Taking Action to Achieve Certification

Schools and districts work to complete sustainability actions

BY DONNA DREWES AND **HEATHER MCCALL**

It's crunch time for the first group of schools working to become certified in the inaugural year of the Sustainable Jersey for Schools certification program.

The program, launched in fall 2014, is a certification and recognition program for New Jersey public schools that want to go green, conserve resources and take steps to create a brighter future, one school at a time. Sustainable Jersey for Schools provides tools, training and financial incentives to support and reward schools as they pursue sustainability programs.

To date $320,000 in grants has been offered to districts and schools to make progress and countless webinars and workshops have helped to lead the way. Sustainable Jersey for Schools now has 224 schools and 85 districts registered and working toward achieving certification. Of this inaugural group, 70 schools within 24 school districts submitted an initial application for certification. The applications include more than 2,000 certification actions that the schools and districts plan to do.

To achieve certification, schools must complete certification actions that total at least 150 points. Each certification action has a point value and schools choose from 87 actions that include performing an energy audit, integrating sustainability into student learning and boosting recycling efforts. Each action includes guidance about who should be involved, resources, what to do, submission requirements and other information related to completing the action successfully. To review the certification actions, go to *www.sustainablejerseyschools.com/actions-certification/actions/*.

Galloway Township students are helping the district pursue Sustainable Jersey for Schools certification

Schools collaborate with their district to complete actions, upload documentation and achieve certification. Certification status is awarded to the individual school, but each district completes a certification application that then populates points into the school application.

Erica DeMichele, K-12 supervisor of curriculum for Delran Township School District is leading the effort to get Millbridge Elementary School certified. In the first round of reviews, this school's application was at the top for points approved. DeMichele said, "I love the Sustainable Jersey for Schools actions, they are practical and provide new ideas for what we can do at the school level. For example, we're now gathering partners and developing ideas for how to improve the outdoor facilities to inspire physical activity while incorporating elements of a sustainability curriculum. In order to be good stewards of the earth we need to pay attention to the health of our students and staff." She added, "We had students submit applications to be a part of the green team. The response was great. The kids know how to do these actions and want to make changes. I'm now getting calls from other schools asking how to start their green team."

School Gardens Certification Action Schools receive ten points toward certification for

completing the School Gardens action. This is a popular action for schools; 49 of the first 70 schools applying for certification indicated that they plan to do this action.

This action requires the creation and maintenance of a school garden. In order to earn points, the garden needs to have been active during the current or previous growing season, include plantings that produce fruits, vegetables or herbs that can be consumed by students, and be used to teach environmental or nutrition education.

The William J. McGinn Elementary School garden, located in the Scotch Plains-Fanwood Regional School District, is a good example. Students at the K-4 school turned an unused outdoor storage space into a vegetable garden and outdoor classroom.

The kindergarten students grow and study plants and share their findings with second-grade buddies. The first-grade classes developed a picture map of the vegetables grown in the garden. The second-grade students wrote letters to pen pals across the district regarding what they had planted. The third-grade developed global cookbooks based on how different cultures use the foods grown. The fourth graders wrote persuasive letters about the benefits of the vegetables they grew to seventh-grade peer leaders who then visited the garden to get an informative tour.

School Travel Plan for Walking and Biking Certification Action Another action that will earn a school 10 points is the School Travel Plan for Walking and Biking action; currently 27 schools intend to complete this action. This plan maps out how to improve pedestrian and bicycle travel to and from school with the goal to increase the number of students who walk and bike to school and to improve safety. Safe Routes to School Regional Coordinators at Transportation Management Associations (TMA) throughout the state can assist schools in developing the plan.

A Galloway Township student

Hampton Public School, located in Hunterdon County, created and continues to update the Hampton Public School Travel Plan that it developed in partnership with HART Commuter Information Services. Hampton Public School conducted a walk audit of Hampton Borough and fourth, fifth, and sixth-grade students took notes of both positive and negative aspects of their town. The results were included in the updated travel plans.

Waste Audit Certification Action In order to be certified, schools must implement two of eleven priority actions. The Waste Audit action provides a school with 10 certification points and is one of the priority actions. The action requires an assessment of the quantity and origin of the school's waste. Waste can include recyclable paper, beverage containers, non-traditional recyclables like ink jet and toner cartridges, usable and reusable items, food and materials like electronics, fluorescent bulbs and chemicals.

A waste audit is useful because a school cannot develop a waste reduction and recycling plan without first identifying the materials that need to be reduced, recycled, re-purposed or disposed. As part of the Galloway Township Kids Go Green curriculum, the Galloway school district has done several waste studies and a walk-through audit of the middle school. A detailed report and recommendations were sent to the school superintendent and plans are being made to perform audits at the other four schools in the district.

The Galloway Township Middle School Environmental Club members recognized from the report that their school cafeteria needed to improve its recycling procedures. They, along with the school principal, the cafeteria employees, and maintenance workers set up procedures to increase the recycling of beverage containers such as milk cartons, cans and juice containers. The school invited two students to attend the food services meetings which has resulted in a push to remove Styrofoam from the cafeteria and has allowed for two-way communication between the students and the staff.

Galloway Middle School Principal Paula Junker said, "I have a great deal of pride in my school, so of course I want to make it more sustainable. Sustainable Jersey for Schools is one way to spotlight and organize all of the things we are doing like Mr. B's Backyard Classroom, Grizzly Garden, the environmental club and our school's solar panels. Since we formed the green team, the teachers, students and operations managers are now coming to

me with new ideas regularly."

Green Cleaning Policy Certification Action

The Green Cleaning Policy action is worth 10 points and can be completed at the school or district level. Implementing a green cleaning program helps to improve air and water quality, student and staff health and reduces costs.

The Newark school district in Essex County is the largest school system in New Jersey with a student population of 40,000 and more than 80 schools. The district employs about 500 staff in its custodial operation. Because of the impact a clean environment has on students, Newark public schools initiated a green cleaning program. A pilot program was instituted to determine how well Green Seal-certified products would perform in an urban school district with buildings averaging more than 85 years in age. The pilot proved to be successful, and the products were quickly accepted by the staff as a less-toxic alternative to the chemicals they had previously been using. The district removed chemicals that had the potential to cause "asthma triggers" and allergic reactions to chemically-sensitive students and staff.

Sustainable Jersey looks forward to celebrating with the first group of schools that achieve certification at the New Jersey School Boards Association Workshop 2015 in October. And, if schools and districts need an additional incentive to get started, there are grants available to help move projects forward. Visit the grants and resources page on *SustainableJerseySchools.com* for an overview.

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New Jersey's Green Leaders

The 2015 Green Ribbon Schools award program honors schools that have demonstrated best practices in sustainability

BY ALLISON MULCH

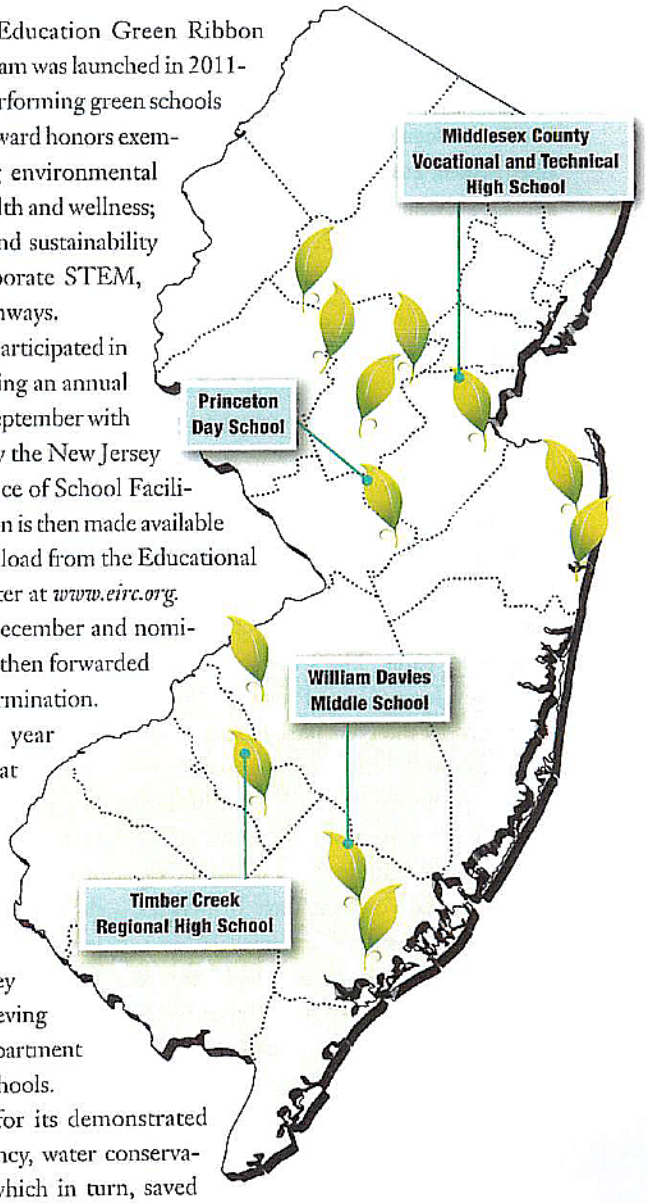
The U.S. Department of Education Green Ribbon Schools (ED-GRS) award program was launched in 2011-2012 to recognize the highest performing green schools in the nation. The recognition award honors exemplary achievement in reducing environmental impact and costs; improving health and wellness; and providing environmental and sustainability education to effectively incorporate STEM, civic skills and green career pathways.

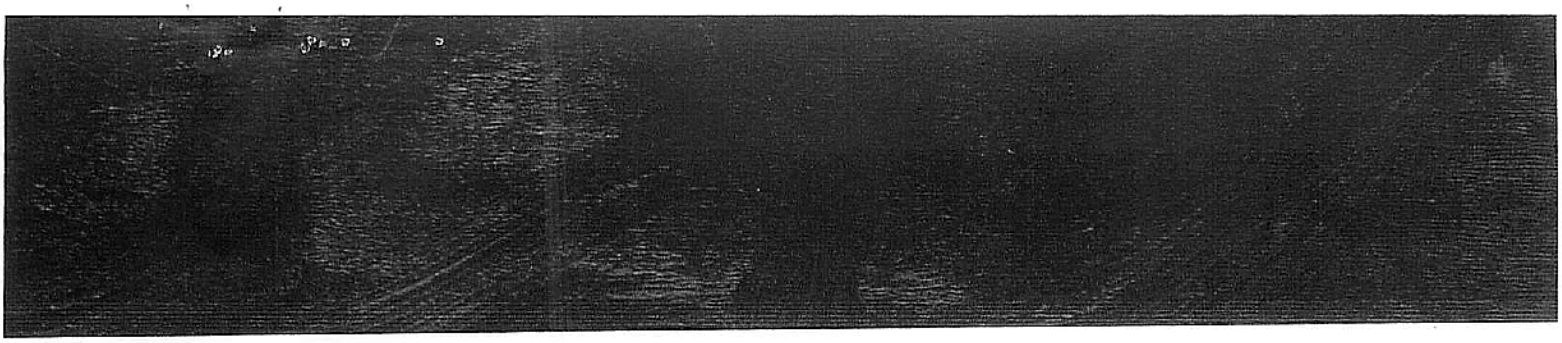
New Jersey has successfully participated in this program every year by hosting an annual award cycle which begins each September with an announcement distributed by the New Jersey Department of Education's Office of School Facilities. The current year's application is then made available for schools and districts to download from the Educational Information and Resource Center at *www.eirc.org*.

Submissions are due each December and nominees are selected by committee, then forwarded to the feds for their final determination. Winners are announced each year on Earth Day and celebrated at a formal award presentation in June or July.

This year's award ceremony was held on June 3 in Washington, D.C. and representatives from four New Jersey schools were honored for achieving the designation of 2015 U.S. Department of Education Green Ribbon Schools.

Each school was selected for its demonstrated progress toward energy efficiency, water conservation and reduction of waste, which in turn, saved





money. Additional criteria included creating healthier environments more conducive to learning by improving indoor air quality, reducing chemicals and pesticides, and adding nutritious food options, outdoor recreation, and wellness programs. Finally, schools were required to infuse sustainability and environmental education into their curriculum as a catalyst for STEM and 21st century themes.

Read about the four winners below and meet representatives from the schools at the Workshop 2015 conference in October.

Middlesex County Vocational and Technical High School, East Brunswick campus, East Brunswick The Middlesex County Vocational and Technical School East Brunswick campus is a suburban school, built in 1969, which serves 637 students. Through conscious conservation efforts, the school reduced its domestic water use by 16 percent and energy use by 18 percent in just a year's time. The school had an outside contractor perform an energy audit and subsequently implemented retrofits.

All maintenance issues at the school are used as educational opportunities; teachers diagnose problems with students in pertinent career paths. The school participates in the New Jersey Green Program of Study, sponsored by the New Jersey Department of Education, to offer three designated sustainable pathways: sustainable architecture and design; green construction; and energy for a sustainable future.

Middlesex Vo-Tech/East Brunswick conducted a sustainable courtyard project. As interior courtyards had become overgrown and unattractive, the school collaborated with several career majors – architectural technology, carpentry, HVAC, agriscience technology and welding – to create a beautiful space. The students removed overgrown vegetation and built walkways using reclaimed wood planks. Students also dismantled two trailers and recycled the wood and metal. Welding students made metal frames for bridges and carpentry students created two completely recycled bridges from reclaimed wood. Upon completion of the courtyards, the school was contacted by Woodbridge Township to assist with the Green Museum, which began the school's mission to educate students and staff about sustainability and using reclaimed products in career majors.

The East Brunswick campus of Middlesex County Vocational Technical School is a Weather Bug School that collects data on the weather, some of which is shared with the National Weather Service. It also makes use of Curriculum for Agriculture and Science Education (CASE) and Trout in the Classroom. The school's Green Technology Exposition included projects such as organic dry cleaning and a dance department video about a trash vortex in the ocean.

A recent project is a school garden. Agriscience students planted raised beds and experimented with different herbs to keep the pests out, but groundhogs were winning the war. Students consulted several local farmers, who determined that the garden needed to be fenced. Farmers also helped students learn about proper soil nutrition, crop rotation, and garden maintenance. For cold weather, the students built cold frames to grow kale and spinach for the culinary arts department, and herbs are grown in the hydroponic system in the school's green laboratory. Students also built compost bins for scraps and created a groundwater containment pond to provide a habitat for – and enable student instruction about – various aquatic species.

The school was awarded a Coordinated School Health Grant from the New Jersey Department of Health. As part of the school's goal to promote student and staff health in the school, the cafeteria added a salad bar, switched Styrofoam lunch trays to reusable trays, and began to offer more seasonable fruits and vegetables. The food service provider changed food vendors to limit the distance the food had to travel. The staff and student body, along with the community, have embraced Middlesex/East Brunswick's mission of health and fitness and the school hosts a five-kilometer run in honor of a deceased graduate.

Timber Creek Regional High School, Erial Timber Creek Regional High School in the Black Horse Pike Regional district, is a suburban school serving 1,329 students. Timber Creek has reduced utility costs since installing high-efficiency lighting, changing refrigeration practices, establishing wiser heating and air conditioning practices, shutting off lights and computers when not in use, and structuring more responsible irrigation practices. As a result, Timber Creek has mitigated climate change by reducing greenhouse gas emissions by 70 percent in three years. Over 58 percent of the school's energy usage is produced onsite with a 1.3 megawatt solar array.

Timber Creek has focused attention on a philosophy of "reduce, reuse, and recycle." The school has organized a composting and single-stream recycling program throughout the school. Compost is collected by Organic Diversion, a company that coaches the students and staff on how to collect materials, and provides the school with reports on collection quantities and strategies to improve composting and recycling efforts. The compost is also used in the science curriculum, where students examine it for microbes and decomposition rates.

Timber Creek has improved indoor air quality by discontinuing the use of chemicals used to strip flooring and installing fil-

ters with a minimum efficiency rating value of eight in HVAC systems. The school's wellness coordinator organizes biometric screenings and establishes weekly goals for individual staff members and establishes workout regimens. The health and physical education department welcomes guest speakers throughout the year.

Timber Creek has an organic garden constructed from untreated, repurposed solar-panel wood shipping boxes. The garden is supported by a 300-gallon off-grid rain collection system that collects roof rainwater and uses a 12-volt battery recharged with solar to power a pump with a capacity of four gallons per minute. Garden produce goes to the cafeteria, local food banks, and community senior centers.

Sustainability issues are integrated into the curriculum. In chemistry, topics studied include solar cells, nuclear energy and environmental chemistry, greenhouse gases and how they contribute to global warming, alternative energy sources, the hydrogen fuel cell and biofuel. Students learn about nutritional concepts, food contamination, organic foods, healthy food choices, and composting in the nutrition, culinary, and hospitality courses. Food-based classes use the food grown in the organic garden. In environmental science, the climate unit treats greenhouse gases and climate change according to a framework of natural climate change, evidence for past climate change, and current observations with implications for the future. The energy unit covers fossil fuels and an evaluation of alternative energy sources. Biology classes address the relationships between resource use and sustainable development and how humans impact the diversity and stability of ecosystems. Art students use trash, newspapers, recycled materials, drips of paint, and found items to create sculptures and paintings. Engineering students create cardboard chairs, cranes out of recycled materials that hold as much weight as possible, and robot chassis from repurposed pallet wood.

Princeton Day School, Princeton Princeton Day School (PDS) is a coeducational prekindergarten through 12th-grade private day school for 900 students.

PDS created a Green Panther Certification Award for classrooms and offices to self-monitor behavior based on environmental indicators and questions. The pre-K through 4th-grade classrooms all have a designated sustainability student leader, and use a green/red magnet system to save electricity. PDS has also created a Green Panther Home Award for families to implement these conservation behaviors in their own homes.

In 2011, Ecometrica performed a greenhouse gas assessment that quantified the school's emissions, and the school launched facilities changes to decrease its environmental impact. PDS has installed CO_2 sensors, passive solar harvesting lights, occupancy sensors, low-flow toilets, water bottle refilling stations, high-efficiency boilers, double-pane high-efficiency windows, and a building control system. PDS has composted more than 80,000 pounds in the last four years. The school has a fully transparent bill system that tracks all forms of energy use on a monthly basis. The students performed greenhouse gas assessments in 2013 and 2014 in partnership with students from nearby Princeton University.

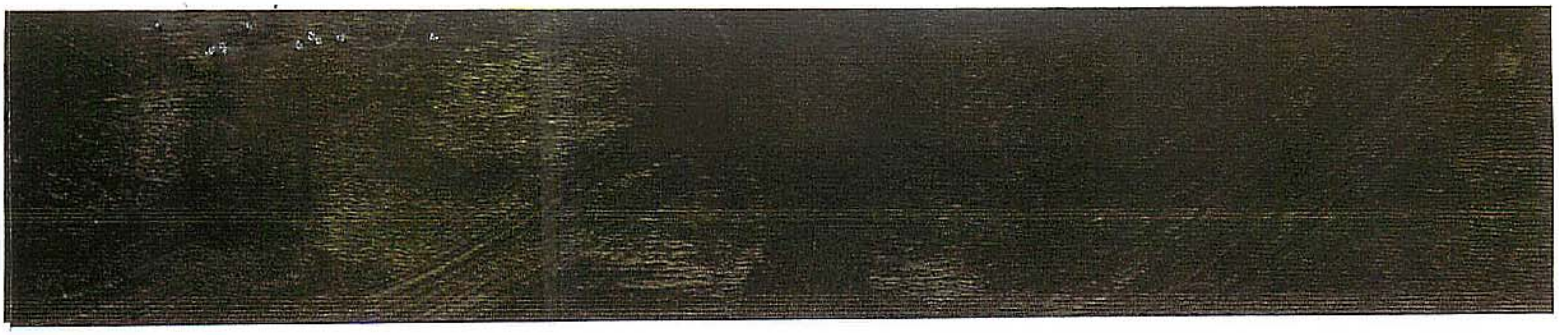
PDS created an annual Barn Week during which lower school students learn animal stewardship, and garden education is integrated into the health and wellness initiative in all grades. High school students prepare an annual Harvest Dinner from local and organic food for 250 families and teach about its importance.

PDS has a physics course on energy; a history course on oil; an English class on food, sustainability, and writing; a compulsory sustainability course for all sixth graders, and required outdoor garden classes for all preK–fourth grade students that involve a 50 x 150 foot organic garden.

PDS has implemented sustainable dining practices. There is an outdoor kitchen and classroom for the use of the school community. No disposables are used in the school's dining or catering, all food is cooked from scratch, the school uses 19 percent local food, and the school hosts "Healthy Me, Healthy Planet" Tuesdays featuring foods high in nutrition and low in carbon footprint. All food other than dairy and meat is composted. As a result, PDS has become Green Restaurant Certified at the three-star level.

The high school's very active Environmental Action Club (EnAct) organized environmental issues conferences titled "Our Future, Our Challenge" with more than 100 students participating from public and independent schools. EnAct partnered with the Princeton Environmental Film Festival to create Next Generation Fairs and won the Youth in Focus Award. EnAct and the PDS Theatre Company promoted sustainability education through the stage production of the play "Urinetown," earning the 2014 Paper Mill Playhouse award for education.

PDS has offered teacher workshops in school garden design and curriculum reform. The school's sustainability coordinator and garden coordinator present regularly at conferences, and welcome educators to come to PDS for advice on making grounds more sustainable teaching tools. PDS runs environmental summer



camps that are open to the public.

William Davies Middle School, Mays Landing
William Davies Middle School (WDMS) is one of three schools in the Hamilton Township school district in Mays Landing. It has 980 students in grades six through eight. As a Title I school, 52 percent of students receive free and reduced-price lunch. WDMS is one of the largest middle schools in New Jersey, but the school's reach extends beyond state borders, thanks to social media. Five years ago every student was given a netbook through the Talent 21 Grant Initiative. This motivated staff to rewrite the curriculum to implement this technology to create 21st-century learners and young environmental stewards. For example, sixth-grade students hear from speakers from the Atlantic County Utilities Authority and create projects demonstrating how they are reducing their carbon footprint. Their art projects on endangered species are exhibited at a local mall for shoppers to vote on a favorite. Seventh-grade students focus on water conservation via their annual Walk for Water to raise money to place wells in Ghana. Eighth-grade students participate in an annual Green Career Day, which offers presentations from local sustainability-minded companies. Environmental literacy projects include investigations of sustainable agriculture and students rewrite job descriptions to reflect environmental changes and demands.

The school is an Eco-Schools USA and a Keep America Beautiful Recycle Bowl participant. The environmental club created an outdoor learning space through fundraising and product donations and developed relationships with local businesses, nonprofit groups and colleges. Now students care for vegetable gardens, a greenhouse, a koi pond, rain barrels, a drip irrigation system, and a butterfly garden. For many of the students, these outdoor habitats are their only exposure to these plants and animals.

Solar panels generate 14 percent of the school's energy usage and double as a teaching tool to study solar energy. Moreover, WDMS partnered with the Richard Stockton College of New Jersey to obtain an extensive energy audit for the school, which will encourage WDMS to increase focus on energy management and reduce its carbon footprint.

For more information on the Green Ribbon Schools program, including highlights from winners in other states, go to *www2.ed.gov/green-ribbon-schools*.

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Free Sustainable Schools Consulting Services

NJSBA has two full-time consultants dedicated to supporting board members in sustainability initiatives and training. John Henry, NJSBA STEM and sustainable schools specialist, and Kara Angotti, U.S. Green Building Council Center for Green Schools Fellow, are available to answer questions from board members, and conduct training on the topic. They can be reached by email at jhenry@njsba.org and kangotti@njsba.org.

Green Delivers

Environmentally friendly buildings can improve student health and achievement without breaking your budget

JIM FRENCH AND **ROD OATHOUT**

The difficult decisions facing school districts, from budget cuts to improving test scores to personnel issues, are significantly multiplied when districts choose to design and construct new facilities.

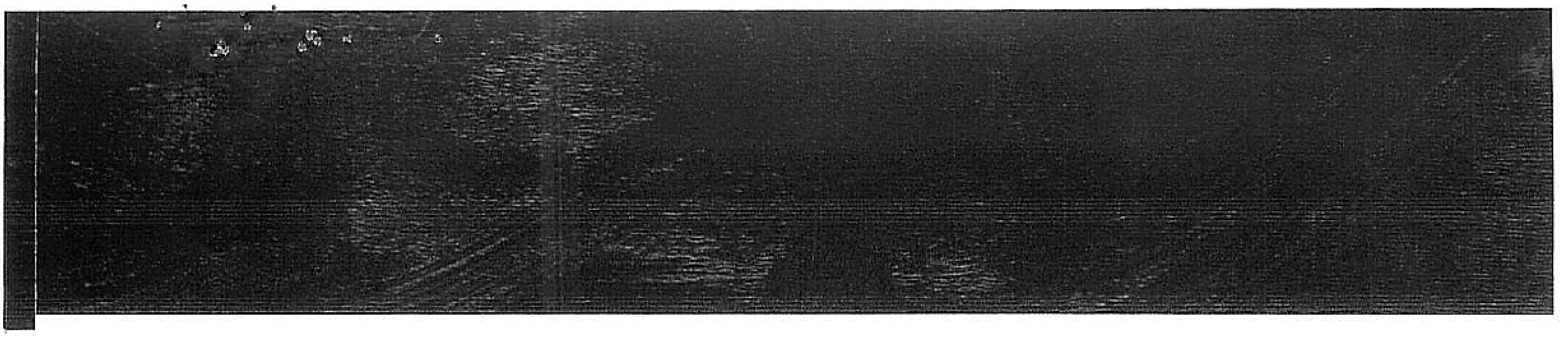
One of the first questions school leaders ask us as designers is: "Should we design a green school?" The green school debate has been active for years, with proponents making claims that green schools improve the health and performance of students, result in lower operating costs, and do not increase construction costs.

However, the extent to which green design affects occupants, operations, and construction costs is often difficult to quantify, which can make green school design sometimes hard to justify to school communities.

The extent to which green design affects occupants, operations, and construction costs is often difficult to quantify.

We recognized the need for a research study to better inform us and our district clients about green school design. We wanted to have data for districts debating the merits of green school design.

We developed the study with the Institute for the Built Environment (IBE) at Colorado State University. We wanted to look at performance, both building operational performance, and the effectiveness of education delivery. We asked the question: "What effect does green school design have on occupants and long-term building performance?" We used the U.S. Green Building Council (USGBC) Center for Green Schools' definition of a green school: a school that creates a healthy environment that is conducive to learning



while saving energy, resources, and money.

We identified 12 schools in eight states offering preschool through eighth-grade instruction, including Arizona, Colorado, Iowa, Minnesota, Missouri, Nebraska, Oregon, and Washington. We opted to evaluate PK-8 schools because these facilities offer a more controlled and consistent operational environment for study. We also selected schools that were third-party certified or align with criteria for certification as sustainable buildings, and were in operation for at least 12 months.

The findings show that the green schools we studied are more energy efficient, provide more space per student, and are constructed for less cost when compared to regional averages for schools constructed during the same time frame. The overwhelming perception of school staff is that the learning environments within these schools have a positive impact on health, achievement, and behavior.

Energy reduction

The IBE team used a variety of energy usage tools and programs to evaluate energy consumption at each school, including ENERGY STAR, Target Finder, and Architecture 2030. A full calendar year of utility data was provided by school representatives.

The overall ENERGY STAR score was 81, which means they were operating better than 81 percent of similar buildings nationwide. Also, the study determined that eight of the 12 schools met or exceeded current Architecture 2030 targets.

Energy savings through design can be accomplished in many ways. We use research and computer simulations to help reduce the need for energy consumption. We then strategically apply technology,

> Design does not stop when the school opens. The design process must include traveling back to a project to measure building performance.

like ground source heat pumps and photovoltaic solar panels, to help achieve our design and performance goals.

Green doesn't have to cost more

To evaluate the value of green design, the project cost for each school was compared to regional costs for schools constructed in the same year using the "Annual School Construction Report" published by the Peter Li Education Group.

On average, the schools in the study were constructed at a 6 percent cost savings over regional averages. The buildings also had, on average, an additional 26 square feet per student, or 14 percent more space per student for instruction, compared to the regional mean. These findings show that there does not need to be a cost premium in order to design and build a green school.

"We know that green design processes, materials, and building systems are only a portion of the factors influencing cost," says Stephanie Barr, lead researcher for IBE. "In order to understand the impact of green building practices on cost, a more detailed analysis of all factors is needed. However, our analysis shows that green building practices do not have to equate to higher project costs."

Green construction does not have to cost more than traditional building construction. The secret sauce is challenging every design decision to focus on how money is spent. For most projects, the construction budget is the budget—there is no more money. In green construction, energy efficiency and sustainability are often the primary goals that impact the use of budget dollars. As the design team formulates the project, ingredients that don't contribute to the goals are simply left out of the project.

For instance, floor tile is a common ingredient in school construction. The fact is, though, that floor tile does not contribute to energy or sustainability goals. As a result, money that would normally be used for floor tile is used in a different way to advance the goals of the project and a less-expensive flooring system is applied.

Comfort increases

To gauge the impact of green school design on occupants, teachers and administrative staff were surveyed using an online questionnaire.

Eighty-seven percent of respondents reported that they perceived a positive impact on student health. Seventy-one percent of respondents perceived that the building has a positive effect on student achievement, and 71 percent also perceived a positive effect on student behavior. On a personal level, 85 percent of respondents reported that their health and productivity were positively affected by the building.

As designers, we experience a variety of learning environments while visiting schools across the country. Ask any of our designers or educational planners and they will tell you that green schools provide a superior learning environment. They have more light. They are more inviting and healthier. While we need more research,

these responses validate what we experience when we are in a green school.

We have found that some elements used by our design teams have an immediate impact on occupant health, including HVAC systems that create desirable indoor temperatures, humidity, and carbon dioxide levels.

The selection of building materials, such as carpet and wall coverings, contributes to the quality of the indoor environment. Plus, the use of shapes and colors in the interior palette promote a positive learning environment that impacts student achievement.

Technology, including sound reinforcement, lighting controls, and instructional devices, also creates a healthier, more sustainable environment for students.

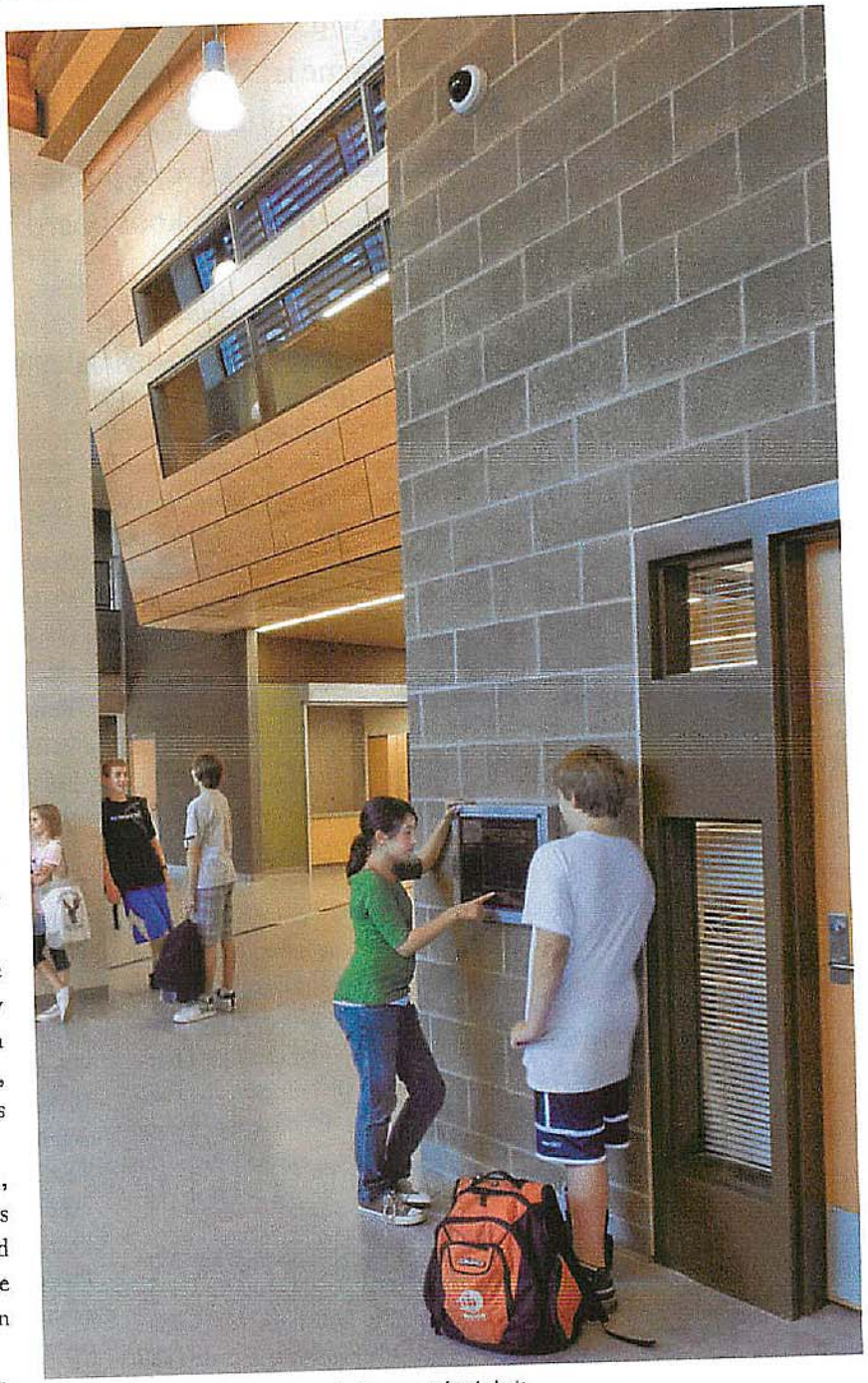
Evaluation is critical

The most important lesson we learned through this process was that design does not stop when the school opens. The design process must include traveling back to a project to measure building performance.

Evaluating the actual performance of a school post-construction is the only way to determine if the intended design actually has been delivered to the client, and in school design the ultimate client is the community.

Without post-occupancy evaluation, it is impossible to know if a building is performing – both operationally and programmatically – as designed and if the public is in fact receiving a valuable return on its investment.

The full report can be found at *www.dlrgroup.com*.



Green design means more light and more inviting spaces for students.

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