



A DEEPER SHADE OF GREEN

Schools can maximize sustainability efforts by taking a holistic approach.

BY PATRICIA-ANNE TOM, CONTRIBUTING WRITER



Schools and universities increasingly are implementing green features into their buildings and operations. But as Kermit the frog once said, “It’s not easy being green” — or at least not as easy as it seems to create a truly “sustainable” and healthy educational environment, say experts.

THE DANGERS OF CREAM-SKIMMING

After making the decision to go green, many schools and universities make improvements that are easy to implement and have a quick return on investment (ROI), according to Rachel Gutter, director for The Center of Green Schools at the U.S. Green Building Council (USGBC). However, “the danger in cream-skimming is that some of the things that are most accessible with the fastest payback on the investment reduce your ability to advocate a second time around to go deeper” and secure more funding and support for additional green efforts, she says.

For instance, lighting retrofits and window replacements are less expensive than swapping out a university’s heating, ventilation and air conditioning (HVAC) system. Payback on the former could be as quick as a couple of years, whereas a new HVAC system may not yield cost savings for a decade or more. Other projects, such as using green cleaning products, may not yield any monetary return and take time to change purchasing contracts and train staff, which means investment up front.

Gutter says if schools address easy items first and then have to seek additional funding for longer-term projects or projects that create no cost savings, “when they go to a school board or taxpayers who have to approve additional funding for round two, they will be under the same pressures to show as quick of a payback” as was realized on the easy projects.

A HOLISTIC APPROACH

A smarter approach, Gutter says, is to look holistically at the school’s goals, priorities and all of the sustainable improvements it wants to make, then present those projects to funders as a complete package. “This allows you to average the numbers together and bundle improvement measures so that the entire project is desirable to decision-makers,” she says. “If you resist the urge to do the easy stuff first,” but instead “understand

Wind turbines outside Lady Bird Johnson Middle School in Irving, Texas, provide power to the school and have helped it become a “net-zero” building, producing more energy than it consumes. Architect: Corgan Associates. Photo courtesy of Charles Davis Smith, AIA.

TEXAS MIDDLE SCHOOL NETS A WIN WITH NET-ZERO MENTALITY



Lady Bird Johnson Middle School in Irving, Texas, features ample use of natural lighting and displays the sustainable technologies at work in and around the facility. Architect: Corgan Associates. Photo courtesy of Charles Davis Smith, AIA.

Lady Bird Johnson Middle School in Irving, Texas, is a prime example of a school that looked at the big picture when embracing sustainable school design, construction and operations, according to the USGBC. When building the district's eighth middle school, the Irving Independent School District wanted to incorporate modern technology as well as reverse negative trends associated with climate change, according to Scott Layne, assistant superintendent for support services. The result was what the district is calling a "net-zero" building that produces more energy than it consumes from the energy grid.

To accomplish that, the 152,000-square-foot building incorporates such features as solar and wind energy generation, passive solar interior daylighting, an efficient building envelope, rain harvesting techniques, a

high-efficiency kitchen, geothermal heating and cooling, and advanced control systems that manage lighting loads.

A key feature of the school's sustainable design included constructing the building with reflective wall panels. Designers also erected a canopy on two sides of the building to prevent the sun's heat from entering the classrooms, while allowing natural light to permeate through the windows. The canopy takes into account the sun's angles throughout the year, so in the winter when the sun hangs lower, rays reach the classrooms to warm the building.

Ultimately, Lady Bird Johnson's sustainability efforts have enabled the school to reduce energy consumption by more than 50 percent compared with a traditionally designed school.

Moreover, because of the use of efficient materials and renewable energy technology, the school has become a tool to educate students on environmental stewardship and energy conservation, according to the district.

"The general message of the school is to reduce, reuse, recycle and educate future generations to become stewards of the environment," says Sangeetha Karthik, project lead architect with Corgan Associates. "We made conscious choices to support the overall message of the building while keeping the economics and use of the building in perspective."

For its efforts, the school received Leadership in Energy and Environmental Design (LEED) gold certification. The school is recognized as the largest net-zero public school in the country, the first net zero middle school in the country and the first net zero public school in Texas. The Center for Green Schools chose Lady Bird Johnson Middle School as the best green school among K-12 campuses in 2013.

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Extensive natural light at Manassas Park Elementary School in Manassas Park, Va., minimizes power consumption. Architect: VMDO. Photo by Prakash Patel.

shared goals and then select improvements over time that support those goals to the best of your abilities, then the more sustainable the improvements are going to be."

Bill Orr, executive director of the Collaborative for High Performance Schools, agrees. When pursuing sustainability, he recommends schools and universities first "look at the bones of the school to determine whether it's a healthy learning environment and conducive to learning."

When school districts step into the green world for the first time, it is a no-brainer to think first about energy-efficiency improvements, according to Orr. However, his organization encourages schools to look beyond energy-efficiency, considering the entire building envelope including factors such as lighting and daylighting, acoustics, thermal comfort temperature zones and indoor air quality.

"When you start looking at greening a school from inside out and start thinking about other factors that create a high-performing school, you may end up with a different equation than if you had just looked at energy-efficiency alone," Orr says.

For instance, schools spend more on energy every year than they do on computers and textbooks, Orr notes. It is therefore logical for schools to want to reduce their utility costs and tackle energy-efficiency projects first. However, by looking at both reducing

SUSTAINABILITY'S TRIPLE BOTTOM LINE

Emory University in Atlanta has long been internationally renowned for its liberal arts, graduate and professional academic programs. More recently, the university has received acclaim for its green initiatives. The USGBC recently named Emory University the nation's top higher education institution in its annual "Best of Green Schools 2013" report.

Yet Emory didn't set out to win awards when it made sustainability a core commitment a decade ago. In 2004, the university's President James Wagner, Provost Earl Lewis and Executive Vice President for Finance and Administration Mike Mandl simply set a vision "to help restore the global ecosystem, foster healthy living and reduce the university's impact on the local environment," according to Emory's Office of Sustainability Initiatives.

The school's sustainability achievements include:

- The Piedmont Project, an annual workshop that teaches faculty and graduate students how to incorporate sustainability into classroom curriculums.

- Sustainability-related courses offered in 47 departments across campus.

- A bus fleet powered entirely by a biodiesel blend made with used cooking oil from campus cafeterias.

- Reduced petroleum consumption and greenhouse gas emissions by offering local and sustainable food in its facilities. By 2015, Emory will be serving 75 percent local or sustainable ingredients in campus and hospital cafeterias.

- Roughly half of the University's 700 acres of land remains undeveloped, supporting the protection of the Wesley Woods, Baker, and Lullwater forests. To preserve green space, Emory has a "no net loss" of tree canopy policy that dictates there should be no overall loss of forest canopy due to the construction or renovation of buildings. Every time Emory needs to remove a tree, it plants enough trees to



The Mathematics and Science Center at Emory University in Atlanta is one of the school's many LEED qualifying structures. Since 2001, all new construction on campus must seek at least LEED silver certification. Architect: Cooper Carry.

Photo courtesy of Kay Hinton of Emory University Photo Video.

maintain the same forest canopy.

- Reduced water and energy use, and waste reduction. For instance, Emory's water management plan encourages incorporating water-saving technology into green buildings, cisterns to collect grey water and rainwater for use in irrigation and toilet flushing. In some buildings, large heat wheels pull moisture from the air while efficiently ventilating buildings. The condensation from the heat wheels on Emory's Children's Pediatric Center and the Whitehead Biomedical Research Buildings amounts to roughly 4 million gallons of water a year for Emory's chilled water system. Overall, Emory plans to decrease water use by 25 percent from 2010 levels by 2020.

- Since 2001, all new construction on campus has been required to seek at least LEED silver certification. The university is retrofitting many existing buildings to become more environmentally friendly — a commitment designed to help the university meet its goals of reducing energy use by 25 percent by 2015 and greenhouse gas emissions by 85 percent by 2050 from 2005 levels, according to the Office of Sustain-

ability Initiatives.

USGBC has recognized Emory for having among the highest number of square feet of LEED-certified space of any campus in America, with 11 buildings having achieved LEED gold status and six projects pending that, once certified, will total 3 million gross square feet of LEED-certified space. Emory claims one of the first LEED-EB gold buildings in the United States, the Goizueta Business School, and the first LEED-certified building in the Southeast, the Whitehead Biomedical Research Building.

While the statistics are a good measure of how far Emory has come in its sustainability efforts, the figures are less important than measuring the university against what Ciannat Howett, director of Emory's Office of Sustainability Initiatives, calls the environmental, economic, and social "triple bottom line" of sustainability. "Sustainability has long been a top priority at Emory, where our vision is to develop and promote a model for healthy living here on campus that can translate to communities around the globe," she says.



A brownfield conversion, the Providence Career and Technical Academy in Providence, R.I., garnered a Green Ribbon from the U.S. Department of Education. Architect: The S/L/A/M Collaborative / StudioJAED. Photo courtesy of Frank Giuliani.

the amount of energy consumption and improving air quality, a school might be able to address areas such as the HVAC system or windows that reduce energy use and simultaneously improve student and teacher comfort. The results could be reducing utility bills and the number of student absences, such as lowering the sick days taken by children with asthma, for example. The payback is that children perform better in a healthier learning environment, and “schools get money based on average daily attendance,” he notes.

NEXT STEPS

If a school has already taken a few sustainability steps but wants to make further headway, Orr suggests examining what is going on in the school district, where the facility is in its lifecycle and what sources of funding have been identified.

“A school district might have one facility that’s in poor shape and another that has fundamentally better bones, and that might help it prioritize what to upgrade and re-do,” he says. Looking at the big picture might help a district standardize some high-performance features, such as windows, so that it doesn’t have to carry different sets of equipment, or create multiple contracts for cleaning supplies.

Schools also need to examine existing green efforts and leverage opportunities to engage students, teachers and the community to make broader strokes in sustainability, Orr adds. After all, even if a school retrofits all

of its lighting fixtures, it won’t reduce energy costs if students and teachers leave the lights on at the end of the day and on the weekends.

To build support for sustainable schools, “instead of doing green projects in a vacuum, start with the end in mind, and phase-in projects over time,” Orr recommends.

“If you’ve already taken a few green steps, then use that momentum and savings and leverage it to go further. Take advantage of opportunities and bundle improvement measures,” Gutter adds. ■

TOM is a contributing writer based in San Francisco.

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