Va., was completed in 2004. In addition to featuring energy-conservation benefits, the ECS building is used as a "classroom" by the university to develop the in-house maintenance staff's capabilities for new energy-conserving technologies, which can be applied in future renovation and construction projects. The administration also hopes this state-of-the-art building–which serves as a laboratory for studying the effects of LEED registration on the design process–will build campus-wide support for its day-to-day energy conservation initiatives.



Energy conservation was the prime initiative behind the first higher education project in Virginia, Old Dominion University, to be LEED-certified.

AN INTIGRATED TEAM APPROACH

A team approach embracing an integrated building system philosophy is crucial to the LEED process. Per LEED protocol, our team at Moseley Architects started the project by conducting a preliminary feasibility study of the applicability of LEED to the owner's project conditions and goals. It was determined that it would be beneficial to assemble the entire design team to develop a proposal to the owner. It is favorable for teams to start in the programming phase–ideally before site selection–with an in-house charette (brainstorming session) to identify whether the project is a candidate for LEED registration.

The project must be LEED-compatible in terms of site, building orientation and ability to incorporate energy-conservation schemes. For example, it is better to orient the building on an east-west axis in order to cost-effectively control the effects of the sun on the north and south facades of the building. In this sense, the architect must work closely with the civil engineer before establishing the building footprint. As the site analysis for the ECS building evolved, it became apparent that the site of the building would be both LEED-compatible

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Old Dominion administration hopes that the ECS building will build campus-wide support for the school's day-to-day energy conservation initiative.

and would fulfill master plan goals established by the university's Building Committee.

The project team also facilitates the assessment of the project's technical potential to score points under each of the LEED categories. The goal is to identify as many points as are technically feasible within the given project conditions, tagging the ones that may impact budget or schedule in any way. Following the in-house charette, the project team participates in a similar process with the owner, discussing the team's technical findings in light of the owner's programming goals and budget. The objective is to conclude the owner charette with at least 30 likely points, with a buffer for the project team to meet the 26-point minimum required for certification.

A GOOD LEED CANDIDATE

The ECS project at Old Dominion was a good candidate for LEED certification. First and foremost, the project team was comfortable that the university had an adequate budget capacity to meet their programmatic goals. Second, the university embraced a commitment to energy conservation and environmental stewardship, and recognized the benefits of having a LEED-certified building on campus.

The LEED system awards up to 69 points within five categories with defined criteria–sustainable site, water efficiency, energy and atmosphere, materials and resources, and indoor air quality–plus a sixth category for innovations, which are reviewed case-by-case. To be considered for certification, a planned project first must be registered with the USGBC, and it must meet seven prerequisites in the five categories. There are four certification levels: Certified, 26 points; Silver, 33 points; Gold, 39 points; and Platinum, 52 points.

After many discussions with the owner regarding all of the possibilites, ECS project manager Kevin Kattwinkel and the design team worked toward fulfilling key principles in each of the five certification categories, as well as design innovation. The following outlines the specific innovations incorporated into the ECS building under each LEED category.

- Sustainable sites: provisions were made for bicycle storage areas and alternative fuel recharging stations; no new parking areas were created; building is near public transportation; rainwater is collected on the roofs, channeled through on-site "rain gardens"–a combination of plantings and rock material–which clean storm water before it leaves the site.
- Water efficiency: Water-efficient landscaping, using native, drought-resistant plants and water-efficient (i.e., primarily drip) irrigation was employed; a 20 percent reduction in water use is seen in the building through efficient metered plumbing fixtures.
- Energy and atmosphere: energy performance is optimized by 20 percent over a comparable new building through high-efficiency mechanical sytems–which use heat-recovery devices–distributing the air handlers and utilizing carbon dioxide monitoring, increased insulation, external sun-shading for south and west elevations, maximal daylighting and low-E glazing.
- Materials and resources: construction of waste-management plan to salvage or recycle 50 percent of construction debris; use of salvaged, certified, recycled and rapidly renewable materials.
- Indoor environmental quality: construction of indoor air quality management plan to keep potential contaminants out of the HVAC system; materials selected for low VOC emissions; university has smoke-free building policy.

The LEED-certified ECS building reflects Old Dominion University's commitment to energy conservation and environmental stewardship.

GUARDING THEIR POINTS

Throughout the design process, each member of the design team acts as the guardian of the points in his or her discipline. At the same time, the team must work together to maximize the project's overall goals. Discussions among team members and with the owner often result in agreements that reduce costs. These results would not be realized without going through the analysis inherent in the LEED process.

The LEED process requires careful planning and skillful execution of the drawings and specifications with clear definitions of LEED-certifiable components to enable vendors to bid these technologies and products. Then the architect and owner must stand behind their specifications. For example, the interior doors in the ECS building were specified to be manufactured with certified wood and without urea formaldehyde. A vendor tried to substitute a door that included crossbanding manufactured using urea formaldehyde. After much discussion among the owner, designers and product manufacturer about the pros and cons of different crossbanding materials, the project team insisted that the manufacturer meet the original spec.

The certification process also raises the level of detail in our calculations and documentation. Throughout the design and construction process, the project team collects documentation that is used in the certification application to prove that the team has met the requirements of each point. Project teams must be prepared to provide the USGBC with additional documentation during the certification process if requested, and also must be prepared for an audit of one or more points.

TRACKING RESULTS

The rigor of the LEED process gives the design team confidence that operational results will meet projections–but only time and further analysis will tell. For example, we have assessed one-year operational data for Third Creek Elementary School, a new elementary school in North Carolina, the first school to reach a Gold LEED Certification in the nation. Water consumption is down by 70 gallons per student per year at Third Creek when compared with that of the same students in their previous building; the school's water consumption is approximately 10 percent of other similarly sized schools in the same district. Energy consumption has met all of the model's predictions, despite the fact that the school is actually operating at 30 percent more hours than what was modeled.

Project teams should approach every project as if it might become a LEED-registered project. Even if teams conclude their initial in-house programming charette without sufficient technical points for LEED registration, or the owner decides not to pursue LEED certification, they can approach every project at a higher level of awareness amd commitment to sustainable design. Architecture and engineering firms can consider adopting an environmental mission statement for the firm as well as assembling a team comprising members crossing conventional studio and geographic lines to develop ways to mainstream sustainability.

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