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JULY 2019

## Facilities Upgrade and Retrofit Guide



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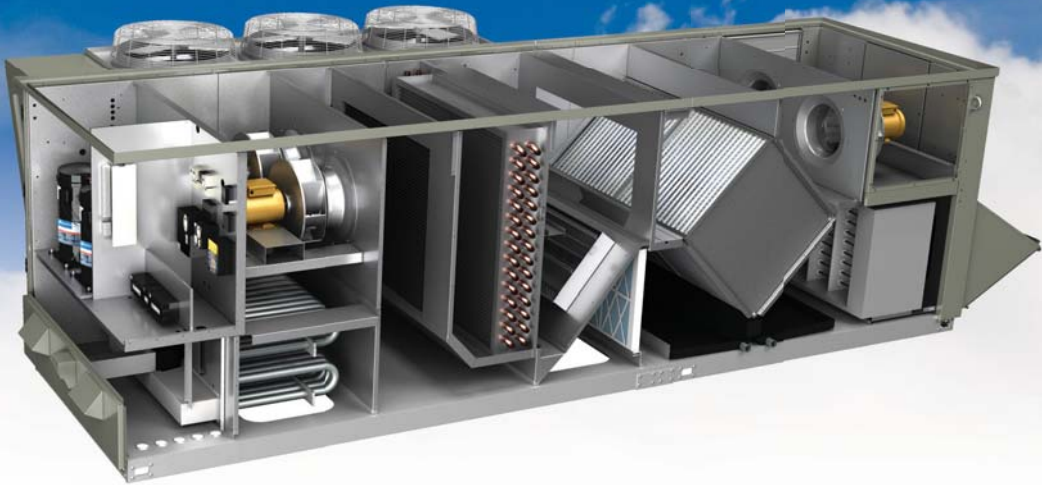
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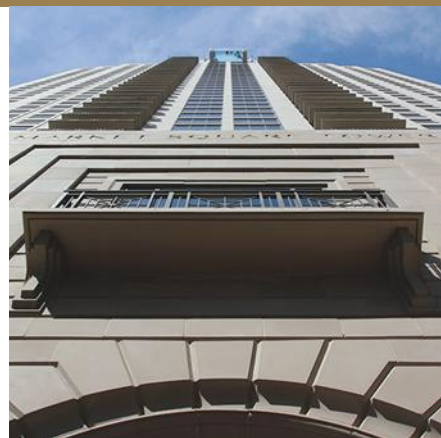
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# PROBLEMS IN PROVIDENCE

Poor facility conditions contribute to deep-seated dysfunction in the city's school system

**E**VERY year, *American School & University* devotes two of its magazine issues to highlighting the best in new and updated education facilities. In those two architectural competitions, AS&U brings attention to exemplary building designs, with the hope that those projects inspire other schools and universities to pursue facility improvements that enhance learning.

But when we celebrate the impressive new education facilities that provide cutting-edge learning environments for students, what's left unsaid is that there are thousands of schools across the nation with facilities that don't measure up to those standards.

At worst, students are attending classes in spaces that are unsanitary, unsafe and unsuitable for learning.

The latest reminder of that came in June when a report on the Providence (R.I.) school system concluded that the district is riddled with

dysfunction and is failing to provide a quality education to its 24,000 students. The review, commissioned by the Rhode Island Department of Education and conducted by the Johns Hopkins University Institute for Education Policy, paints what Rhode Island Gov. Gina Raimondo calls a "devastating" portrait of conditions that prevent students from succeeding academically.

The report cites many issues that have contributed to the district's problems, but the dreadful conditions found in many of the 12 schools visited by the review team were a prominent factor.

"In some cases, facilities clearly disrupted learning and possibly students' health," the report says.

The physical condition of schools varied considerably, the report noted, but "the worst reduced seasoned members of the review team to tears."

Among the conditions cited:



MIKE KENNEDY

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crumbling floors, bathroom stalls without locks, brown water coming out of faucets, lead-contaminated water, ceiling paint peeling off in sheets, exposed asbestos, a leaking raw sewer pipe that dripped on passing students, rodent infestation, students with sticky mouse traps stuck to their shoes, and classrooms where some students had to sit on the floor because there weren't enough chairs.

City and state officials vowed to use the grim findings in the report as a springboard for improving the school system.

"This report calls on all of us to step up and to channel our collective outrage into action," Raimondo said.

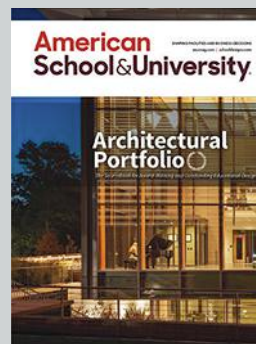
She has directed Rhode Island Education Commissioner Angélica Infante-Green to develop recommendations for addressing the problems in Providence. ■

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**HAVE** an exceptional project that deserves recognition? American School & University is still accepting entries for Architectural Portfolio 2019. Contact Molly Roudebush at [mroudebush@asumag.com](mailto:mroudebush@asumag.com) or 913.967.1959 for information about reserving a spot for your project. Judging starts in late August.

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## DEVOS SUED AGAIN OVER STALLED LOAN FORGIVENESS PROGRAM

Defrauded former students who attended for-profit colleges have filed a class-action lawsuit to force the U.S. Department of Education and Secretary Betsy DeVos to follow existing law and provide the students with debt relief.

The Project on Predatory Lending says it filed the suit in San Francisco on behalf of more than 158,000 former students who have sought debt relief through the government's loan cancellation program.

The suit argues that the education department has abdicated its responsibility by refusing to adjudicate the claims of defrauded students.

"The Department has intentionally adopted a policy of inaction and obfuscation," the lawsuit contends.

For more, visit <http://bit.ly/Devos-sued-again>

## STATES WITH THE LARGEST HIGHER EDUCATION ENROLLMENT, SPRING 2019

California, the nation's most populous state, also is the state with the most students enrolled in its higher-education institutions.

Figures from the National Student Clearinghouse Research Center show that 2,341,696 students were enrolled in California colleges in the spring 2019 semester. Texas and New York reported college enrollment figures that exceeded 1 million.

Overall, the 10 states with the highest spring 2019 enrollments accounted for more than 8.8 million students—more than half of the nationwide spring 2019 enrollment of 17.5 million.

For the states with the most college students in spring 2019, visit <http://bit.ly/2019-college-enrollment>

## FORCED BY ARCHBISHOP, INDIANAPOLIS CATHOLIC SCHOOL FIRES GAY TEACHER



Just days after the Archdiocese of Indianapolis cut ties with one Catholic high school over its refusal to fire a gay teacher, another school in the archdiocese fired one of its educators to avoid the same fate.

The Indianapolis Star reports that Cathedral High School says it is terminating a gay teacher in order to avoid a split with the archdiocese.

Another Catholic high school in Indianapolis, Brebeuf Jesuit Preparatory School, rebuffed the archdiocese and refused to fire one of its teachers who is gay. The archdiocese announced last week that it has cut ties with Brebeuf.

Cathedral's board Chairman Matt Cohoat and President Rob Bridges posted a letter on the school's website announcing the decision to "separate" from a teacher in a public same-sex marriage. The letter is addressed to the "Cathedral family."

For more, visit <http://bit.ly/Indy-school-fires-gay-teacher>

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## SUB-STANDARDS

**T**OUGHER standards for school bus drivers and a fire suppression system could have prevented the deaths in a 2017 school bus fire in western Iowa, federal safety investigators say.

The Des Moines Register reports that National Transportation Safety Board (NTSB) concluded that the Riverside Community School District failed to ensure that the driver was medically fit before the crash, which killed two in December 2017.

"We've got to send the message that by God if you're a school district you have a responsibility to make sure that you're providing the oversight that those kids deserve," says NTSB Chairman Robert Sumwalt.

The 74-year-old bus driver, Donald Hendricks, who died in the fire along with his 16-year-old passenger Megan Klindt, had mobility difficulties that limited his ability to evacuate the bus. Hendricks used a walker and had back surgery scheduled the week of the fire.

Klindt's family has a wrongful death lawsuit pending against the school district.

District Superintendent Tim Mitchell says the district cooperated with the NTSB investigation and is working to ensure that its bus transportation is safe.

The bus became stuck after Hendricks backed out of Klindt's rural driveway and the bus's right rear wheels dropped into a 3-foot-deep ditch.

Investigators say the fire likely started in the bus's turbocharger, which overheated after the bus's rear tires became stuck in a drainage ditch with the exhaust blocked and Hendricks revved the engine in an effort to free the vehicle.

Having a fire suppression system could have provided more time to evacuate, the NTSB says. The federal requirements for school bus fire safety haven't been updated since 1971.

## BUS APPETIT

**T**HE Denton (Texas) school district has converted one of its old school buses into a food truck that will peddle its wares at area events.

WFAA-TV reports that the Bus Stop Bistro was unveiled at last week's school board meeting.

The food truck is the brainchild of Tonhya Tivis, culinary arts instructor at the Lagrone Advanced Technology Complex in Denton, and Marcus Bourland, the school's principal.

"This was an opportunity to do something super innovative," Bourland says.

The goal is to give students a taste of the real world. Culinary students are preparing the food that is served on the bus, and students in architec-

ture, automotive, engineering and welding programs used their skills to transform the school bus into a rolling restaurant.

"So it was really the whole school coming together to develop something," Bourland says.

The students plan to serve their food all over the district and at festivals throughout the North Texas area. District leaders hope the bistro will inspire other students to get involved and jump start a potential career.

"To see them light up when they see it, that's exactly what we wanted," Bourland said. "Exactly what we wanted."

## TRAIN TRAGEDY

**T**HE man driving an Athens (Texas) school district bus involved in a crash that killed a middle school student has been indicted on charges of criminally negligent homicide and injury to a child.

CBS DFW reports that John Stevens, 78, of Mabank, has been released on \$10,000 bond.

The crash occurred on Jan. 25 at about 4:30 p.m. when the bus stopped before crossing the railroad tracks at Cream Level Road in Athens.

After the bus started to move forward, the train hit the left side of the bus, pushing the bus toward the next

crossing. The bus hit signs and a railroad gate before the train and bus came to a rest near the North Murchison Street crossing.

Besides Stevens, two students were on the bus at the time of the crash. Christopher Bonilla, 13, a middle school student, was ejected from the bus and pronounced dead at the scene. Joselyne Torres, 9, an elementary school student, sustained serious injuries.

Stevens was taken to a local hospital, treated for his injuries and released the same day. ■



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## FLORIDA FIXER-UPPERS

**M**ANY preservation-minded residents of Jacksonville, Fla., worry about the fate of the city's historically significant buildings.

The Florida Times-Union reports some concern and a measure of relief among preservation advocates looking at the Duval County school board's master plan to spend \$1.9 billion to address aging school facilities.

Some schools with architectural significance will see millions of dollars of upgrades. But the plan also calls for some older schools to be torn down and consolidated, and others to be torn down and replaced.

Preservationists got a big win when Kirby-Smith Middle School, built in 1923, was recently taken off a list of schools to be demolished. It's now slated to get more than \$46 million to modernize the school.

Loretto Elementary School, 76 years old, also was given a reprieve and will be modernized.

"Schools become a focal point of their neighborhood, both for activities for children and for other civic events," says Wayne Wood, a preservationist and author of "Jacksonville's Architectural Heritage." "And those schools built prior to the 1930s, almost all of them had the best architects of the time doing the designing. They are the architectural anchors of a neighborhood."

Tracy Pierce, a school district spokesman, says the district will work with the city's Historic Preservation Commission as it rebuild schools.

"As educators, we love the character and charm of old school buildings as much as anyone," he says. "An old school building speaks to the history of public education's contributions to the strength of our community and our nation. Today, we have to prepare students for the present and the future. We have to do that with highly limited funding, and those realities underlie decision making."

A consultant's study that helped guide the proposed plan found that 56 schools were in poor or very poor condition. The cost of bringing them up to modern standards would be too high, compared with just building new facilities, the study said.

The district says that many older schools are small, with low student enrollment, and it makes more financial sense to consolidate them with another school. Increasing concerns about student safety is another driving factor in favor of newer designs.

The master plan does provide good news for some older schools. Andrew Jackson High School would get \$30.8 million in modernization if the plan goes through. It was built in the late 1920s, and along with Robert E. Lee is the city's oldest high school building



**Loretto Elementary School.** Photo courtesy Duval County Schools.



**Kirby Smith Middle School.** Photo courtesy Duval County Schools.

still in use as a school.

Lee was updated a few years ago, mixing modern elements with its historic character.

Ennis Davis, an urban planner, preservationist and historian, argues that demolishing the city's dwindling number of historic buildings, schools included, should be a "last-case scenario." Instead, renovation, mixing the old with new, should be seriously considered for all of the district's historic schools — especially in areas that don't have much political clout.

The city's minority and inner-city areas have, for several decades, been more susceptible to losing older buildings, he said. Older schools such as Henry F. Kite and Annie R. Morgan, both scheduled for demolition, are just as important to residents in those neighborhoods as schools are to residents in more prosperous areas, Davis said.

If buildings can't be saved, though, adaptive reuse of the old buildings should be priority, he said. ■

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The historic David W. Dyer Federal Building and U.S. Courthouse in Miami will house Miami Dade College's School of Design, Engineering and Technology.  
**Photo: National Archives**

# Built to Last

*Reimagining historic buildings for modern educational uses.*

**BY ANDREW GRAHAM, JOSEPH BOWER, AND GABRIEL JAROSLAVSKY**

**H**ISTORIC buildings present a dilemma to schools and universities. On one hand, they are valuable pieces of cultural heritage that showcase a commitment to education. On the other hand, they are often in some state of disrepair, with layouts ill-suited to modern teaching and learning styles. Transforming a historic building to meet modern educational uses requires extensive planning, a more flexible design process, and a unique sensitivity to historic detail.

**BUILDINGS WITH BAGGAGE**

Education facilities today have distinct functional needs. To support contemporary pedagogies, they must be high-tech and flexible, and offer large amounts of unprogrammed space to promote opportunistic learning. Meeting these needs in a context of a historic building is challenging. Rooms may be irregularly shaped, have shorter floor-to-floor heights and outdated mechanical and electrical systems. Hidden inside may be

decades of damage, accessibility violations, and fire and life safety code issues. Any documentation for the facilities may be lost, inaccurate, or skewed by shift-



(Before) The inner courtyard of Dyer courthouse will be enclosed and transformed into event space for students in Miami Dade College's School of Design, Engineering and Technology. **Photo: LEO A DALY**



ing foundations. Meanwhile, the buildings are often protected by preservation standards that can limit changes and frustrate efforts to uncover hidden issues.

### DEVELOPING A BUILDING MASTER PLAN

Step one of adapting a historic building is to develop a master plan that outlines the big-picture goals. Clear project objectives help organize the priorities of the project. Categorizing issues, such as outdated building systems and hidden damage, helps minimize their inherent risks. Prioritizing helps planners meet their project goals by balancing necessities against nice-to-haves.

The Corcoran Gallery of Art is one of Washington, D.C.'s most beloved cultural institutions. In 2014, George Washington University agreed to absorb the Corcoran School of the Arts & Design, and with it, the 1897 Beaux-Arts building that had been its home for more than a century. The gallery hadn't seen a major renovation in 90 years. LEO A DALY was commissioned to transform the facility, originally designed by Ernest Flagg, into a state-of-the-art education building.

Developing a master plan helped focus the goals of the project while taking into consideration budget constraints, code requirements, and construction



Narrow corridors with vaulted ceilings posed planning challenges in the adaptive reuse of Dyer courthouse. **Rendering: LEO A DALY**

schedule. The university was excited about restoring the exterior façade, but decided that providing code-compliant space was the top priority.

Executing the master plan began with a detailed study of the building's condition. Decades of piecemeal renovations had left the building's systems a redundant

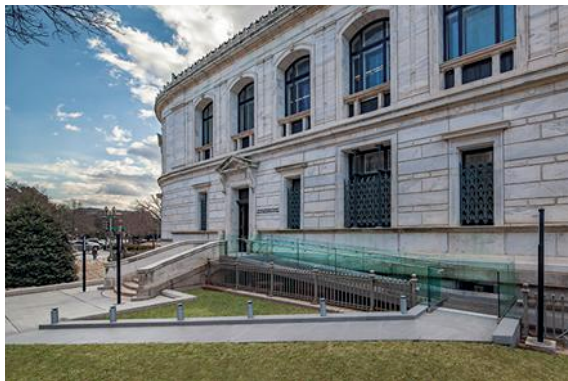
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photo: Joseph Romeo



Accessibility improvements at George Washington University's Corcoran School of the Arts & Design blend seamlessly with historic architecture.

**Photo: Ron Blunt Architectural Photography**



Landmarked galleries of the Corcoran School of the Arts & Design were outfitted with learning spaces designed to be reversible, per historic preservation guidelines.

**Photo: Ron Blunt Architectural Photography**



Flexible learning spaces enable 21st Century pedagogy at George Washington University's Corcoran School of the Arts & Design. **Photo: Ron Blunt Architectural Photography**

maze, and its original documentation had been mostly lost to the ages. To complicate the plan, the Corcoran's landmark status limited potential design solu-

tions. A variety of reality-capture technologies—laser scanning, pipe cameras, hygrothermal wall analysis, and ground penetrating radar—were used to create a realistic 3D model of the building. This information helped undergird detailed design solutions that limited and preserved the historic fabric.

## REVERSIBLE CHANGE

Another challenge of the Corcoran was transforming its landmarked interior galleries into modern learning spaces, while honoring the historic preservation committee's requirement that any intervention be reversible.

Flagg's original design intent for the Corcoran was for large, epic works to be viewed from a distance under natural light. The galleries are soaring spaces with ornamental plaster detailing all around and frosted lay lights overhead. The floor plan unfolds in sequence with no circulation corridor. The challenge was to carve these monumental galleries into human-scaled learning spaces that comply with modern building codes without making any permanent change to the historic fabric.

The learning spaces were treated as sculptural installations—temporary, visually compelling, and appropriately scaled. Rather than classrooms, they are objects within the gallery, with a porous border between in and out. Their walls stop short of the ceiling, enabling their tops to remain open and receive natural light. To reduce ambient noise, louver-like clouds are suspended. Hanging quad boxes provide power to students and promote flexibility. The zone between the inserted rooms and the existing room's perimeter forms corridors for natural circulation.

Interiors are seldom landmarked, but when they are, the restrictions to adaptive reuse are challenging. Navigating them requires close collaboration with historic preservation committees and precise design detail.

## FINDING OPEN SPACE

Historic non-education buildings often lack basic programmatic elements necessary for 21st-century school environments. A common challenge is finding a flexible, open space that can serve a variety of functions, including events, pre-function, and spontaneous collaboration among students.

The David W. Dyer Federal Building and U.S. Courthouse in Miami is being renovated to house Miami Dade College's School of Design, Engineering and Technology. Built in 1931 to house federal agencies, the Mediterranean-Revival courthouse is composed mainly of narrow, out-of-proportion rooms. Its corridors, which feature vaulted ceilings, are protected,

placing a hard limit on the size of spaces. Miami Dade College's program calls for a conference center where students can gather and take advantage of networking events.

With those restrictions in mind, planners created an event space by combining several smaller rooms and enclosing the building's inner brick courtyard – a garden-like outdoor space in the center of the building. The enclosed courtyard functions as a casual gathering space, event space and pre-function space for the conference center. The addition of a skylight will enhance use of the courtyard by providing an open, air-conditioned space for a range of activities.

### CREATING A SENSE OF PLACE

As a campus expands, newly acquired buildings can pose an image problem. Universities want their campuses to create a strong sense of place through a coherent architectural vernacular. Planners must take care to integrate existing buildings into the campus fold.

Winona State University in Winona, Minn., recently annexed a two-block area just off campus to house its growing college of education. LEO A DALY adapted three former K-12 buildings, one of them historic, into Education Village, a micro-campus for teacher training. The buildings needed a cohesive identity that would connect back to the main campus.

Local materials form the basis for Education Village's identity. Chiseled Winona limestone was used in additions to each of the buildings, reflecting the iconic bluffs overlooking the city. The additions instantly identify the mini-campus as part of the university.

In an increasingly competitive higher-education marketplace,



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Limestone-clad additions to existing k-12 school buildings create a strong sense of place for Education Village at Winona State University. **Rendering: LEO A DALY**

a strong sense of place connects facilities to a university's brand, attracting students who want to be part of something special.

### LETTING HISTORY TEACH

Winona State was founded in 1858 as Winona State Normal School (or, teacher's college) and was the first tax-supported school west of the Mississippi River. Education Village offered a unique opportunity to use the buildings' history to teach, connecting students to the university's roots.

Education Village is designed to give prospective teachers experience with the challenges they are likely to face as educators. That means creating a spectrum of learning environments, ranging from no-tech classrooms to cutting-edge technology-enabled STEM-themed areas and makerspaces. On the no-tech end of that spectrum, Cathedral Elementary, a Catholic school built in 1929 and the oldest of the existing three buildings in Education Village, provided an opportunity to challenge students in novel ways.

A study of Winona State education grads found that young teachers often are challenged by outdated classrooms. To respond to this situation, the university established a historic classroom in Cathedral Elementary that will be fully preserved. Slate blackboards will

teach chalk writing. An attached coat room will tax the students' situational awareness. Historic wood flooring will test how they cope under increased noise and glare conditions.

Projects like Education Village show how seemingly anachronistic features of a historic building can be leveraged as pedagogical assets.

### BUILDING GOOD WILL

One more feature of Education Village is the increased good will the university has earned for rehabilitating three beloved buildings.

Relations between universities and their home communities are sometimes strained. Traffic woes, parking battles, and rental housing are frequent sore spots. It may have been cheaper and more convenient for Education Village to be built as a ground-up project. But by preserving these buildings, Winona State also saved the stories, memories, and values of a community. Gestures like this resonate for years to come. ■

#### BIO

**GRAHAM**, AIA, NCARB; **BOWER**, AIA; and **JAROSLAVSKY**, LEED AP, NCARB are architects with LEO A DALY specializing in the planning and design of higher-educational facilities. They can be reached at [AJGraham@leoadaly.com](mailto:AJGraham@leoadaly.com), [JTBower@leoadaly.com](mailto:JTBower@leoadaly.com), and [GMJaroslavsky@leoadaly.com](mailto:GMJaroslavsky@leoadaly.com). **Ignacio Reyes**, AIA, NCARB, LEED AP; **Michael Bjornberg**, FAIA; and **Cindy McCleary**, AIA, NCARB also contributed to this article.

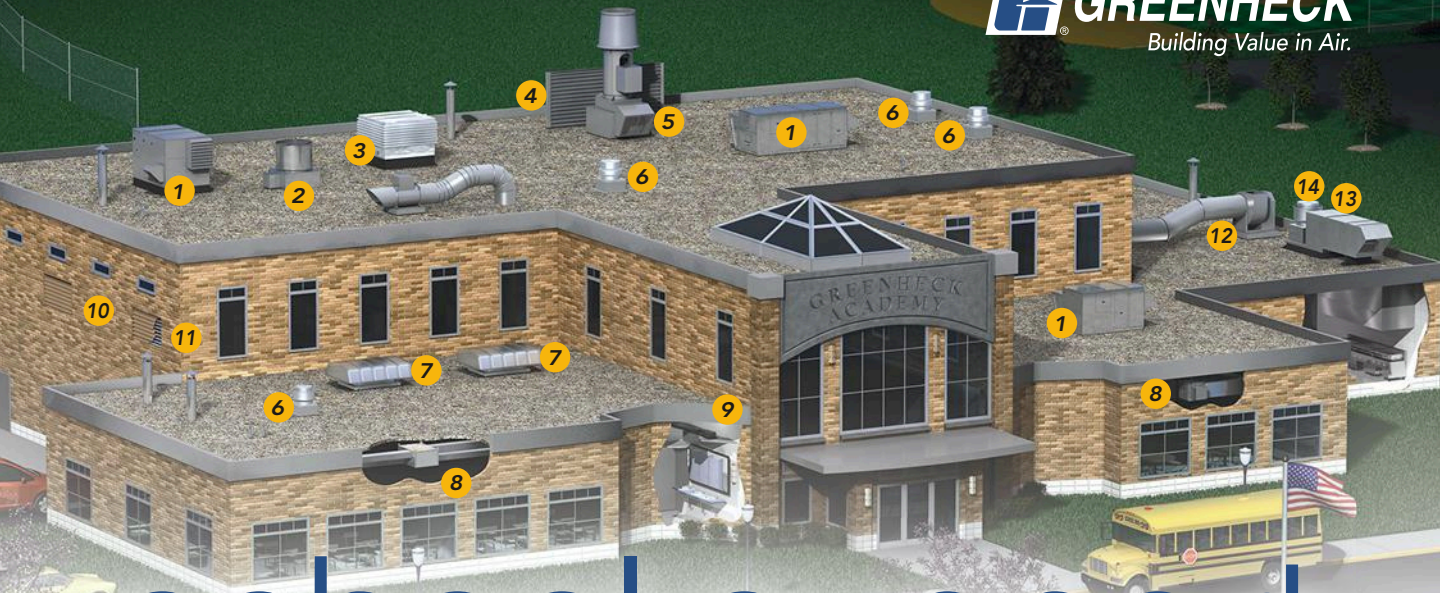


LEO A DALY recently completed phase one of George Washington University's Corcoran School of the Arts & Design, transforming the 1897 Ernest Flagg-designed gallery into a state-of-the-art home for arts education.

**Photo: Carol M. Highsmith**

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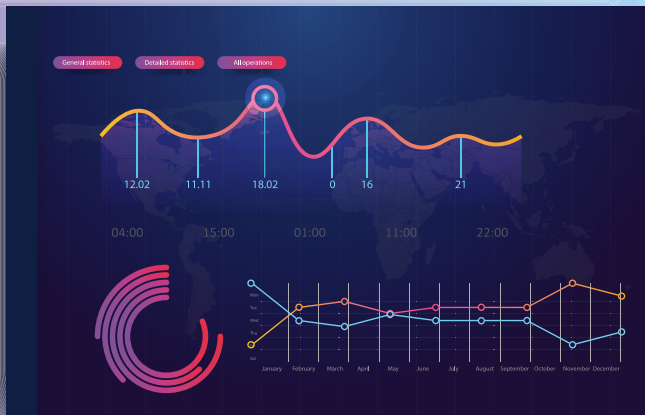
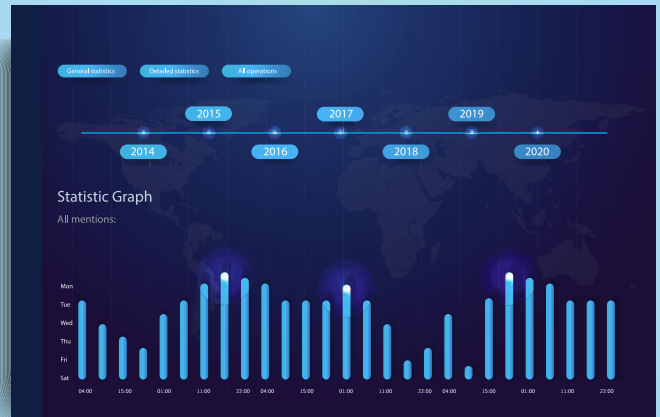
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# Model Behavior

*Why energy modeling is an integral part of the design process.*

BY SEAN ELLISTON

**E**NERGY modeling software has improved continually since it was first developed more than 30 years ago. As building mechanical and electrical systems become more complex, teams can better analyze them by creating energy model simulations. Energy modeling simulates building operation and produces useful performance data to evaluate design decisions.

Energy modeling has been gaining a stronger presence in building design. An energy model is most recognizably associated with a LEED certification or building energy compliance following the performance pathway under IECC and ASHRAE, but there is a growing need to integrate energy modeling into every project's workflow. In the past decade, development of net-zero commercial buildings has surged, and alongside every design is energy modeling. Net-zero buildings are driving the industry forward to a higher standard.

Education facilities—K-12 schools, higher educa-

tion and general education—make up 37 percent of emerging or verified net-zero buildings in the United States and Canada, according to Getting to Zero: 2018 Getting to Zero Status Update and List of Zero Energy Projects. K-12 schools make up 50 percent of education facilities. Because K-12 schools serve as a lasting part of a community, they need to be designed to benefit existing and future generations. Whether or not the design target is net-zero, energy modeling can play a role in getting a project to the next level. Modeling helps identify aspects in a design to reduce energy consumption and determine which design options are the best fit.

## THE BENEFITS OF ENERGY MODELING

Three key benefits of energy modeling are holistic representation, energy performance prediction and quantifiable results.

Holistic representation looks at the building as a whole. Design alteration affects energy performance. Sometimes this result is more obvious than others.

Understanding some interactions may be tricky, but energy modeling overcomes this challenge by incorporating design features and simulating all compounding interactions together. This enables teams to better understand the interactions and carry out lessons learned when pursuing future projects.

Energy performance prediction is beneficial before constructing a new building. Gauging energy performance enables a design team to avoid complications once a project is complete. As technology advances, design teams are more capable of incorporating new technologies into a model to fully predict whether energy performance increases or decreases. This eliminates guesswork and hesitation when taking on a new project. Additionally, energy performance prediction is critical for net-zero design because estimated annual energy consumption is needed to size the on-site renewable energy system. There are also more design options available with a higher level of control strategies. Using energy modeling ensures a team is on the right path for optimum energy efficiency.

Understanding the impact of results ultimately leads to better decision-making. Whether energy performance increases or decreases is only half the story.



An example of lighting reduction through daylighting at Klein Cain High School in Houston.

Photo by Luis Ayala, courtesy of PBK.

The other part is knowing how energy consumption changes with various conservation measures. That information is needed to make informed decisions. Quantifiable results enable various design alternatives to be measured for comparison and see how they will

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## SOLAR SCHOLARS



The solar array at Maize High School. Photo courtesy Stan Bergkamp (via Twitter).

A high school in the suburbs of Wichita, Kan., has activated a solar power system capable of producing enough energy in one day to power the school for a month.

The Wichita Eagle reports that the 240-kilowatt system at Maize High School in Maize, Kan., consists of 720 solar panels and is the largest privately-owned system in Kansas. Stan Bergkamp, a physics and chemistry teacher and the instigator of the project, says the system is 400 feet long and 75 wide and stands in an empty field adjacent to the high school.

Bergkamp says the threat of climate change is one of the driving forces for pursuing the project.

"I couldn't talk to my chemistry classes about the acidification of the oceans or the bleaching of the coral reefs and personally not do something," he says.

Once the system is paid for, it will save the school \$3,200 a month, and more than \$30,000 a year, as well as reduce annual carbon emissions by 240 tons, according to Bergkamp's calculations.

In 2017, Bergkamp presented his plan to the school board. He wanted to use renewable solar energy to create enough electricity to power Maize High School. He has since raised more than \$160,000 of the \$400,000 needed, and financed the remaining funds through ICM Inc., an ethanol plant in Colwich, Kan.

The Maize school board supported the project, as did Bergkamp's students.

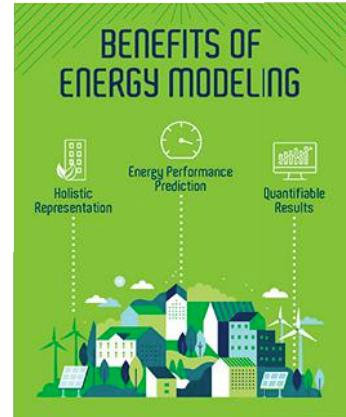
"Without doubt the strongest supporters I have are the students that I have, and kids I've taught," Bergkamp says. "What I underestimated when I started the project was the emotional impact it would have on my students and how proud they are to be a part of it."

ICM Inc. bought the \$400,000 system and will lease it to Maize High School for six years, with an agreement to pay \$2,000 a month until it is paid off.

Bergkamp said they chose to finance the project through ICM because the company could receive a 30 percent tax credit on the infrastructure, and the school district could not.

Once the system is paid off, the plan is to do the same for Maize South High School and surrounding schools.

"The short-term goal would be to have every building in the district to have some type of solar energy to supplement their energies," Bergkamp says. "The long-term goal is to use this as a model that other districts can use." ■



Courtesy of PBK.

affect a building's energy performance. Once the amount is identified, planners can direct their focus to design strategies with the highest energy cost savings.

Some design strategies vary depending on building location, type and construction budget. Energy modeling creates an opportunity to explore and discover what fits for specific projects. This ultimately empowers design teams to make more educated decisions, including design factors such as return on investment.

### STARTING THE PROCESS

Several resources are available to guide design strategies for reducing building energy usage. The Advanced Energy Design Guide for K-12 School Buildings – Achieving Zero Energy has an entire chapter with a list of strategies to guide a building toward reaching net-zero. Even if a project's goal is not net-zero, these strategies help reduce energy consumption.

There is no perfect energy model. Many variables go into an energy model, and unfortunately, some of these variables have the possibility of misaligning with a building's actual utilization. The energy model is dependent on





Solar panels promoting sustainability at Dickinson (Texas) ISD, Educational Support Center.  
**Photo by Jud Haggard, courtesy of PBK.**

assumptions, human input, estimated occupancy and building behavior. Assumptions and behavior discrepancies always persist. The trends and comparisons observed in the energy model results may contain inherent deviation from

actual construction, but still convey valuable insight. In the end, energy modeling is a valuable tool compared with the alternative of rudimentary hand calculations and intuition alone. Producing an accurate energy model requires extensive skill and experience.

The education building environment we create today builds the foundation that future generations will know and rely on for the sustainability of all building design. The level of design to deliver this reality comes hand in hand with energy modeling.

Energy modeling is the heart of the energy modeling software package, but there are additional features to some software packages to evaluate the indoor environmental quality. These include the ability to account for ambient daylight quality, quality views and thermal comfort control for a complete building performance simulation.

The net result is an environment that occupants enjoy and a system that is smart about the energy needed to operate the environment. Whether a design team's next project applies a single design strategy resulting in moderate improvement or applies a handful of design strategies that take the project all the way to net-zero, both building designs are moving forward.

One day all educational buildings will reach, then surpass the threshold of net-zero. It all starts with a single step. What is your team's next step toward a better building environment? ■

#### BIO

**ELLISTON, P.E.**, is director of sustainability of LEAF Engineers, a PBK Company. He runs energy modeling analyses to reduce energy consumption, optimize system selection and operation and incorporate sustainable design. He can be reached at 713-940-3300 or Sean.Elliston@LEAFengineers.com.

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# Time for a Facelift?



St. Mary's Hall at Boston College.  
All photos courtesy DiMella Shaffer.

*Understanding how campus architecture can affect your bottom line.*

BY ED HODGES

**I**T is no secret that campus visits are an important factor for students deciding where to attend college. Prospective students make up their minds very quickly, so capitalizing on first impressions is critical for higher-education institutions.

A 2016 study, “Beyond The Campus Tour: College Choice and the Campus Visit,” by Justine Rebecca Okerson (William & Mary ScholarWorks), said that campus visits were influential in the college choice process because they “allowed students to react to the aesthetics of the campus and evaluate the community firsthand.” The general “feel” of a campus relies on not only the student population, but also the architecture and landscape.

With only a small window of opportunity to connect with students on campus during the application process, higher-education institutions must consider improvements that will have the greatest effect. Although new construction is typically the first solution that comes to mind, it’s not always the most sustain-

able or budget-friendly. In fact, many campuses have seen a decrease in new construction and an increase in deferred maintenance projects and reconfigurations of existing facilities. But how do you determine the right approach for your school?

## ASSESSING YOUR CAMPUS

Surveying your campus is a valuable exercise, but what is crucial is understanding how prospective students perceive the identity of your campus.

This refers to not only the reputation of the culture and academics, but also the overall campus aesthetic. For example, when one thinks about a school such as Princeton University, gothic stone buildings with vaulted ceilings come to mind; Harvard University is easily identified by its Neo-Georgian, brick campus; the University of Virginia’s Neoclassical architecture of the lawn leaves an impression even after you are gone from campus. Schools that have an identifiable architectural style must be mindful of how construc-

tion and renovations will affect campus identity as they look to update facilities.

To determine the perception of a campus, consider several elements of the institution: Does the student body consist of commuters or out-of-staters? What are the aesthetic or common features of campus buildings and facilities? What's the general atmosphere on campus? Other questions of value might be: What is the campus identity now? What would you like the campus to be 20 years from now?

For example, at Northeastern University in Boston, the successful transition from a commuter school to a residential college over the last two decades involved the construction of residence halls, student centers, landscaped quads and other improvements to attract students to campus. Identifying the gaps in the perception of prospective students can help prioritize plans for capital improvement.

For most campus facilities, there are key improvements that can better support a modern learning environment. Here are several ways to maximize smaller changes:

### 1) Break Traditional Rules

The line separating student centers and libraries



Graduate housing at Harvard University.

is fading, as more schools begin to fuse these social and study locales. Food service has traditionally not been welcomed in library facilities, but there has been a shift toward rolling study and social areas into one. Librarians are welcoming coffee and

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The general “feel” of a campus relies on not only the student population, but also the architecture and landscape (St. Mary’s Hall at Boston College).

light food service into their facilities, and student centers are getting study and collaborative spaces to complement dining and club activities. Design that supports multiple functions of a single space can help make the most out of limited real estate.

## 2) Make Campuses Greener

Making investments in landscaping can be a cost-effective way to update a campus. At Furman University in Greenville S.C., elements such as its Asia Garden help the campus stand out for the beauty of its natural and cultivated landscape as much as its buildings. The same can be said for the campuses of College of the Holy Cross in Worcester, Mass., and Wake Forest University in Winston-Salem, N.C. The transformation of former commuter lots into landscaped quads for residents changed the perception of the Northeastern University campus and has led to a large increase in freshman applications.

## 3) Shift to Sustainability

By focusing on the sustainability of campus buildings, physical, functional and financial burdens are reduced. As of 2015, buildings account for about 40% of global energy-related carbon dioxide emissions, according to the United Nations’ 2017

Global Status Report. Schools are making an investment in their future by improving sustainability and increasing the number of sustainable facilities. This also generates opportunities for utility rebates and government incentives and as long-term stewards of the institution the life-cycle costs of energy-efficient upgrades lead to long-term savings.

By updating a campus to better serve and support the existing student population, universities increase students’ connections to the school and in turn, the likelihood for their advocacy to prospective or incoming students. These connections translate into alumni affinity and may increase future giving. Capital improvements also help to round out the impression of a school. It gives prospective students a cohesive, tangible picture of what life on a campus is like, and generates a desire to become a participant in that campus culture.

## SENTIMENTAL APPEAL

On campuses worldwide, students and faculty alike develop a considerable sentimental attachment to certain physical elements or icons.

Many schools have noticed students’ attraction to consistent campus architecture, such as the uses of Beaux-Arts architecture of University of North Carolina at Chapel Hill or the Spanish Renaissance style of the University of San Diego. Competition for students

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Graduate housing at Harvard University.

has driven schools to update their facilities—a comprehensive renovation of the residential colleges at Yale has led to a similar 10-year renewal project of the house system at Harvard.

The “beauty” of a college campus and whether or not it “looks like a college” has an enormous effect on high school students as they tour schools, according to Okerson. This image will resonate most with existing students and help attract new ones. Creating a cohesive environment of architecture and landscape appropri-

ate to the locale and culture should be an important element of a university’s capital improvement efforts. The investment will provide a return in the quality of life of students and faculty, and in enrollment rates and alumni endowments. ■

**BIO**

**HODGES** is Principal & CEO for DiMella Shaffer. He has more than 35 years of architectural experience encompassing a broad range of projects that focus on academic design. He can be reached at ehodges@dimellashaffer.com.

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## Q&A with Jane Smith

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# PLANNING WITH PIXELS

School design using digital media technologies.

**T**HE use of digital media technologies in school design is changing how architects work with administrators and stakeholders. Two-dimensional, fixed-view renderings are making way for 3D computer modeling and virtual reality. Design options, color palettes, and materials and finishes are viewed virtually early in the process. The result is greater satisfaction with the final design.

## ENGAGED COMMUNICATION

In education, transparent communication is essential. When a school district seeks community input on a bond referendum, virtual images give voters an immediate understanding of the proposed projects. Posting a 3D model of a project online for public comment brings immediate transparency and inclusiveness to the process.

There are pitfalls to watch for, however. Stakeholders may love the design, but 3D embellishments introduced to make models “pop” may lead to cost creep in added features, materials, or finishes. Thankfully, integrative software can help quantify components to control costs. In the case of renovation or alteration projects, surveys that use drones can ensure accurate cost estimates through mapping and virtual documentation of existing features and components.

## TOOLS ON THE MARKET

Available tools include software

and hardware for 3D modeling, virtual walk-throughs, environmental and sustainable design analysis (e.g., daylighting and energy calculations), actual-scale virtual reality (VR) via eyewear, site contour development, building information modeling (BIM), drone technology, and holographic imaging platforms.

Drones make possible high-resolution aerial imaging of site elements and adjacent structures so design creations fit within the exact context of the location. Drones also aid construction by viewing overall progress of the project and conducting special inspections in hard-to-reach areas.

BIM software serves as an information hub for administrators and facilities personnel during design and construction. It provides a valuable resource for ongoing building maintenance. BIM is used for:

- **Site logistics.** Helps determine site constraints, equipment needs, and best methods for routing and phasing.
- **Constructability.** Breaks down the model into sequences for best construction methods and identifying potential issues.
- **4D modeling.** Analyzes schedules against the model (i.e., visuals clarify keys to staying on schedule) and ensures team accountability.
- **Planning.** Helps the team visualize and address issues.
- **Coordination.** Coordinates construction with mechanical and



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electrical contractors to identify issues and reduce costs.

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## THE FUTURE

What will the future bring in digital media technologies to design and communicate more effectively? In many respects, the future is already here. Virtual walkthroughs now are enhanced through goggles or glasses so the user and space are scaled for a real-life experience. New developments are underway that incorporate all five senses, and applications are in the works to perfect holographic imagery.

A new world is emerging with digital media technologies. We're on the cusp of major changes that will transform what tomorrow's school designs look like. Get on board, and start using these tools to design your school to enhance student learning! ■

## BIO

**Paul W. Erickson**, AIA/NCARB/REFP, is past president of AT&R Planners/Architects/Engineers, a Minneapolis, Minn., firm specializing in preK-12 and post-secondary planning and design. Erickson has specialized for more than 40 years in school planning, design, and construction. He can be reached at perickson@atsr.com. For more information about this article, visit [www.atsr.com](http://www.atsr.com).



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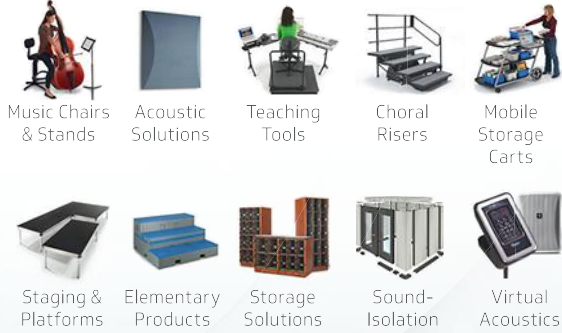
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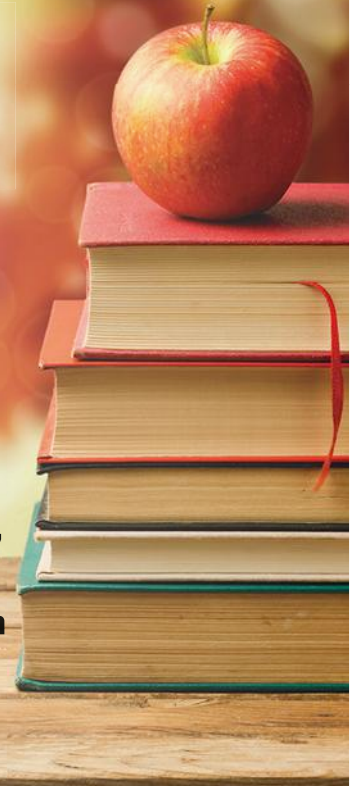


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## BENEFIT OF THE DOUBT

**T**HE Los Angeles Unified School Board has voted to end random searches of students with metal-detector wands.

The Los Angeles Daily News reports that the 4-3 vote will bring to an end a 26-year policy and came after an emotional discussion about how to keep the district's 600-plus campuses safe in an era of recurrent gun violence.

The board also directed Superintendent Austin Beutner to work with community groups to develop an alternative.

Civil rights advocates have long argued that the random searches distract from instruction time and make young people in schools feel like criminals.

"Administrative random searches are incredibly invasive, dehumanizing and communicate to students that they are viewed not as promising minds but as criminals," Board Member Tyler Okeke said. "Los Angeles Unified must find alternatives to this practice that foster an inclusive, welcoming academic environment that values each student at every school."

The district's wandering policy is carried out at all middle and high schools by campus administrators.

The district began requiring random metal-detector



Photo courtesy of the Los Angeles Unified School District.

searches to look for weapons in the wake of an incident in 1992, when a gun hidden in a student's backpack accidentally killed a 16-year-old at Fairfax High School.

Random searches were supposed to be carried out at various hours of the day in a "specific, unbiased pattern," but opponents allege the searches tend to unfairly target students of color, especially black students.

A coalition of civil rights groups led by the American Civil Liberties Union formed a coalition in 2015 with United Teachers Los Angeles to oppose the policy.

Opponents of the searches say data given to them by the district shows that few if any guns are retrieved as a result of random searches. Others, however, argue that such numbers show the policy's effectiveness as a deterrent.

## FRIED CHICKEN

**A**UBURN University's National Poultry Technology Center (NPTC) and Tyson Foods have opened the largest stand-alone solar-powered poultry house to be operated completely off the grid.

The university says the 54-foot-by-500-foot poultry house is in Cullman County, Ala., and is capable of housing 36,000 broilers.

It will be one of two identical houses on a farm where 5.50-pound broilers will be grown. One house will be the control house while the other will be operated exclusively by solar power, also known as Stand-Alone Solar for Poultry (SASP).

"Auburn University's NPTC will work closely with Tyson Foods and Southern Solar Systems to provide leadership in the application of solar power technology to broiler production houses," says Paul Patterson, dean of Auburn's College of Agriculture. "The research will provide important, new information on how solar power technology can improve environmental sustainability and profits for farmers."

On-site researchers will compare its energy use



Photo courtesy of Auburn University's National Poultry Technology Center.

over a 12-month cycle with the normal operation of the twin house next door.

The data and insights gleaned from this project will help identify sustainable practices and new forms of energy for the poultry industry.

"Electricity drives all functions in poultry houses and is the largest variable cost for poultry farmers," says Dennis Brothers, extension specialist with NPTC. "We believe this new system may reduce costs for farmers while increasing efficiency." ■

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