

Supporting Sustainability

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ABSTRACT (ENGLISH)

Billions of dollars have been spent on green design and construction of K-12 and higher-education school facilities; thousands of them have earned recognition for their environmentally responsible design and construction; hundreds of colleges and universities have pledged to achieve significant reductions in their greenhouse gas emissions; and sustainable design practices have become routine if not mandatory in many jurisdictions. Daylighting dimming? Since a seminal 1999 study by the Heschong Mahone Group showed a correlation between classrooms with effective daylighting and improved student test scores (Making an Impact, AS&U , September 1999), school systems from coast to coast have incorporated daylighting strategies into new and renovated learning spaces. To bring renewed attention to the benefits of school daylighting, the Eneref Institute has established a Natural Interior Daylight Initiative and is forming a networking group of school administrators to help schools overcome the impediments to greater use of daylighting in education facilities. Green facilities, green financing It's not unusual for the Fort Bend (Texas) school district to be building new schools-the suburban Houston system has grown from less than 29,000 students in 1987 to 74,500 students in 2016-17, and voters approved a \$484 million bond package in 2014 to provide education facilities for the steadily growing community. [...]it's not surprising that Fort Bend wants its new elementary schools to meet U.S. Green Building Council standards for sustainable design and construction-the district's Elementary School Education Specifications, adopted after the 2014 bond referendum, state that future elementary campuses should be designed to qualify for...

FULL TEXT

How green are schools?

The answer to that question will depend on your perspective-whether you're basing your judgment on the progress that education institutions have made in energy efficiency and sustainable practices, or if your focus is on the many opportunities for improvement that have yet to be captured.

Billions of dollars have been spent on green design and construction of K-12 and higher-education school facilities; thousands of them have earned recognition for their environmentally responsible design and construction; hundreds of colleges and universities have pledged to achieve significant reductions in their greenhouse gas emissions; and sustainable design practices have become routine if not mandatory in many jurisdictions.

But that leaves tens of thousands of education facilities across the nation still operating with inefficient systems and strategies that waste energy and other resources, and plenty of K-12 and higher-education administrators for whom sustainability is not a priority. For those seeking to minimize the environmental impact of school facilities and combat the effects of climate change, the green school movement has only just begun.

"We don't want to lose the momentum," says Seth Warren Rose, founding director of the Eneref Institute, an organization that advocates for sustainable development. "We need every drop of efficiency we can get."

Daylighting dimming?

Since a seminal 1999 study by the Heschong Mahone Group showed a correlation between classrooms with effective daylighting and improved student test scores (Making an Impact, AS&U, September 1999), school systems from coast to coast have incorporated daylighting strategies into new and renovated learning spaces. By capturing natural light and dispersing it throughout classrooms and corridors, schools can reduce the demand for electric lighting and create a more pleasing learning environment that boost student performance.

But 18 years after that study, the enthusiasm for daylighting in schools has dimmed, Rose asserts, as other energy-saving initiatives with quicker paybacks have overshadowed it. To bring renewed attention to the benefits of school daylighting, the Eneref Institute has established a Natural Interior Daylight Initiative and is forming a networking group of school administrators to help schools overcome the impediments to greater use of daylighting in education facilities. Conserving energy and providing an environment more conducive to learning should be enough to persuade school planners to pursue daylighting, Rose argues.

"We have to convince them that it's worth the investment," Rose says. "You get a double dip; there's the energy benefits, and the performance benefits."

In an effort to make its case for daylighting, Eneref conducted a study of lighting improvements at Wilson Elementary School in the West Allegheny (Pa.) district. Prior to renovations, the desire for better use of daylight was a recurrent theme; a survey of teachers found that 71 percent thought daylighting levels in their classrooms were inadequate.

A renovation added skylights throughout the school, as well as LED lighting with automatic dimming controls. Clear skylights over the corridors admit direct sunlight into interior spaces, and prismatic skylights over music and art spaces, the school's collaborative classroom, library and cafeteria diffuse the light and block the heat from the sun.

Those changes along with upgrades of the school's HVAC system enabled Wilson Elementary to cut electricity consumption in half—from about 1.5 million kilowatt hours in 2013 to around 740,000 kilowatt hours in 2015.

In addition, anecdotal evidence from students and teachers seems to support the findings of the Heschong study that daylighting helps create a better learning environment.

West Allegheny Principal Chris Shattuck says that both teachers and students reported having better attitudes and more energy after their classrooms were infused with natural light.

Green facilities, green financing

It's not unusual for the Fort Bend (Texas) school district to be building new schools—the suburban Houston system has grown from less than 29,000 students in 1987 to 74,500 students in 2016-17, and voters approved a \$484 million bond package in 2014 to provide education facilities for the steadily growing community.

And it's not surprising that Fort Bend wants its new elementary schools to meet U.S. Green Building Council standards for sustainable design and construction—the district's Elementary School Education Specifications, adopted after the 2014 bond referendum, state that future elementary campuses should be designed to qualify for Leadership in Energy and Environmental Design (LEED) certification. Earlier this year, Madden Elementary, which

opened in 2015, became the first Fort Bend school to become LEED-certified.

What is unusual about the three elementary schools set to open later this year in Fort Bend is not that the facilities will be green, but that the bonds issued to pay for the facilities also are green.

Leonetti, Neil and Patterson Elementary Schools are 850-student campuses under construction, and about \$52 million worth of tax-exempt bonds that Fort Bend is selling to provide construction funding for the schools are designated "green bonds." The district is the first K-12 system in Texas to issue green bonds. The designation is meant to attract investors who want their money going to environmentally responsible projects.

"My goal was to attract more potential investors," says Steven Bassett, the chief financial officer for the Fort Bend district. "Many investors want to invest only in green projects. We have lots of investors in our bonds, but this could help us expand our investor base and maybe save a little money."

As the name implies, green bonds are bonds issued to support specific sustainable, environmentally friendly projects. They have become more popular in recent years, yet represent only a tiny share of the overall bond market.

"In the past few years, a specialized green bond market has emerged as a critical source of funds for building a low-carbon infrastructure," says a 2017 report from California State Treasurer John Chiang, *Growing the U.S. Green Bond Market*.

The report says that in mid-2016, about \$24 billion of the outstanding bonds in the U.S. market were designated green bonds. That's an impressive number, but just a tiny drop in the bucket (0.061 percent) of the overall U.S. bond market of \$40 trillion.

Chiang says the acceptance of green bonds has been slowed by the lack of a universally accepted definition of what constitutes a green bond.

"The green bond market has been described as a 'Wild West' in that no enforceable code ensures the environmental integrity of bonds labeled as green," the report states. "Greenwashing-issuance of bonds labeled as green that lack genuine environmental benefits-remains a concern for investors."

Another impediment to green bonds in the United States, Chiang found, is the lack of consensus on climate change-what should be done to address it or whether it is a real phenomenon.

"Official support for green bonds is fragmented," the report says. "As a result, U.S. corporations, public agencies and local state governments feel less pressure to practice environmentally sustainable investment than their counterparts in other countries."

Some school systems might balk at using green bonds, Bassett says, because of the disclosure requirements involved with making sure a project is delivering on the green elements it promised. But Bassett says that as part of Fort Bend's bond program, district officials promised transparency about the projects it was building, even before green bonds became a possibility.

"We had already committed to maximum disclosure," Bassett says.

Honoring the best

One way to keep the momentum for green schools moving forward is to bring attention to some of the schools, universities, administrators, students and teachers making extra efforts to incorporate sustainable strategies into facility operations and classroom instruction.

Earlier this year, the Center for Green Schools and the Green Schools National Network honored several education institutions with recognition in the 2017 Best of Green Schools.

The San Francisco Unified School District was singled out in the transformation category for its zero net energy efforts. The district is pursuing a strategy to have all new construction be zero net energy ready and to cut the energy consumption in existing buildings in half by 2030. The district also is mandating that deferred maintenance projects adhere to strict zero net energy guidelines and that by 2030, all district vehicles must run on electricity or low-carbon fuel.

Arizona State University in Tempe received recognition in the higher education category for its sustainability efforts. Those include its Poly Garden, which leases plots to middle and high school students, who grow produce there and donate it to local food banks. The university also manages a Sustainability Science Education program and a Sustainability Teachers' Academy.

Prairie Crossing Charter School in Grayslake, Ill., was singled out in the K-8 category for its environmental education and green facilities. The school's LEED-certified building is surrounded by about 40 food gardens, native landscaping and outdoor classrooms. Students grow produce that is donated to local pantries and help area businesses adopt green practices.

Boston Latin School's Youth Climate Action Network was honored in the high school category. The environmental club's work has led to installation of a solar array and 350 trays of vegetation on the school's roof, as well as stations throughout the school to refill water bottles. The club's recycling program reduced waste by 50 percent and led to a \$75,000 lighting retrofit that cut energy costs by \$33,000 a year.

Chapel Hill-Carrboro City (N.C.) School District was honored in the school system category for reducing emissions by 20 percent, which equates to 5,250 metric tons. That has resulted in savings of \$1.5 million. The district's composting program for its cafeterias has diverted 500,000 pounds of waste from landfills in two years.

Hillcrest Elementary School in Oak Harbor, Wash., received an award in the student leader category. After the school's green team urged the Oak Harbor School Board to stop using Styrofoam trays, the school switched to compostable trays, which reduced waste production by 75 percent and lowered waste-hauling costs by 50 percent.

Joseph DaSilva, school construction coordinator with the Rhode Island Department of Education, received recognition in the policymaker category for his leadership in the green schools movement. He is credited with championing green school design and construction and was involved in bringing about the state's first net zero energy school, the Paul W. Crowley East Bay Metropolitan Career and Technical Center.

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Credit: Mike Kennedy

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